BAY STATE WIND LLC PROPOSAL FOR

LONG-TERM CONTRACTS FOR OFFSHORE WIND ENERGY PROJECTS

800 MW WITH A PROJECT-SPECIFIC GENERATOR LEAD LINE

DECEMBER 20, 2017

Submitted to

Massachusetts Department of Energy Resources and the Electric Distribution Companies

Prepared by

Bay State Wind LLC

Bay State Wind
An Ørsted & Eversource Initiative

Bay State Wind

Ørsted

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EVERSOURCE

Bay State Wind at a glance

25 miles
off the Massachusetts South Coast.

30 MW
battery storage solution, larger than any other pairing with offshore wind in the world today.

400 MW
installation using the very latest in offshore energy technology.

175,000
is the number of cars that would need to be removed from the road to equal the greenhouse gas reductions from Bay State Wind.

Over 850
annual jobs created during construction.

Over 7,900
direct and indirect jobs over the life of the project.

250,000
homes in Massachusetts will be supplied with clean, reliable and stable-priced power.

$700 million
direct investment in the commonwealth.

$8.75 million
to support the commonwealth's cornerstone programs for low income families.

$30 million
in lease payments, fees and taxes to support local government functions over the operational lifespan.

$150 million
estimated annual winter price reduction benefits.

Bringing home the promise of offshore wind

- Positions Massachusetts at the forefront of the United States' emerging offshore wind industry
- High quality, high skilled jobs for the new green energy economy, launched right here in Massachusetts
- A clean and reliable energy source powered by Massachusetts' world-class offshore wind resource
- Long-term investment in Massachusetts ports and harbors

Bay State Wind is the strongest, most dependable and experienced partner to help Massachusetts realize these opportunities.

Project benefits

Increasing and diversifying energy supply

- Dramatically advances the commonwealth's use of carbon-free renewable energy
- Reduces electricity price spikes that hit communities and businesses hardest during peak winter usage

Consumer benefits

- Bay State Wind will generate over will generate over $700 million in energy consumer savings over the project's lifetime

Enhances energy reliability and resilience

- Delivers power directly to high-demand areas in Massachusetts, relieving constraints on the grid
- State-of-the art battery storage system to meet peak consumer demand

Economy-wide benefits

- Bay State Wind will invest over $500 million in the local Massachusetts economy, creating a much-needed economic shot in the arm for areas like New Bedford and Fall River
- These investments in turn get "recycled" through the Massachusetts economy, generating another $1 billion in added value

Why Bay State Wind?

Bay State Wind brings together a formidable partnership of two large energy companies with one common goal, to ensure the high-quality delivery of the power of offshore wind to Massachusetts.

In Eversource, you have more than a century of local New England knowledge and unparalleled experience building and operating electrical transmission systems. In Ørsted, you get unrivaled industry expertise and the experience of delivering the most technologically advanced offshore wind farms at the lowest cost to consumers.

Our intention is simple, to guarantee that Massachusetts successfully delivers one of the largest offshore wind farms in the US and becomes the North American hub for the offshore wind industry. We will do this by delivering for consumers, workers, businesses, the environment and the commonwealth. Our corporate goals are completely aligned with the policy objectives of Massachusetts and we welcome the responsibility in delivering them.

This is our passion; this is what we do.

Ørsted

About Ørsted

Ørsted is the world's leading offshore wind developer, responsible for constructing nearly a quarter of the world's installed offshore wind capacity. Based in Denmark, it has chosen to base its North American headquarters in Boston and is recognized as the leader in offshore wind in the US market. It operates across the US, Europe and Asia, and brings immense experience of constructing and operating offshore wind farms in even the most challenging of conditions.

Ørsted has worked positively with government and partner companies to undertake the ongoing construction of the world's largest 2,600 MW offshore wind installation off England's east coast, establishing the area as Europe's leading center for offshore wind production and manufacturing.

EVERSOURCE

About Eversource

Headquartered in Boston, Massachusetts and Hartford, Connecticut, Eversource is a Fortune 500 company and New England's leading electric transmission builder.

The company employs around 8,500 people. It has planned, designed and delivered over $2.8 billion worth of major electricity transmission upgrades in Massachusetts over the past decade. Eversource has more than a 100-year history of operation in Massachusetts and actively supports 191 Massachusetts communities it serves. Eversource works tirelessly to support the energy efficiency, carbon reduction and renewable energy goals of the commonwealth.

Ørsted by numbers:

- Built the worlds first offshore wind farm in 1991
- 23 offshore wind farms constructed with 3.8 GW capacty
- 7 offshore wind farms under construction equaling 5 GW
- 8.8 GW total offshore wind capacity by 2022
- Over 2,200 employees dedicated to designing, building and operating offshore wind power
- Built largest offshore wind farm to date and is currently developing what will be the world's largest at 2.6 GW
- Global offshore wind leader with a pipeline of projects totaling 10 GW

The Bay State Wind advantage

A partner for the long haul
Bay State Wind will construct, own and operate the offshore wind farm throughout its lifetime. We are committed to Massachusetts for the long haul and spreading the benefits of our projects into the local community.

Strength of supply chain
Ørsted is leveraging its market-leading global position and US project pipeline to give suppliers greater certainty in making long-term decisions to invest in the commonwealth and the US, resulting in a major boost to the local economy.

Knowledge of New England's electrical system
Bay State Wind will utilize the deep knowledge of its partners to deliver offshore wind power into the electrical system, serving Massachusetts as efficiently as possible. Ørsted's extensive experience with undersea electricity transmission systems will ensure the maximum amount of clean energy is delivered to shore. Eversource's sophisticated understanding of New England's electrical grid will enable Bay State Wind's clean energy to be delivered to Massachusetts consumers efficiently and effectively.

Financial capacity
Backed by Eversource and Ørsted, Bay State Wind has unbeatable financial strength. In 2016, combined assets exceeded $50 billion and combined annual cash flows totaled almost $4 billion. Crucially, the partnership will be able to construct this offshore wind farm without the need to bring in other financial partners.

Record of environmental stewardship
Ørsted began life as Danish Oil and Natural Gas. Since that time, the company has increasingly moved into renewable energy as the world and the company's values have changed. We recently changed our name to Ørsted to reflect our move towards 100% renewable energy. Eversource is focused on being a catalyst for clean energy development in New England. It allocates 7 percent of its annual revenues – or more than $500 million annually – to energy efficiency programs for its nearly 4 million customers. Its energy efficiency programs have been consistently ranked number one in the country.

We are skilled at undertaking complex infrastructure projects in sensitive locations and are the only developer with a marine biologist on staff who has a focus on protection of the North Atlantic Whale.

Case Study
Ørsted is in the process of constructing the world's largest offshore wind farm off the east coast of England, an area with an historic fishing industry similar to Massachusetts. Ørsted has been dedicated to constructive engagement with the Holderness Fishing Industry Group (HIFG) in the local area.

> HFIG has sought to work with various other sea users. Of these, by far the most positive response has come from Ørsted, which has collaborated with us on a study of the ecological effects of the construction and operation of the Westermost Rough wind farm. The wind farm study is the first of its kind to be conducted anywhere in the world and is proving to be of significant value in assuaging fishermen's concerns about offshore wind development.

Mike Cohen, CEO of HFIG and Chairman of the National Federation of Fishermen's Organization

Delivering one of the World's most advanced offshore wind farms

Bay State Wind has acquired a lease for a site located 25 miles offshore of Massachusetts – a significant distance away from the south coast and residential communities.

The proposal is to build a state-of-the-art, 400 MW installation using the very latest in offshore energy technology. If built today, Bay State Wind would be the largest offshore wind farm in the US – a scale that the project team behind Bay State Wind has the expertise and proven track record to deliver.

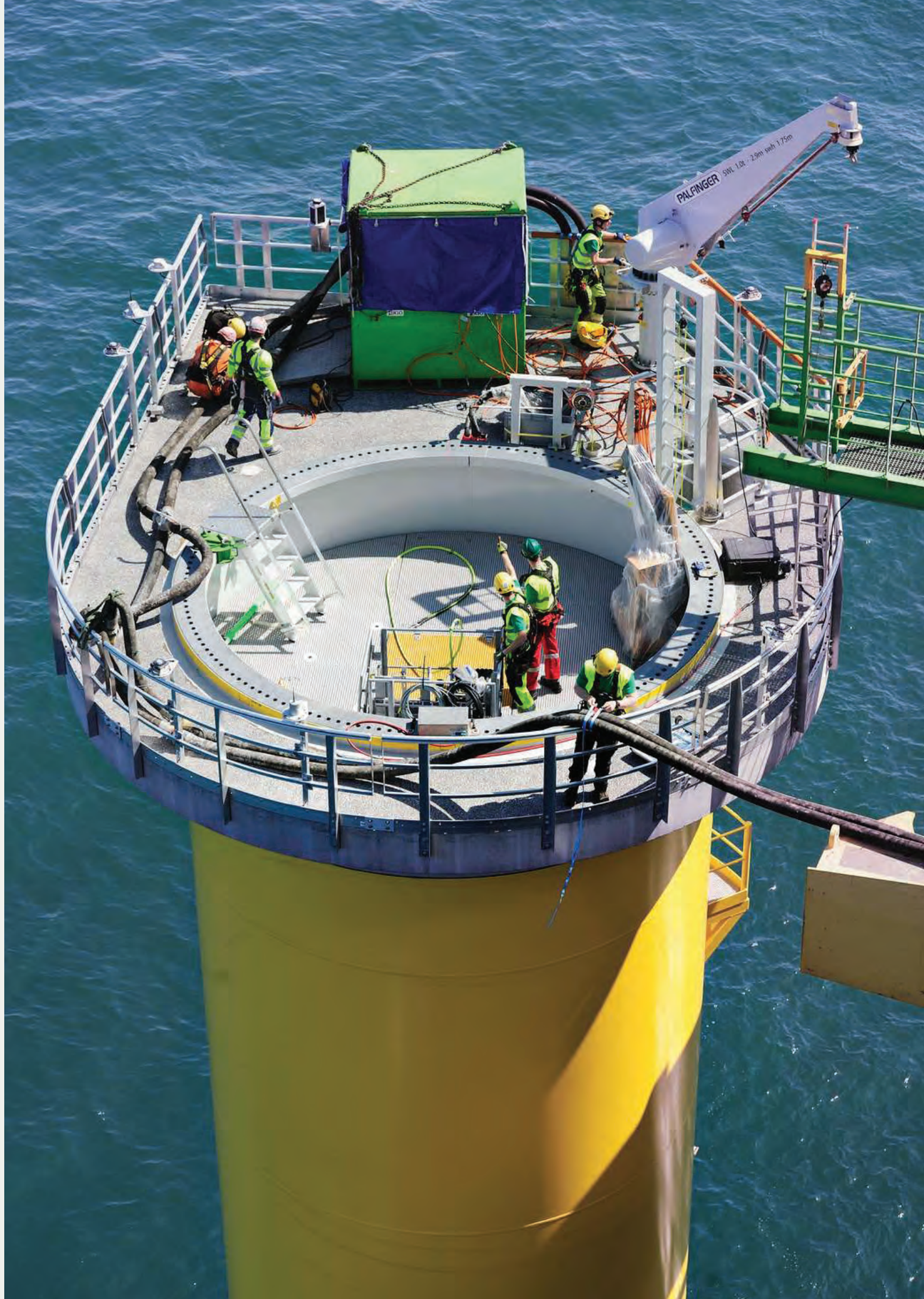
The benefits of this project will be significant to Massachusetts:

- Only this scale of development can genuinely deliver on the policy goal of Massachusetts to become the hub of the offshore wind industry in North America
- A project of this scale delivers maximum impact for the supply chain, jobs and state and local tax revenues
- Helps to achieve genuine diversification of energy supply, helping to avoid price hikes for customers

The World's largest offshore wind farm battery storage capability
Bay State Wind is planning to support the project by developing the biggest battery storage system ever deployed in conjunction with a wind farm, helping to ensure power is available during peak hours when it is needed most.

Transmission
Bay State Wind will leverage its world-leading technical expertise in building offshore and onshore electricity transmission.

Staging area
New Bedford will serve as the operations and maintenance center for Bay State Wind. This development will deliver a significant economic boost and create new jobs in the area.



Project benefits

Increasing and diversifying energy supply
The 400 MW offshore wind farm proposed by Bay State Wind will dramatically advance the commonwealth's utilization of carbon-free energy resources. And by diversifying the commonwealth's energy supply, Bay State Wind will help dampen volatile electricity prices that often-hit communities and businesses during the hard winter periods.

Consumer benefits
Electricity customers in Massachusetts benefit in two key ways:

- Savings on annual electricity bills
- The most cost-effective offshore wind proposal

Analysis conducted by Levitan and Associates for Bay State Wind estimated that Massachusetts consumers could save up to $150 million per year on their winter electricity bills through the Bay State Wind project.

Bay State Wind will leverage the expertise and financial strength of its partners, as well as the benefits of economies of scale, to deliver its many benefits to consumers at a materially lower price than any offshore wind resource contracted in the US to date.

Clean energy benefits
Bay State Wind will realize the commonwealth's clean energy goals established by the landmark Act to Promote Energy Diversity passed by the commonwealth of Massachusetts in 2016, building the foundations for a new industry that will grow and is expected to deliver a significant portion of energy for the US in the future, replacing carbon based generation. We want Bay State Wind and Massachusetts to be the catalyst for change.

Enhance electricity reliability
By capturing New England's powerful offshore wind resource through the most advanced generation, transmission and storage technologies, Bay State Wind will deliver a steady stream of carbon-free power to Massachusetts, significantly improving the reliability of the commonwealth's energy supply during peak winter periods.

Other community benefits

Bay State Wind is committed to spreading the benefit of its proposed ambitious partnership with the Commonwealth of Massachusetts throughout the communities it will serve.

Skills and training
We have entered into a Memorandum of Understanding with the **Massachusetts Maritime Academy** to financially support scholarships, which offers students from under-represented communities the opportunity of careers in the maritime industries.

We have also entered into a Memorandum of Understanding with **Bristol Community College** (conditioned upon award) to provide 1 million dollars for the Bay State Wind Faculty Endowment that will provide funding for five years for a professor that will focus on offshore wind training and curriculum.

Help with energy bills for low-income households
Bay State Wind has struck landmark agreements with four of Massachusetts' leading **Community Action Agencies** to help low-income families with their energy bills. Bay State Wind will contribute up to $8.75 million over the life of the project to help to alleviate the energy burden on low income households and make low-income homes more energy efficient.

Collaborative research and initiatives
Conditional upon award, Bay State Wind will implement a portfolio of collaborative research and programmatic initiatives for the protection of New England's fisheries and whale populations, including:

- **Woods Hole Oceanography Institute**
  $500,000, multi-year grant for the development of advanced whale detection systems
- **New England Aquarium Right Whale Project**
  $500,000 grant, in collaboration with Massachusetts Lobstermen's Association and others, to improve the right whale population status through prevention of gear entanglement
- **Whale Alert Project**
  $25,000 annual grant for the refinement of the Whale Alert System to prevent lethal ship strikes
- **Mitigation and Monitoring Advisory Panel**
  Bay State Wind will develop a panel that includes right whale specialists, acousticians and environmental representation to provide input for a mitigation and monitoring plan
- **Center for Coastal Studies**
  $5,000 annual grant (up to 5 years) for the Marine Debris Program to promote marine waste reduction and recycling initiatives
- **National Ocean Science Bowl/Blue Lobster Bowl**
  $5,000 annual grant (up to 5 years) to support the highly-regarded high school Ocean Science Education Program and encourage students to enter into the renewable energy field

Launching a new American industry right here in Massachusetts

Through our detailed and ambitious ports and supply chain strategy, Bay State Wind will deliver high skilled, high paying jobs to Massachusetts. With strong vendor relationships stretching back over 20 years, we are perfectly placed to deliver new jobs through suppliers across Massachusetts.

New Bedford
New Bedford is one of our preferred staging areas for construction, as well as the operations and maintenance base throughout the lifetime of the wind farm.

Somerset
Bay State Wind's offshore wind power will make landfall at Somerset. Where the electricity transmission cable comes onshore, Bay State Wind will build a new electrical substation as well as an advanced technology energy storage system. Local construction jobs will be spurred during development as well as local property tax revenues that will continue throughout the project's life.

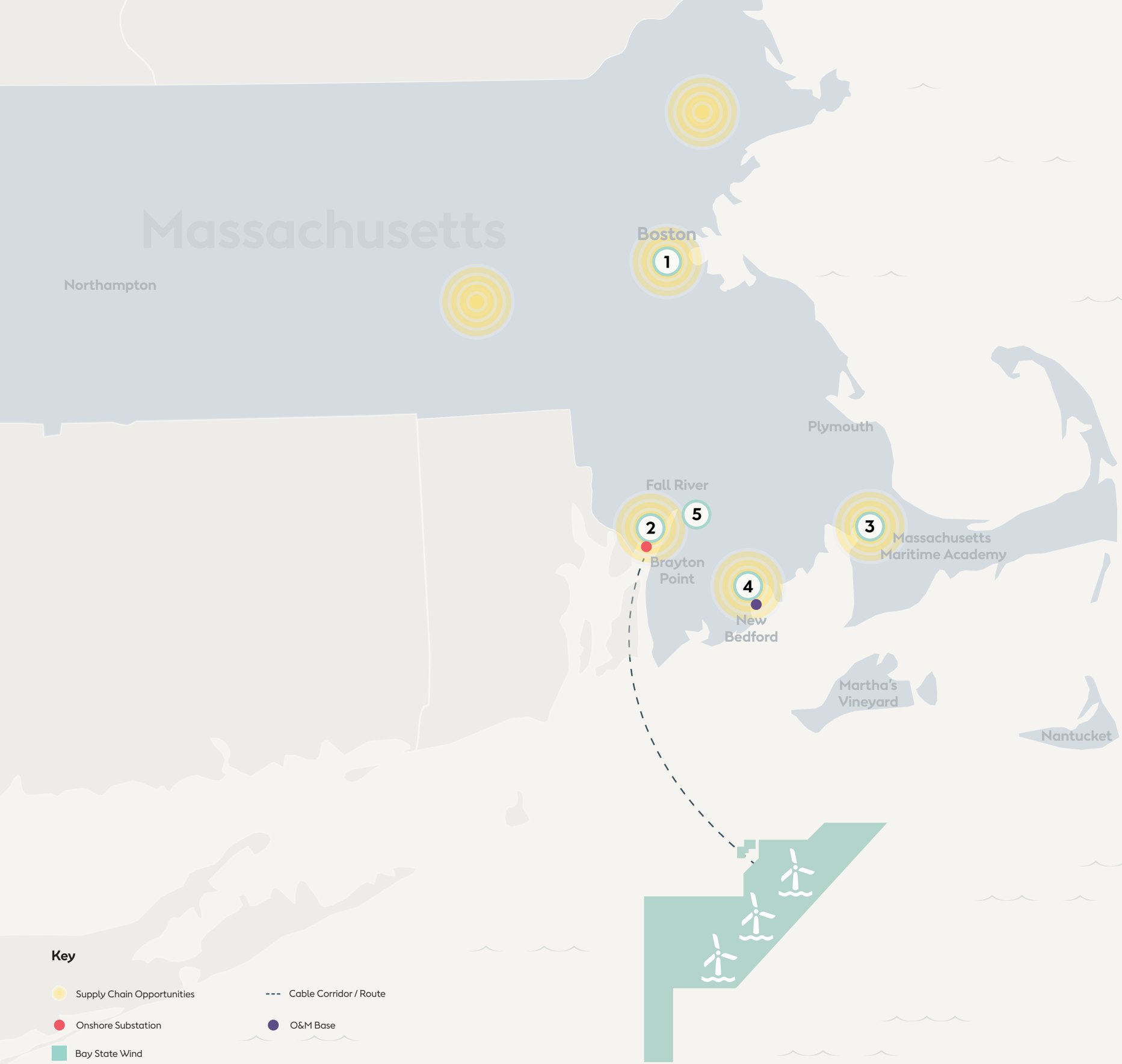
Additionally, Bay State Wind is exploring with a major supplier the potential for Brayton Point to become the home of a new multi-million-dollar manufacturing facility for the fabrication of steel towers.

Supporting the Massachusetts economy
We will look to work with several advanced manufacturing firms with significant operations within Massachusetts.

Work will include:

- Manufacturing of the offshore substation components
- Construction and deployment of the flagship battery storage system
- Manufacturing of secondary steel parts associated with the transition piece
- Fabrication of steel towers

" Bay State Wind will deliver high skilled, high paying jobs.



1) Boston and Boston Harbor

- Location of Ørsted (North America) and Eversource headquarters
- The Bay State Wind project and procurement will be managed from here
- Preferred site for the outfitting and painting of transition pieces

2) Brayton Point

- Landfall of the export cable
- Onshore project substation
- Grid connection
- Deployment of the battery storage facility
- Potential site for manufacture of steel towers

3) Massachusetts Maritime Academy

- Global Wind Organization (GWO) certified training
- Transition pieces mock-up donated by Bay State Wind

4) New Bedford

- Potential site for wind turbine or foundation pre-assembly and load-out point
- Operations and maintenance base
- Fuelling point for project, maintenance and transportation vessels
- Bay State Wind pproject office where health, safety and environmental teams will be based

5) Fall River

- Potential site for the outfitting and painting of transition pieces
- Potential site for various staging needed during construction

baystatewind.com

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View our short film at baystatewind.com

All graphics in this document are for illustrative purposes.
Dates are based on available information and are subject to change.

Cover image: New Bedford Harbor, MA

Bay State Wind
An Ørsted & Eversource Initiative

LONG-TERM CONTRACTS FOR AN 800 MW OFFSHORE WIND ENERGY PROJECT WITH A GENERATOR LEAD LINE

Prepared for

Fitchburg Gas & Electric Light Company d/b/a Unitil
Massachusetts Electric Company d/b/a National Grid
Nantucket Electric Company d/b/a National Grid
NSTAR Electric Company d/b/a Eversource Energy
Western Massachusetts Electric Company d/b/a Eversource Energy
(collectively, the "EDCs")

and

Massachusetts Department of Energy Resources

December 20, 2017

Submitted by

Bay State Wind
An Ørsted & Eversource Initiative

Portions of this Proposal contain confidential, proprietary, and/or commercially sensitive information, and which accordingly have been redacted from the "Public Version" of this Proposal. Bay State Wind LLC has submitted a Confidential/Privileged Version of this Proposal which includes the redacted information, and which should be treated as a non-public record that is exempt from disclosure pursuant to applicable laws or as expressly set forth in the Request for Proposals.

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Acronyms and Abbreviations

ABCD	Action for Boston Community Development
AC	alternating current
Action	Action Inc.
AEP	Annual Energy Production
AFUDC	allowance for funds used during construction
aMSL	above mean sea level
ASIT	Air-Sea Interaction Tower
AWEA	American Wind Energy Association
Bay State Wind	Bay State Wind LLC
BCC	Bristol Community College
Bid	this response to the RFP
Bidder	Bay State Wind LLC
BOEM	Bureau of Ocean Management
BUAR	Massachusetts Board of Underwater Archaeological Resources
CBP	U.S. Customs and Border Protection
CEII	Critical Energy/Electric Infrastructure Information
CFR	Code of Federal Regulations
COP	Construction and Operations Plan
CT DEEP	CT Department of Energy and Environmental Protection
CT	Connecticut
CSC	CT Siting Council
CTV	Crew Transfer Vessel
DOB	Depth of Burial
DOE	U.S. Department of Energy
DOER	Massachusetts Department of Energy Resources
DP2	dynamic positioning
DPU	Massachusetts Department of Public Utilities
EDC	The Electric Distribution Companies listed on the cover page to this proposal
EIA	Environmental Impact Statement
EIR	Environmental Impact Report
EIS	Environmental Impact Statement

EPC	Engineering, Procurement, Construction
ESA	Endangered Species Act
ESG	Environmental, Social, and Governance
ESI	Eversource Investment, LLC, an Owner of Bidder
ETS	Expandable Transmission System
Eversource	Eversource Energy, the corporate parent of ESI
FCM	Forward Capacity Market
FCP	Fisheries' Communication Plan
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIR	Fishing Industry Representative
FLiDAR	floating light detection and ranging
FLO	Fisheries Liaison Officer
FONSI	Finding of No Significant Impact
GHG	greenhouse gas emissions
GIS	generation information system
GLL	Generator Lead Line
GW	gigawatt
GWh	gigawatt-hours
GWO	Global Wind Organization
GWSA	Global Warming Solutions Act
HSE	Health, Safety, and Environment
HV	high voltage
Hz	hertz
IBEW	International Brotherhood of Electrical Workers
IEC	International Electrotechnical Commission
ISO-NE	ISO New England
ITC	Investment Tax Credit
km	kilometer
kV	kilovolt
kW	kilowatt
LAI	Levitan and Associates, Inc.
LEAN	Low Income Energy Affordability Network

LGIA	Large Generator Interconnection Agreement
LGIP	Large Generator Interconnection Procedures
LiDAR	light detection and ranging
LIHEAP	Low Income Heating Assistance Program
LMP	locational marginal price
m	meter
M.G.L.	Massachusetts General Laws
m/s	meter per second
MADEP	Massachusetts Department of Environmental Protection
Mass CEC	Massachusetts Clean Energy Center
MCA	Maritime and Coast Guard Agency (United Kingdom)
MEPA	Massachusetts Environmental Policy Act
MHC	Massachusetts Historical Commission
MMA	Massachusetts Maritime Academy
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MP	MP
MRP	Massachusetts Research Partnership
MVA	megavolt-amps
MVAr	megavolt-amps (reactive)
MW	megawatt
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standards
NCLC	National Consumer Law Center
[redacted]	[redacted]
NEPA	National Environmental Policy Act
NEPOOL	New England Power Pool
NERC	North American Electric Reliability Corporation
NHESP	Natural Heritage and Endangered Species Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Power Coordinating Council
NPT	Northern Pass Transmission

NSRA	Navigational Safety Risk Assessment
O&M	operations and maintenance
OATT	Open Access Transmission Tariff
OCS	Outer Continental Shelf
OEM	original equipment manufacturer
OFTO	Offshore Transmission Owner
OnSS	onshore substation
Ørsted	Ørsted A/S, the corporate parent of Ørsted NA
Ørsted NA	Ørsted North America Inc., an Owner of Bidder
OSS	offshore substation
Owners	Ørsted NA and ESI, the 50/50 owners of Bidder
PACE	People Acting in Community Endeavors
PNOI	preliminary non-binding overlap impact
POI	Point of Interconnection
PPA	Power Purchase Agreement
PTF	Pool Transmission Facilities
[redacted]	[redacted]
REC	Renewable Energy Certificate
RFP	Request for Proposal
RIDEM	Rhode Island Department of Environmental Management
RI HPHC	Rhode Island Historical Preservation & Heritage Commission
[redacted]	[redacted]
SAP	Site Assessment Plan
SCADA	Supervisory control and data acquisition
SEC	Site Evaluation Committee
SEMA/RI	Southern Massachusetts and Rhode Island
SHPO	State Historic Preservation Office
SOV	Service Operating Vessel
SSCAC	South Shore Community Action Council
STATCOM	Static Synchronous Compensator
SWA	Service and Warranty Agreement
TBA	time-based availability
TP	transition piece

TSS	Traffic Separation Scheme
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
WAP	Weatherization Assistance Program
WHOI	Woods Hole Oceanographic Institute
WTG	wind turbine generator
XLPE	cross-linked polyethylene

Confidentiality Statement

Portions of this Proposal contain confidential, proprietary, and/or commercially sensitive information, and which accordingly have been redacted from the "Public Version" of this Proposal. Bay State Wind LLC has submitted a Confidential/Privileged Version of this Proposal which includes the redacted information, and which should be treated as a non-public record that is exempt from disclosure to the maximum extent permissible under applicable laws and as expressly set forth in the Request for Proposals.

1. CERTIFICATION, PROJECT AND PRICING DATA (CPPD FORM)

The Certification, Project and Pricing Data ("CPPD") document is a Microsoft Excel workbook that is provided on the website at www.MACleanEnergy.com.

Please see Attachment 1-1 for CPPD form.

2. EXECUTIVE SUMMARY OF THE PROPOSAL

The bidder is required to provide an executive summary of the project proposal that includes a complete description of the proposed generation and/or transmission bid, the proposed contract term and pricing schedule, and other factors the bidder deems to be important. Expandable Transmission proposals must provide the information requested below for each phase of the expansion and identify all incremental equipment and incremental costs associated with the expandable nature of the plan.

Bay State Wind LLC (Bay State Wind, the Bidder), a 50/50 joint venture between Ørsted North America Inc. (Ørsted NA) and Eversource Investment, LLC (ESI) (collectively "Owners")[1], is proud to propose the Bay State Wind Project (the Project), a first-of-its kind U.S. utility-scale offshore wind farm located approximately 25 miles (40 kilometers [km]) off the south coast of Massachusetts. **The Project will provide 800 megawatts (MW) of clean, reliable offshore wind energy to the Commonwealth of Massachusetts at the lowest possible cost, maximizing long-term economic and environmental benefits.**

This Bid consists of state-of-the-art wind turbine generators (WTG), associated inter-array cabling, an onshore substation (OnSS) and offshore substation (OSS), export cables, a battery energy storage system, and onshore works for grid connection to the ISO New England (ISO-NE) electric grid. The individual wind turbine size, total number of WTGs, and other aspects of the Project, may change in order to reflect the latest developments in technology and to optimize Project cost and performance prior to final permitting and construction.

The Project includes optionality for either a generator lead line (GLL) or expandable transmission system (ETS), as required in Section 2.2.1.3 of the RFP, the latter of which could [redacted] provide up to 1,600 MW of transmission capacity. This Bid presents the GLL solution.

The Project can offer this clean power to the Commonwealth at [redacted] for power and RECs. [redacted]

Key Project parameters are detailed in Table 2.1.

[1] Ørsted NA is an indirect wholly-owned subsidiary of Ørsted (Ørsted). ESI is an indirect wholly-owned subsidiary of Eversource Energy (Eversource).

Table 2.1 Key Project Parameters

Project Size	800 MW
Location (Site Control)	Bureau of Ocean Management (BOEM) Lease OCS-A 0500
Generator Lead	1 X 800 MW OSS with [redacted] subsea cables
Storage System	55 MW/110 megawatt-hour (MWh) (2 hour discharge)
Products Offered	Energy and Renewable Energy Credits
Point of Interconnection (POI)	Brayton Point, Massachusetts
Price (power and RECs)	[redacted]
Term	20 years; [redacted]
Qualified Capacity (expected) – Summer	[redacted]
Qualified Capacity (expected) – Winter	[redacted]
O&M and Construction Base	New Bedford, Massachusetts
Commercial Operation	[redacted]

2.1 Bay State Wind – Bringing Home the Promise of Offshore Wind

Ørsted and Eversource are proud to propose the Bay State Wind Project (the Project), a first-of-its kind U.S. utility-scale offshore wind farm located approximately 25 miles (40 km) off the south coast of Massachusetts. The Project will provide 800 MW of clean, reliable offshore wind energy to the Commonwealth of Massachusetts at the lowest possible cost, maximizing long-term economic and environmental benefits. The Bidder is a 50/50 joint venture that brings together world-leading offshore wind generation and transmission development, operational experience and regional knowledge of electricity markets. The resulting collaboration will dependably deliver offshore wind to the Massachusetts market at the lowest cost to consumers.

[redacted] Key Project Benefits

- [redacted] in net lifetime economic benefits
- [redacted] million short tons of greenhouse gas emissions avoided over the 20-year contract period
- **$300+** million annual reduction in winter prices
- **1,250** construction jobs and [redacted] permanent O&M jobs
- **10,853** indirect jobs created
- Over **$500** million in total direct investment in the Commonwealth
- **$17.5** million in total contributions to low income programs

Entering into a long-term contract with the Bidder's project is a cost-effective strategy for the Massachusetts Electric Distribution Companies (EDCs) and the Commonwealth to pursue. The Project will:

- **Enhance electric reliability** by capturing New England's powerful and consistent offshore wind resource through the most advanced generation and transmission technology, providing much needed electricity supply directly into the constrained Southern Massachusetts and Rhode Island (SEMA/RI) load zone.
- **Contribute to reductions in winter price spikes** by providing additional energy and capacity where and when the resource is needed most through industry-leading high load factor generation integrated with a significant storage system that will deliver during periods of highest demand.

- **Be cost-effective to ratepayers** by delivering multiple benefit streams to ratepayers at a materially lower price than any offshore wind resource contracted in the U.S. to date.
- **Mitigate transmission costs** by interconnecting at one of the most robust points on the Southern New England grid and optimizing the design and utilization of the offshore and onshore delivery systems; and holding ratepayers harmless for any cost overruns.
- **Ensure project viability** by deploying the Bidder's combined team to overcome the complexities and challenges that have stymied previous efforts to develop offshore wind, and to meet the Commonwealth's energy cost, system reliability and greenhouse gas reduction challenges in the most aggressive and responsible timeframe possible.
- **Promote energy storage systems** by deploying the U.S.'s largest battery storage system ever to be paired with offshore wind; and by selecting one of [redacted] emerging advanced technology companies as the Preferred Option for this showcase project.
- **Mitigate environmental impacts** by adding a significant new emissions-free resource to New England's generation mix and making a significant down-payment towards the Commonwealth's Global Warming Solutions Act (GWSA) targets. Further, the Project will leverage the many proprietary techniques and lessons learned in developing its portfolio of European projects to avoid, minimize and mitigate any harm to New England's indigenous wildlife and social resources. As well, Bidder is making a major financial commitment to the leading research, educational and advocacy organizations for implementation of strategies to protect and enhance New England's whale populations.
- **Create and foster economic development in the region** through a multi-faceted, long-term supply chain strategy that includes: 1) maximizing use of [redacted] for construction and operations and maintenance (O&M) activity; 2) development of the first Jones Act-compliant installation and transportation vessels, which will allow greater utilization of [redacted] 3) procuring products and services through [redacted] to the greatest extent possible; 4) leveraging Ørsted's considerable pipeline and buying power to attract leading offshore wind component manufacturers to locate [redacted]; 5) repurposing underutilized properties for development of onshore project elements (i.e., substation, battery storage); and 6) supporting training and certification programs for offshore workers.
- **Provide relief to low income ratepayers** including tens of thousands of households in Massachusetts through a partnership with the state's leading community action agencies. The Bidder will specifically support two programs – the Low Income Heating

> ***"New England is setting the pace for a national clean energy future with its proven track record in energy efficiency and bold clean energy goals. Our partnership with Ørsted on Bay State Wind represents a significant opportunity to help make those goals a reality and we look forward to delivering this renewable and reliable source of power to customers."***
>
> **Jim Judge, Chairman, President, and CEO of Eversource Energy**

Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP) – which offer bill payment relief and implementation of a portfolio of energy efficiency services designed to reduce overall home energy consumption for low income customers.

A more detailed matrix of how the Bidder's proposal satisfies the threshold bidder eligibility requirements (Section 2.2.1 of the RFP) and RFP review criteria (Section 2.2.2 of the RFP) is provided as Attachment 2-1.

2.2 Why Bay State Wind?

With issuance of its *Request for Proposals for Long-Term Contracts for Offshore Wind Energy Projects* (RFP), Massachusetts has pushed itself to the forefront of the offshore wind industry in the U.S., with the opportunity for the Commonwealth to garner a first mover advantage. With this RFP, the Commonwealth stands poised to capture the significant energy, environmental and economic rewards that development of a locally-based offshore wind generation hub can deliver. The Commonwealth is well positioned for this leadership role – an excellent wind resource, strong maritime tradition and ports infrastructure, supportive academic institutions, a skilled workforce, and enlightened political leadership and progressive energy policies are among Massachusetts' most compelling competitive advantages.

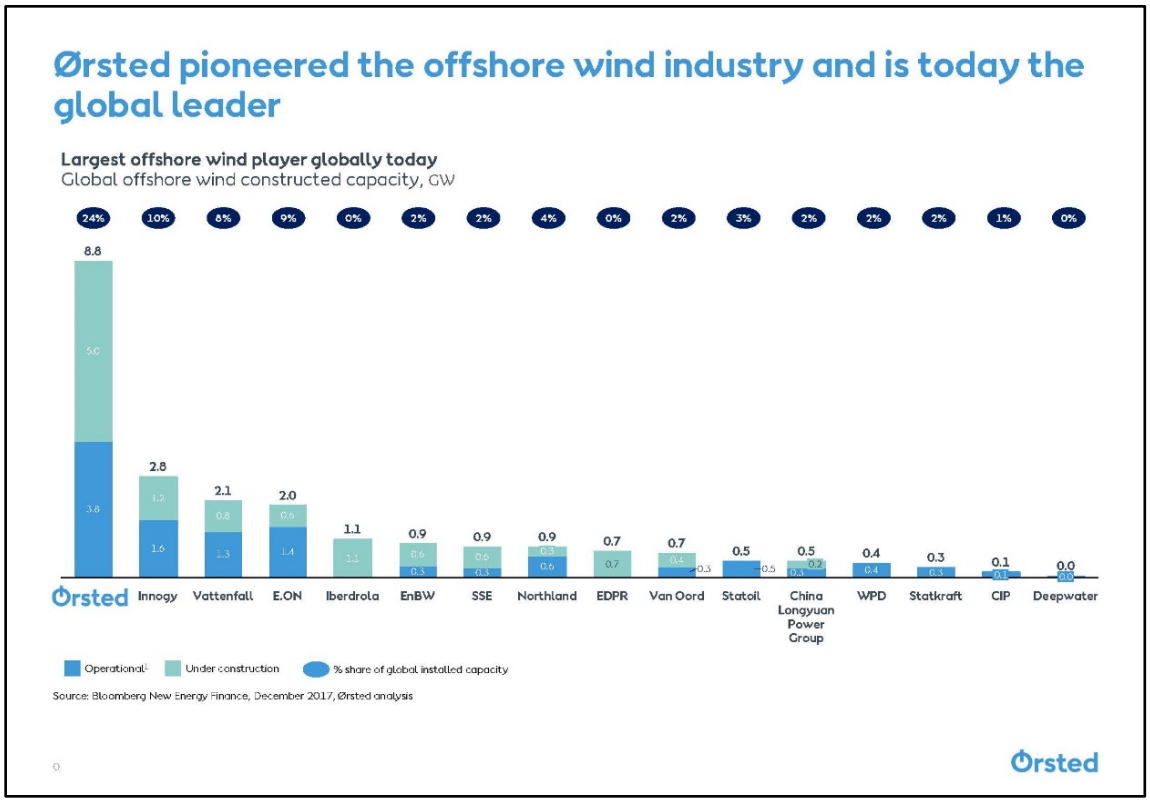
Massachusetts has positioned itself to be on the forefront of advanced technological development and scientific research. A successful U.S. launch of this global industry – and establishing the Commonwealth's central place in it - will hinge on the results of this RFP and on who the Commonwealth chooses as its partner in the all-important initial phase of this journey. Bay State Wind is the unquestioned choice – Ørsted and Eversource together possessing the requisite ***experience, skills, financial strength, and capacity*** to deliver on the Nation's first utility-scale offshore wind project and securing the Commonwealth's preeminent position in the future of this burgeoning clean energy industry.

Ørsted's leadership in global offshore wind development is unparalleled with nearly three-times the installed capacity as its closest competitors. Over the past 25 years, Ørsted has constructed 3.8 gigawatts (GW) of offshore wind capacity, with another 5 GW under construction taking its operation base to 8.8 GW of capacity by 2022 (Figure 2.1). The lessons learned over this 25+ year evolution culminate in this Project, reflecting the very best in offshore wind design, engineering, finance and construction, and adapting these best practices to the U.S. East Coast market.

Ørsted brings to the Project many "firsts" in the offshore wind industry, including but not limited to:

- Pioneered the industry with the development of the first-ever offshore windfarm (Vindeby, 1991);
- Successfully developed the first commercial-scale offshore windfarm in the world (Horns Rev I, 2003);
- Designed and constructed the largest windfarm in operation today (London Array, 2013);

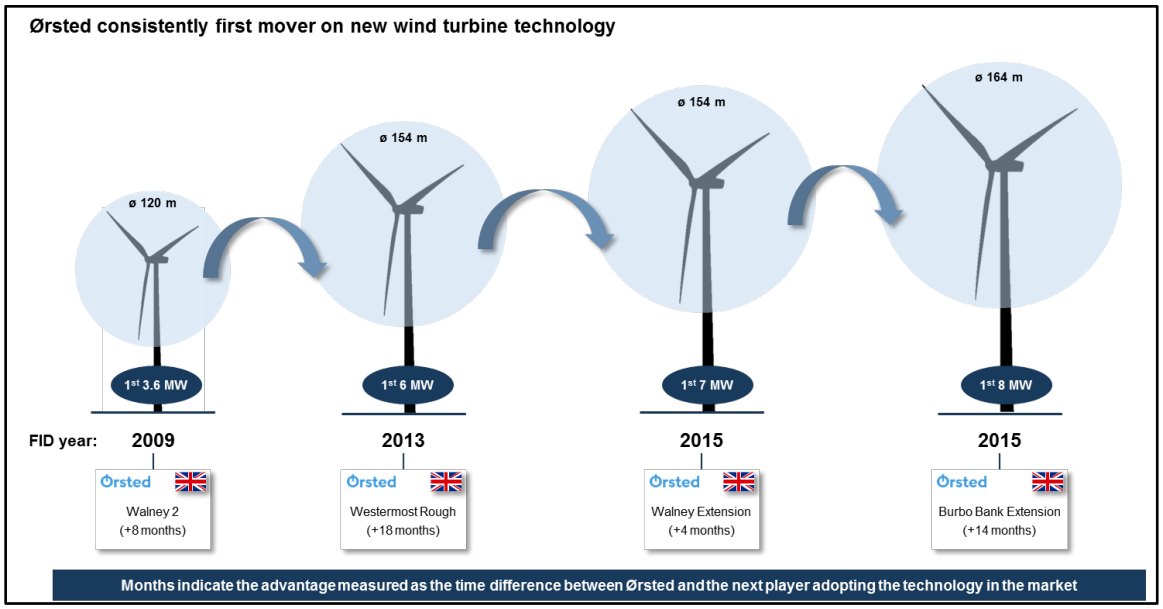
Figure 2.1 Global Offshore Wind Capacity



- Competitively awarded a power purchase agreement (PPA) for what will be the largest windfarm in the world once constructed (Hornsea I and II, 2,600 MW);
- Achieved a significant cost milestone as the first developer to win a tender with a zero-subsidy bid (Germany);
- First developer to effectively decommission an operating offshore windfarm and restore seabed to former conditions (Vindeby);
- First developer to integrate battery storage as part of an offshore wind farm (Burbo Bank Extension);
- [redacted] and
- [redacted]

Ørsted's better understanding of life-cycle cost and risk, gained from almost three decades of offshore wind experience, allows capture of the first-mover advantage on key technology, as demonstrated in Figure 2.2.

Figure 2.2 First Mover Advantage on WTG Technology



Ørsted's "develop, build, own, and operate model" means the Bidder is vested in the long-term success of our wind farms. Ørsted's track record demonstrates that it is careful not to overpromise; and always live up to our commitments. Ørsted remains responsible for delivering on its obligations over the life of the asset. Unlike other developers, whose interests may be more short-term, our financial success is inextricably linked to the performance of generation assets over their useful life. This means that Ørsted's interests are well-aligned with those of utilities and the electricity consumers Ørsted serves.

Eversource, a Fortune 500 company based in Boston and Hartford, has been serving Massachusetts customers for over 100 years. During that time, Eversource has continuously supported both the energy policy and goals outlined by the Commonwealth, in addition to the growth of the 191 communities that it serves. Eversource, which is only one of four North American energy companies recognized as an Environmental, Social, and Governance (ESG) leader, is New England's premier energy company and transmission developer. Eversource brings to bear its deep commitment of supporting the Commonwealth's renewable energy goals, and has utilized its considerable experience in doing this to interconnect renewable generation sources, such as wind power, into the electrical system. As New England's premier transmission developer, Eversource is also able to interconnect resources in the most reliable and cost efficient manner possible, thereby sustaining both the integrity of the transmission system, while also alleviating costs for all customers. Finally, Eversource is recognized as the leader in providing top tier reliability, with the utmost focus on safety, to all customers within the New England region.

Together, Ørsted and Eversource bring a winning combination to the development of the U.S.'s first utility-scale offshore windfarm. These strengths are encapsulated in the following core competencies:

- Technical acumen (engineering, procurement and project management);
- Financial capacity and independence;

- Strength of supply chain relationships;
- Knowledge of electricity markets;
- Demonstrated commitment to the economic future of the region; and
- Environmental stewardship.

Each of these competitive advantages is summarized below.

2.2.1 Technical Acumen

As an industry leader, Ørsted has gained invaluable expertise in the development of over twenty offshore wind projects. Many claimed that building such complex, massive energy infrastructure projects in the harsh conditions of the open ocean was a fool's errand. Ørsted has proven the skeptics wrong; and to this day our cadre of 2,000 dedicated wind energy employees – more than three times the number of our nearest competitor – continue to drive innovation. And Ørsted is already seen as the industry standard-bearer in the U.S. and Asian markets. Our agility is demonstrated as the first international company to enter these new markets.

Ørsted works hand-in-hand with vendors in the design and development of the numerous components that must integrate seamlessly in the challenging offshore environment. As further documented in Section 12, Ørsted is organized into functional areas of specialization (e.g., WTGs). Ørsted has industrialized development of offshore wind farms; individual projects are not "one-off" but leverage the learnings of prior developments and fit neatly within a larger portfolio. Ørsted's relationships with vendors puts it in the unique position to drive innovation, standardization and cost reduction for this Project and future offshore wind development in collaboration with our supplier network. This is a huge differentiator and means that the Project, and the Commonwealth, are benefitting from Ørsted's European experience to the fullest extent possible.

Ørsted has keen insight into where the industry is headed, and the unique ability to anticipate cost reductions in the bid price. Moreover, as explained in Section 8, Ørsted has the unique ability to establish improved engineering solutions in its procurement specifications and to work in close collaboration with suppliers to meet or exceed these standards in a process of continual refinement.

As documented in this Bid, Ørsted's long-term stake in these complex generation systems means the Bidder can analyze fleet performance and internalize these lessons in developing the next generation of offshore wind projects in an optimal cycle. The Bidder's deep bench of transmission planners and engineers provides an unmatched ability to configure, procure, construct, and operate the offshore wind farm assets consistent with reliability requirements, and with an eye towards providing the greatest value to the grid.

Furthermore, this sophistication extends to our O&M program aimed at maximizing the production from our portfolio of more than 1,000 individual WTGs. As documented in Section 11, Ørsted has achieved a significantly better record in reducing unplanned outages after taking over this function from the equipment supplier once the warranty period has expired.

A more recent addition to the Bidder's arsenal is our companies' collective focus on storage solutions to exploit the full potential of intermittent renewable energy resources. Ørsted has created a dedicated division, centered in the United States, to advance and coordinate the

company's deployment of advanced storage solutions. Eversource brings deep experience in interconnecting renewable resources into New England's electrical system reliably and cost-effectively. With this proposal, the Bidder leverages these combined company skills in technology research and development to advance the Commonwealth's interest in integration of storage solutions.

2.2.2 Financial Capacity and Independence

The Bidder's Owners bring unrivaled financial capacity to the Project. Ørsted and Eversource are publicly traded companies with a combined market capitalization of approximately $40 billion, and combined operating cash flows of approximately $4 billion annually, driven largely by regulated assets and long-term electricity supply contracts. Each maintain excellent, investment grade credit ratings (please see table below) and Eversource has the highest credit rating among U.S. utilities.

Eversource has the highest credit rating among U.S. utilities and is the only energy company in the United States with an A+ rating (S&P).

Sponsor	S&P	Moody's	Fitch
Ørsted	BBB+ (stable)	Baa1 (stable)	BBB+ (stable)
Eversource	A+ (stable)	Baa1 (stable)	BBB+ (positive)

Their financial strength and proven track record have been, and will continue to be, critical in enabling them to fund project construction and operation, and, where desirable, to attract capital from investors on terms more favorable than less financially robust developers could obtain. Their financial resilience will insulate the development, construction and operation of Bay State Wind from the inevitable ups-and-downs of the business cycle.

The Bidder intends to finance the development, construction and operation of the Project exclusively with capital from its Owners. Doing so eliminates the risk that project-level financing imposes on projects of this type, ensuring that financing issues will not delay project construction or otherwise impede the delivery of clean energy to Massachusetts ratepayers. The Owners will secure the funds for their respective capital contributions to the Project through a combination of internally generated cash flows and capital markets issuances at the publicly traded parent level.

Eversource and Ørsted have the financial wherewithal and project-development experience to adopt a strategy that will maximize the benefit of the federal investment tax credit (ITC). Specifically, they can fully utilize the ITC without bringing in other tax equity partners (even for an 800-MW project). In contrast, developers that are less financially robust, have less experience, or are subject to constraints imposed by third-party tax-equity investors will face considerably greater challenges in maximizing the value derived from the ITC, especially in light of the federal tax reforms under consideration by Congress. By virtue of the financial strength and proven track record that Eversource and Ørsted possess, the Project is uniquely positioned to qualify for the ITC on an accelerated schedule that will maximize value, and to apply that value efficiently, passing resulting cost reductions on to Massachusetts ratepayers.

2.2.3 Strength of Supply Chain Relationships

The size and scope of Ørsted's market influence allows it to extract the best deal from vendors across the offshore wind supply chain. As further documented in this Bid, Ørsted has the unmatched ability to leverage its' market-leading global position and U.S. project pipeline to give suppliers greater certainty in making long-term decisions to invest in the Commonwealth, resulting in a major boost to the local economy. As the developer with the largest portfolio (operating, in construction, and under development), and the only developer active in Europe, North America and the Asia-Pacific region, our suppliers have been more than willing to follow Ørsted across the globe.

Bay State Wind has the strength, expertise, and commitment to make Massachusetts the center of the new U.S.-based offshore wind industry.

This is not a new strategy but a reprise of Ørsted's phenomenal success in building a robust UK industry in service of that county's growing ambitions for offshore wind development. Ørsted's 2,000-MW build-out on the UK's East Coast was accompanied by a multi-billion dollar investment by supply chain partners, the creation of 1,600 construction jobs and 500 long-term O&M jobs, including for example, the establishment of factories by Siemens Gamesa and Mitsubishi Vestas for the production of wind turbine blades. Through Bay State Wind's commitment to the Commonwealth, much the same will be accomplished here, and already evidenced by the Memorandum of Understanding (MOU) between Ørsted and [redacted] Beyond procurement and manufacturing, the Bidder is similarly committed to establishing long-term, constructive and mutually respectful relationships with local trade unions with the result of supporting the professional development and deployment of union labor in this new industry wherever feasible.

2.2.4 Demonstrated Commitment to the Economic Future of the Region

The Owners have a long track record of supporting local economic growth and encouraging broad supply chain development in the areas where they operate. With major partnerships already solidified (see discussion in Section 2.4.8), Ørsted has made great strides in replicating the models it has developed in Europe to successfully stand up a local supply chain in the Commonwealth and to diversify the industrial use of major port centers, such as New Bedford, and underutilized properties such as Brayton Point. Eversource's more than 100-year commitment to the Commonwealth and its communities, and Ørsted's selection of Boston as the location for its U.S. headquarters, demonstrate their commitment to the region for the long-term. The Bidder has recently opened an office in New Bedford and is proud to support myriad civic organizations statewide, with a particular focus on not-for-profit institutions in and around the Project; colleges and universities who will train the next generation of workers in the emerging offshore wind industry; and research institutions that support a greater understanding of the ocean environment in which it operates. Finally, the Bidder has been in active discussions with a number of the Commonwealth's major energy users to help meet their corporate sustainability goals. The Bidder has secured Letters of Intent from, among others, the Southcoast Health System for the procurement of energy and/or RECs from additional generation constructed within the Lease Area, and the Fenway Sports Group (Boston Red Sox) as a Sustainability Partner.

2.2.5 Knowledge of New England's Electric System

Bay State Wind will utilize the deep knowledge of its Owners to deliver offshore wind power into Massachusetts. Eversource has an unparalleled understanding of New England's electric grid. Over the past 15 years, Eversource has been committed to meeting the region's changing energy profile by designing and constructing solutions to eliminate congestion and alleviate high prices for customers throughout the region. In fact, Eversource's innovative design of the New England East West Solution and Greater Springfield Reliability Project has delivered annual savings to customers of over $800 million. Combined with Ørsted's extensive experience with undersea systems, this sophisticated understanding of the New England electric grid will enable Bay State Wind's clean energy to be delivered to Massachusetts customers in the most efficient and cost effective manner possible.

2.2.6 Environmental Stewardship

Ørsted and Eversource have a legacy of environmental stewardship. Ørsted recently changed its name from DONG Energy (Danish Oil and Natural Gas) as this name no longer reflects the company's activities. The company has made a commitment to going 100 percent renewable, and already today 85 percent of capital is deployed towards green energy solutions in wind, biofuels, storage and customer solutions. Ørsted has reduced its carbon footprint by more than 50 percent in the span of a decade.

Similarly, Eversource is focused on being a catalyst for clean energy development in New England. Eversource is one of only four North American energy companies recognized as an ESG leader. Additionally, it allocates 7 percent of its annual revenues—or more than $500 million annually—to energy efficiency programs for its nearly 4 million customers. Eversource's energy efficiency programs have been consistently ranked #1 in the country. It is well under way in building 70 MW of solar energy in Massachusetts and divesting its remaining fossil fueled generation. Eversource has spent approximately $6 billion over the past 12 years to strengthen New England's high voltage electric grid to improve reliability and resiliency and to better allow new efficient and less emitting power to reach the region's customers.

The Bidder recognizes the importance of being an environmental steward and ensuring that the construction and operation of the Project is compatible with existing social, economic and environmental uses within and around the Project. Ørsted and Eversource have extensive experience in permitting of complex infrastructure projects across Europe and New England, including the undertaking of environmental impact assessments as part of the development process. [redacted] The Owners' industry-leading team of wildlife and marine specialists have been working proactively since being awarded the Lease in June 2015 to engage with interested and affected stakeholders and to conduct sound site assessment activities to support development of appropriate mitigation and minimization measures.

2.3 Project Summary

The Project has been engineered and configured to optimize production, while taking care to ensure the compatibility of the Project with existing marine and terrestrial uses. The Project consists of the following major elements: 1) generation; 2) transmission and interconnection;

and 3) battery storage system. These are summarized in Table 2.2 and described in turn. Additionally, the Bidder summarizes here our construction plan and use of regional port facilities.

Table 2.2 Summary of Proposed Generation and Proposed Assets in the Preferred Option[1]

Generation	
WTG	[redacted]
Foundations	Monopile/Transition Piece (MP/TP)
Transmission & Onshore Facilities	
Array cable	[redacted] kV cables
Export cable	[redacted] kV cables
OSS	[redacted]
OnSS	Traditional open air solution
Battery storage system	55 MW/110 MWh

[1] The Preferred Option represents the Bidder's current understanding of the generation, transmission and other facilities necessary to provide 800 MW of offshore wind energy generation capacity to the EDCs. As discussed elsewhere in this Section 2, the Bidder will continue to review and may modify the Preferred Option to ensure that it provides the most advantageous and cost-effective solution to the Commonwealth, the EDCs, and the ratepayers.

2.3.1 Generation

The 800-MW Project will be situated within the boundaries of Bay State Wind's federal Lease Area, located approximately 25 miles (40 km) off the southern coast of Massachusetts. The Preferred Option's generation solution will consist of the [redacted] WTG with a [redacted] rotor diameter. This WTG is a [redacted] WTG platform, [redacted]. As discussed in Section 8, Ørsted is in discussion with [redacted] WTG manufacturers who can provide viable generation solutions. Final selection will be made post-award. The Bid will consist of [redacted] each of which will use conventional MP technology to fix the WTG to the seabed. This foundation technology has been used by Ørsted in a safe, economical, and environmentally sound way in over 1,000 prior applications and is entirely suitable for conditions found in near-shore conditions of the Project site.

2.3.2 Transmission

In the Preferred Option, a single, 800-MW OSS will be constructed to convert and package energy for transfer from the WTGs to the OnSS. [redacted] will connect the OSS to the OnSS which will be located at, or in the vicinity of, the recently retired Brayton Point Power Station in Somerset, Massachusetts for delivery to the ISO-New England (ISO-NE) grid. The ISO-NE Feasibility Study indicates that this site can interconnect the expected capacity with no upgrade costs. The Bidder is anticipating the results of the System Impact Study in early 2018. A separate interconnection application has been filed for Bourne, Massachusetts as a contingency. The Bidder has opted to price the generator lead as part of its fixed $/MWh bid price.

2.3.3 Storage

The Preferred Option includes the deployment of a 55-MW/110-MWh battery storage solution, located at the OnSS at Brayton Point. The storage system will be operated in load-following mode, charging with power from the offshore wind farm in off-peak hours and discharging during peak hours to provide additional system reliability and peak price mitigation. Under the Preferred Option, the supplier is [redacted]; however, final selection will be made post-award.

2.3.4 Construction and O&M Ports

The Bidder has signed an option agreement with the Massachusetts Clean Energy Center (MassCEC) for use of the New Bedford Marine Commerce Terminal as its primary construction port, supporting the state's considerable investment in this facility as a major center for offshore wind construction. [redacted] The Bidder will also use a Massachusetts site for the outfitting and coating of TPs; this is likely to be either [redacted] or [redacted]. Lastly, Bidder has entered into an exclusive agreement for the potential use of [redacted], the [redacted] property, as its O&M base. Altogether, these sites represent a significant clustering of major offshore wind deployment activities in the Commonwealth.

2.4 Consistency of the Bid with Statutory Review Criteria – The Bay State Wind Advantage

Massachusetts' landmark clean energy legislation, *An Act to Promote Energy Diversity,* sets out the important public policy objectives that are behind the state's offshore wind procurement strategy. This section considers nine criteria for bid selection that are indicative of the diverse set of grid-related, economic and environmental priorities that drive this and future offshore wind procurements in the Commonwealth. The following discussion highlights how this Bid achieves - and indeed excels - in bringing these benefits to the Massachusetts ratepayer and citizens at large.

2.4.1 Enhanced Electricity Reliability

[redacted] Bay State Wind – By the Numbers
• **800 MW** – Nameplate capacity
• [redacted] – Average annual capacity factor
• [redacted] – Availability
• [redacted] – Expected annual yield (GWh)
• [redacted] **MW** – Winter Qualified Capacity (expected)
• [redacted] **MW** – Summer Qualified Capacity (expected)

With the recent retirement of the Brayton Point Power Station, and the potential loss of approximately 8,000 MW of baseload generation overall by 2020, the ability of the proposed Bay State Wind Project to inject emissions-free power directly into the SEMA/RI load zone beginning in 2022 will contribute greatly to the future electricity needs of the region. Moreover, the Project will help diversify the region's generation profile, adding significant new capacity that is both fuel-free and immune from commodity price volatility.

The Bidder's design and operating plan has been specifically crafted with the region's vital need for enhanced reliability, particularly during winter peaks, in mind:

- Of the three eligible bidders, the Bidder is the furthest along in the ISO-NE interconnection queue process. The completed Feasibility Study shows that the Project can interconnect the expected capacity into Brayton Point with no system upgrade. This will also facilitate achievement of our in-service date, and deliver on the Project's reliability benefits without delay.
- The Bidder has opted to deploy a 55-MW/110-MWh battery storage system as a load-following resource that will help ensure that the system is providing additional power when needed most. The system will charge in off-peak hours and discharge during peak demand hours, contributing an average of [redacted] percent additional energy during the 5-hour summer peak period; and an average of [redacted] percent additional energy during a 2-hour winter peak period.

Offshore wind is a stable, predictable, and reliable source of clean energy with high annual capacity factors and an average forecasting error below 4 percent (2 hours prior to delivery). The Bidder will further enhance these attributes by deploying the following cutting edge technology:

- [redacted]
- [redacted]
- **Optimized windfarm layout**: Using proprietary tools that integrate skills and knowledge from across Ørsted's significant offshore wind organization, the Bidder is able to optimize the Project's site layout for aerodynamics reducing wake loss and increasing overall generation. The Bidder's advanced optimization tools also reduce CAPEX by factoring in foundation and array cable costs to determine the optimal position for each WTG.
- **Static Synchronous Compensator (STATCOM):** The provision of a STATCOM provides greater voltage stability for ISO-NE due to its fast reactive power response. This significantly improves the stability of the system and aids ISO-NE in avoiding cascaded trips and partial blackouts.

The Bidder is committed to qualifying the Project's capacity in the ISO-NE Forward Capacity Market (FCM).

2.4.2 Contribution to Reducing Winter Electricity Price Spikes

The Project will help insulate New England ratepayers from winter electric price spikes by reducing thermal generation in SEMA/RI. Throughout the U.S., fluctuations in seasonal temperatures and extreme weather patterns have resulted in unexpected constraints to current infrastructure. Due to the retirement of non-gas generation (i.e., coal and nuclear) this dynamic is only expected to worsen.

An analysis conducted for the Bidder by Levitan and Associates Inc. (LAI) found that reduction in winter peaks ascribable to the Project will result in estimated savings to Massachusetts ratepayers of **over $300 million per year.** Pairing offshore wind with the battery storage system described above will augment these savings.

2.4.3 Cost-Effectiveness to Electric Ratepayers

The Bidder is pleased to submit a bid price that it believes to be significantly lower than any previous U.S. solicitation in which offshore wind was an eligible resource. This is the ultimate test and manifestation of the Project's advantage – leveraging technology prowess in the design, construction and operation of a cutting edge generating source; strength of balance sheet to reduce financing costs; combined with the market know-how to maximize the value of energy delivered to the grid.

The Bidder has leveraged Ørsted's industrialized approach to development and construction to bring best practices and purchasing power from Europe, where more than 15,000 MW has been built, to New England.

The lifetime net ratepayer benefit of the Bay State Wind Project is conservatively estimated to be more than [redacted]

2.4.4 Avoid Line Loss and Mitigate Transmission Costs

One of the primary advantages of the Project is that it will tie directly into the SEMA/RI control area at Brayton Point, significantly minimizing line losses associated with transmission from projects bringing power into Massachusetts from neighboring control areas. As noted previously, preliminary analysis from ISO-NE suggests that the Project can safely interconnect the expected capacity at this point with no significant upgrades. More importantly, the addition of 800 MW of clean and renewable generation will help defer or displace expensive transmission associated with terrestrial wind projects projected to serve Massachusetts' Class I RPS program.

Additionally, the Bidder's approach is to use state-of-the-art [redacted] transmission technology to minimize line losses to the maximum extent possible.

From a ratepayer perspective, our pricing proposal holds customers harmless from transmission cost overruns, however unlikely. The cost of the GLL is included in our fully bundled PPA price, providing the Bidder with a strong incentive to control costs and maximize delivered throughput.

2.4.5 Project Viability; Reasonableness of Timeframe

Building large-scale windfarms offshore is not easy – especially in a new market like the U.S. By combining the respective strengths and relevant skill sets of two large energy companies, supported by a track record of achievement, the Bidder is the right partner to get the job done and to keep Massachusetts ahead of the pack in the interstate competition for offshore wind jobs and economic development opportunities.

Project viability is supported by the Ørsted legacy of 22 offshore wind farms already developed, constructed and in current operation in Europe, with an additional seven wind farms currently under construction (see Section 12). As detailed in Section 5, financing does not require any outside lending arrangements due to Ørsted's and Eversource's solid

financial balance sheets. Sections 8 and 10 describe how technical design and constructability is retained in-house and is based on almost three decades of experience of engineering, procuring, and constructing offshore wind farms and complex onshore transmission lines. This in-house experience and technical know-how is what sets the Bidder apart from all other offshore wind developers. Further, Section 9 highlights the team's ability to execute the Project in a commercially reasonable timeframe.

Since June 2015, the Bidder has been actively engaged in the development of the Project. Among eligible bidders, the Bidder believes it is furthest along in several key project development areas, including but not limited to interconnection, site control, and environmental permitting. The Bidder was the first U.S. developer to secure a Site Assessment Plan from the BOEM and has now deployed equipment within the Lease Area for the all-important task of gathering data on wind and other environmental conditions. Moreover, the Bidder has developed solid contingency plans and optionality across major project parameters (e.g., suppliers, logistics, interconnection points) to ensure that it has the flexibility to respond to unforeseen events to deliver as committed.

As discussed throughout this Bid, major work streams – including permitting, interconnection, site control, and supply chain development and procurement – are already well underway, limiting the possibility of future surprises that could delay or derail the project. The Bidder has secured necessary land rights for development of our substation and storage solution. Moreover, the Bidder has built considerable optionality into all these work streams so that a ready default is available should our Preferred Option ultimately prove non-viable. Where applicable, these fallback plans are detailed in relevant bid sections.

The Bidder has proposed what it believes to be an aggressive yet realistic schedule for commercial operation given critical path items. The Bidder is well-aware of the Commonwealth's desire to bring these resources on-line as quickly as possible in order to realize the price, reliability, diversity, economic development and environmental benefits that offshore wind can bring and is striving to meet those expectations. Furthermore, the team is taking significant steps to de-risk the project timeline. Further, our de-risking initiatives reduce the risk of COD delays at no cost to the ratepayer irrespective of any cost exposure borne by the Bidder. These steps include:

- [redacted]
- Deviating from our normal practice by taking early investment decisions on some long lead-time items <u>ahead of</u> securing necessary construction permits;
- Entering into detailed discussions resulting in letters of support with builders of Jones Act-compliant heavy lift installation and transportation vessels; and

"As the Commonwealth continues to make unparalleled investments in renewable energy, energy storage technologies have the potential to play an integral role in effectively deploying these new resources… The state and industry [will] lead the way on exploring the most cost-effective deployment of energy storage for Massachusetts' ratepayers."

-Governor Charlie Baker

- Front-loading our site survey activities as much as possible, being the first to mobilize vessels for the geophysical and geotechnical survey campaign to document seabed conditions.

By the same token, the Bidder strives to make commitments that are responsible and well-informed. Our proposed COD of [redacted] strikes the right balance between an optimized engineering, procurement, permitting and construction schedule and the best interests of the Commonwealth.

2.4.6 Promote Energy Storage Systems

The Bidder will support the Commonwealth's cutting edge Energy Storage Initiative to advance the energy storage segment of the Massachusetts clean energy economy. The Bidder will directly advance three of the program's salient objectives, including:

- Attracting, supporting and promoting storage companies in Massachusetts;
- Accelerating the development of early commercial storage technologies; and,
- Capitalizing on storage technology's benefits to clean energy integration, grid reliability, system wide efficiency, and peak demand reduction.

As noted previously, the Bidder will pair the offshore windfarm with a 55-MW/110-MWh battery storage solution. This configuration is chosen to serve as a cost-effective complement to the offshore wind farm – minimizing the capital cost addition while yielding the greatest value to ratepayers through deployment as a peak reduction/shaving resource. Moreover, in the Preferred Option the Bidder has selected [redacted] as the storage solution provider, providing this world-class energy storage provider with a marquee opportunity to boost its position in the growing and increasingly competitive battery storage market.

2.4.7 Mitigate any Environmental Impacts

The Bidder is fully committed to developing the Project in a way that is protective of environmental and human resource values. The Bidder has worked diligently over the past two years to put in place a program to fully document and mitigate, as necessary, any environmental concerns associated with project, including but not limited to protecting and enhancing the region's fisheries; and addressing any issues that may arise with respect to the North American Right Whale. (See Text Box for a description of the Bidder's major funding initiatives in this area).

As documented in Section 7, our extensive team of internal and external subject matter experts, in consultation with outside advisory groups, is transferring the accumulated experience and lessons learned from our state-of-the-art offshore environmental minimization and mitigation program to these shores. This extends both to the site lease area and export cable route – Ørsted has successfully laid cable in environmentally sensitive ecosystems throughout Northern Europe and the Bidder will parlay that expertise to ensure no harm to New England's vital coastal resource. Eversource's experience in successfully navigating the permitting process for a number of complex infrastructure projects is also being brought to bear for our onshore activities.

[redacted] Bay State Wind Environmental Initiative

On a going forward basis, and conditional upon PPA award, Bidder is making a major resource commitment towards the support of New England's preeminent research, philanthropic, educational and advocacy institutions in implementing a portfolio of collaborative research and programmatic initiatives for the protection the region's indigenous fisheries and whale populations. This multi-year commitment will be comprised of the following elements:

- [redacted]
- Woods Hole Oceanography Institute (WHOI) - $500,000, multi-year grant fund for the development of advanced whale detection systems
- New England Aquarium Right Whale Project (in collaboration with Lobster Foundation of MA) - $500,000 grant fund (50/50 split) to improve the North American Right Whale population status through prevention of gear entanglement.
- Whale Alert Project - $25,000 annual grant for the refinement of the Whale Alert System to prevent lethal ship strikes.
- Bay State Wind will develop a Mitigation and Monitoring Advisory Panel that includes right whale specialists, acousticians, and environmental (E-NGO) representation to provide input for a mitigation and monitoring plan.
- Center for Coastal Studies (CCS) – grant of $5,000/year (up to 5 years) for the Marine Debris Program to promote marine waste reduction, removal and recycling initiatives
- National Ocean Science Bowl/Blue Lobster Bowl - grant of $5,000/year (up to 5 years) to support the highly regarded high school ocean science education program and encourage students to enter into the renewable energy field.

2.4.8 Create and Foster Employment and Economic Development in the Commonwealth

For the Bidder, the task at hand is not simply to build a project, it is to build a U.S.-based offshore wind industry, with significant supply chain investments in Massachusetts. The Bidder aims to deliver on the promise of high skilled, high paying jobs that is part and parcel of building this new U.S.-based industry with a multitude of local suppliers. And the team is uniquely positioned to do just that. Our strong vendor relationships, built in some cases across two decades of collaboration, gives us the credibility to get our suppliers to commit to our vision of a vibrant and sustainable U.S. market - and to make concrete investment decisions on that basis. As Figure 2.3 illustrates, while much of this activity is naturally concentrated along Massachusetts' coastal communities, the opportunity to tap into the Commonwealth's solid base of advanced manufacturing and high-tech service industries enables us to also involve inland communities statewide in this green industry.

Local economic development highlights of the Project include:

- An estimated 1,250 construction job-years.
- An estimated 10,853 indirect jobs.
- Approximately [redacted] permanent jobs in O&M over the [redacted] planned operating life of the Project.
- Use of New Bedford as the staging area for construction, and the O&M base over the life of the asset. This will require the Bidder to make short- and long-term lease payments, port fees, and annual property tax payments. The Preferred Option includes WTG pre-assembly and long-term O&M based in New Bedford, though the exact use of this site is to be determined.
- Entering into an exclusive arrangement with [redacted], one of Europe's top specialized [redacted] manufacturers and suppliers of [redacted], to set up operations in Massachusetts. [redacted]

[redacted]. As of this Bid, the Bidder, and its supplier [redacted], are actively pursuing the leasing of a [redacted] site [redacted] resulting in 240 construction job-years.

- Securing a letter of support from [redacted] expressing its intentions to investigate the potential for establishing a new steel tower fabrication facility in the Commonwealth, potentially at the former site of the Brayton Point Generating Station. At full operation, the plant would result in 150-200 new jobs.

[redacted]

- Working with various vessel owners to support the construction of two Jones Act-compliant heavy lift installation and transportation vessels in the U.S. This will have profound consequences for Massachusetts' ambitions to establish its preeminent position in the offshore wind supply chain and for the U.S. market more generally. As evidenced by this Bid, the deployment of a U.S.-built, flagged and operated installation and transportation vessel will enable the greater use of [redacted] It will also facilitate cost savings in project development by avoiding the "workarounds" heretofore required to meet the strictures of the Jones Act.
- Cable landing and OnSS development at Somerset, Massachusetts. This site will serve multiple purposes - it will enable the Bidder to make landfall of the export cable, facilitate development of the OnSS, and support deployment of the battery storage solution. In addition, it will repurpose the existing transmission infrastructure. Use of the site will create local construction jobs while contributing to the local property tax base as an offset resulting from the Brayton Point Power Plant closure.
- Shortlisting several advanced manufacturing firms with significant operations within Massachusetts, including:
  - [redacted] for the manufacture of components to be used in the OSS and the Transition Pieces (TPs);
  - [redacted] for the construction and deployment of the Project's battery storage system; and
  - [redacted] for manufacture of [redacted] steel parts [redacted]. Other [redacted] suppliers also under consideration for this scope.
- Entering into a Memorandum of Understanding (MOU) with the Massachusetts Maritime Academy (MMA) to provide long-term financial support for this state university focused on careers in the worldwide maritime economy. Initial funding will support the offering academic scholarships from students from under-represented Gateway Cities across the state. Subject to bid award, future funding will support such initiatives as the development and offering of Global Wind Organization (GWO) certified training, which is mandatory for all workers going offshore or working at heights. In this way, the Bidder hopes to empower the next generation of students to be a part of the emerging offshore wind industry.
- Memorandum of Understanding with Bristol Community College (BCC) to begin in December 2017. The purpose of this MOU is for the Bidder and BCC to work collaboratively together in the development of a wind energy educational component at the college. The MOU includes:
  - Participating in the BCC "Women in STEM" series
  - Serving on the BCC STEM advisory board
  - Participating in BCC's K-12 initiative to train middle school and high school science teachers on developing an offshore wind energy curriculum
  - Hosting BCC student interns
  - Serving as a guest lecturer in BCC's offshore wind courses

  Exploring a collaboration with BCC and other industry stakeholders to develop an offshore wind training center in New Bedford, Massachusetts. In addition, the MOU contains a pledge of $1 million contingent upon a PPA to use for various initiatives

such as; scholarships, classroom needs, training programs, infrastructure projects as they relate to a new campus location.

- [redacted]

2.4.9 Benefits to Low Income Ratepayers

The Bidder has entered into a major agreement with four of Massachusetts' leading Community Action Agencies for the statewide delivery of services that aim to lessen the overall energy burden to low income customers. Under the agreement, the Bidder will contribute a total of $17.5 million pre-COD and during the 20-year PPA term to support two of the Commonwealth's cornerstone programs – the Low Income Heating Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP). Using the extensive and well-established Low Income Energy Affordability Network (LEAN) for service delivery, the Bidder's funding will supplement available public funding to reach more ratepayers in every corner of the Commonwealth for bill payment relief and implementation of a portfolio of energy efficiency services designed to reduce overall home energy consumption for low income customers. Funding will be allocated to service providers statewide in accordance with formulas established by the Massachusetts Department of Housing and Community Development, which will also provide oversight of expenditures. In their letter of acknowledgement, the CEOs of two of the Commonwealth's leading Community Action Agencies estimate that "the amount pledged by the Bidder would help serve the home energy needs of tens of thousands of households" over the course of the agreement (see Attachment 14-2). This funding will be borne by the Bidder and will not be passed on to other consumers through the PPA.

2.5 Scale Matters

Throughout the regulatory process leading up to this RFP, the Bidder has supported a solicitation that enables price discovery around projects of varying capacity. In this way, the Bidder has sought to demonstrate the material price advantage associated with the scale economies attendant to larger-scale windfarms. Significant upfront investment in lease acquisition, permitting, procurement and certain construction activity is largely fixed and unchanging irrespective of windfarm size. Thus, it stands to reason that the ability to spread these fixed costs over the greater production of a larger windfarm will result in a lower cost per kilowatt-hour to the ratepayer.

Additionally, in our view, Massachusetts is in its own "competition" with neighboring states who are also now aggressively entering the race for offshore wind resources. To the state that commits the greatest capacity will likely go the jobs. **A larger project is more likely to attract the investment and clean energy jobs that the Commonwealth is hoping to attract through this procurement mechanism.**

The numbers speak for themselves. We believe we have put forward a bid price that is compelling. Should the Commonwealth want to get the lowest possible price for electricity consumers with the greatest economic benefits in terms of jobs and economic development opportunities, a large scale project is the way to go. It would further put Massachusetts ahead of other states competing for their share of offshore wind economic development.

As the Evaluation Team compares projects of varying size, the Bidder wants to underscore two points.

First, purchasing a significantly lower cost large-scale project today is demonstrably in the public interest. As the Evaluation Team considers the possibility of future cost reductions, a level playing field analysis will consider the *weighted average price* of two sequential 400-MW bids against today's price for an 800-MW bid. If the 800-MW bid is [redacted] percent lower than a 400-MW bid in this solicitation, then the Evaluation Team should understand that the next solicitation will have to produce a 400-MW bid that is [redacted] percent lower to match on price (Figure 2.4). In addition, 800 MW will attract supply chain investments earlier compared to potentially two 400-MW projects with different configurations. Although we firmly believe that the U.S. offshore wind industry still has a distance to travel down the cost curve, we do not see such a dramatic cost decline as feasible in the very short-term.

[redacted]

Second, we encourage the Evaluation Team to also consider the window of opportunity presented by the **Federal Investment Tax Credit (ITC)**. The ITC provides a five-year declining federal incentive for the development of offshore wind. Projects that commence construction in 2018 will qualify for an 18 percent tax credit while those starting in 2019, the final year of the ITC, will only qualify for 12 percent. Thereafter, unless extended by Congress, the Federal ITC will go to 0 percent. Every dollar that is realized from the ITC is one less dollar that would have to be incurred by Massachusetts ratepayers. All else equal, should Massachusetts defer procurement it could otherwise make today it will also lose out on this important federal benefit.

In developing this Bid, the Bidder recognizes the burgeoning interest that has been shown across the Northeast region in offshore wind generation. In addition to future solicitations under the Energy Diversity Act, several states have followed Massachusetts' lead by announcing their own commitments to the development of offshore wind generation resources through procurement processes. This includes:

- **Connecticut**: The Connecticut Department of Energy and Environmental Protection (DEEP) issued a draft RFP on December 15, 2017 for, among other things, offshore wind capacity. Pursuant to 2017 legislation DEEP is authorized to procure roughly 200 MW of offshore wind.
- **Rhode Island**: Rhode Island Governor Gina Raimondo's March 1, 2017 announcement that the state would set a new goal of 1,000 MW of renewable energy by 2020. As footnote 8 of the Massachusetts Section 83C RFP notes, Narragansett Electric "has

expressed interest in evaluating and considering projects proposed in response to this RFP."

- New York: New York Governor Andrew Cuomo has adopted a 2,400 MW offshore wind goal by 2030 and the New York State Energy Research and Development Authority is finalizing the state's Offshore Wind Master Plan. Pursuant to New York's Clean Energy Standard, it is anticipated that offshore wind delivered into NY-ISO from neighboring control areas will be eligible to participate.

Furthermore, apart from these state-led procurements, the Bidder believes that an offshore wind market may develop with municipalities and large commercial customers interested in purchasing renewable energy. As reflected in Section 5, the Bidder has signed a Letter of Intent with one of Massachusetts' signature institutions – Southcoast Health Systems – to explore this opportunity further.

For these reasons, the Bidder anticipates a vibrant regional offshore wind market to materialize over the next few years, and is confident in its ability to secure additional offtake pursuant to these upcoming opportunities. [redacted]

[redacted]

- [redacted]
- [redacted]

[redacted]

[redacted]

[redacted]

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

2.6 Alternative Bids

The Bidder is submitting two separate bid cases, differing in total project nameplate capacity. These include: 1) a 400 MW bid; and 2) an 800 MW bid. For each of these bid cases, the Bidder proposes a GLL and an ETS. As per guidance from the EDCs, the Bidder is submitting each of the project bid cases with both the GLL and ETS solution, for a total of **four** separate bids (i.e., two bid cases X two transmission solutions).

The salient differences between the bid cases are as follows:

1. **400 MW bid**. This bid is responsive to the RFP requirement mandating that bidders provide a 400 MW nameplate capacity project. Of the two bid cases, this project achieves COD in the earliest timeframe, while delivering substantial benefits to Massachusetts EDCs and the customers they serve.
2. **800 MW bid**. This bid front-loads more of the offshore wind development required under the Energy Diversity Act. As highlighted in Section 2.5 the main advantage of this bid case is that it captures the significant economies of scale associated with offshore wind development to deliver a substantially lower bid price. This larger bid also pulls forward and augments the many consumer and grid benefits of offshore wind development enumerated above, including but not limited to net economic benefits, winter price suppression effects, enhanced reliability, and early and greater achievement of greenhouse gas reduction targets. Moreover, the 800 MW bid

enhances Massachusetts competitive position relative to other states in the quest for local supply chain development.

To facilitate the Evaluation Team's review of these separate bid cases and how they differ from one another, Bidder has developed a matrix highlighting those sections of the bid that materially differ from one another. This matrix can be found at Attachment 2-3.

[redacted]

2.7 Project Entities and Affiliates

The Bidder holds a federal offshore renewable energy lease (BOEM Renewable Energy Lease No. OCS-A 0500) (the Lease), as well as certain other property rights, and has engaged in permitting activities for the proposed Project. The Bidder's affiliate BSW ProjectCo LLC, which is also a 50/50 joint venture of the Bidder's Owners, has engaged in project development activities for the proposed Project, such as entering into agreements with partners, consultants, and property owners, as well as contributing to the drafting of this proposal. See Figure 12.1 and Attachment 5-10 for the corporate structures of the Project, Bidder, and Owners.

In the event that the proposed Project is selected in this RFP for negotiation, the Bidder intends – as further discussed in Sections 5.2 and 6.2.1 - to: (1) assign the geographic portion of the Lease where the proposed Project will be constructed from the Bidder to BSW ProjectCo LLC, as provided by BOEM's regulations; and (2) sign PPAs associated with the proposed Project in the name of BSW ProjectCo LLC.

The Bidder has an affiliate relationship with NSTAR Electric Company d/b/a Eversource Energy and Western Massachusetts Electric Company d/b/a Eversource Energy, two of the EDCs participating in the RFP Process, and both members of the Evaluation Team. Accordingly, measures have been put in place to ensure that the Bidder and its affiliates comply not only with applicable law and the requirements of the RFP, but also with voluntary standards to prevent any actual or apparent instance of unfairness, discrimination, or undue preference toward the Bidder in this RFP Process, as detailed in Section 5.17.

Section 3

Operational Parameters

The Project will assist the region in overcoming winter reliability challenges by delivering energy when it is needed most and helping to reduce winter peak energy prices and price volatility. **Only the Bay State Wind Project will deliver the full extent of these benefits**.

- The Project will have **significant capabilities in offering flexibility solutions to ISO-NE, increasing system stability, balancing the system** as well as **optimizing the operation** of the transmission and distribution networks.
- The Bidder is proposing a 55-MW/110-MWh **battery storage** solution from a [redacted] supplier that **enhances grid stability, shifting energy delivery to meet the demand profile**.
- The **annual winter price reduction benefit averages over $300 million** per year.
- The Project expects to be able to qualify substantial capacity in the Forward Capacity Market beginning with Forward Capacity Auction [redacted]
- The Bidder will implement state-of-the-art systems to **reduce both maintenance scope and costs to the Commonwealth and electric ratepayers**.

8.9% average hourly energy delivery increase in summer peak hours with battery time-shifting

11.4% average hourly energy delivery increase in winter peak hours with battery time-shifting

Anholt Offshore Wind Farm

3. Operational Parameters

In this section, the Bidder outlines the maintenance outage requirements, operating constraints, and reliability benefits of the Bay State Wind Project's Preferred Option. The Preferred Option Project has been designed with redundant equipment, which will minimize maintenance requirements, disruptions in service, and overall risks to the utility grid, while maximizing the predictability, reliability, and ancillary benefits of the generating and energy storage assets. For example, the Project includes the installation of two transformers working in parallel, meaning that if one is out of operation, the Project will still be able to produce and deliver energy. This level of optimization is possible due to the deep well of experience and expertise that the Bidder draws from with respect to its owners Ørsted and Eversource.

3.1 Maintenance Outage Requirements

Specify partial and complete planned outage requirements in weeks or days for all generation facilities and transmission facilities. Also, list the number of months required for the cycle to repeat (e.g., list time interval of minor and major overhauls, and the duration of overhauls).

The Bidder will develop and implement an overall maintenance plan that is based on the specific equipment and features of the Project. This plan will detail the activities and frequency of the surveys, inspections, and regular maintenance to be performed, including scheduled outage events. All of these activities will be conducted according to industry best practices and the experience of the Bidder's Owners, to preserve asset integrity, extend its lifetime as far as possible, and minimize any outages, as outlined in Table 3.1 below.

[redacted]

Table 3.1 Indicative Planned Outage Overview per Main Asset

Main System	Sub-systems	Scheduled Outage	Extent of Outage
WTG Maintenance Program	WTG including tower	[redacted]	[redacted]
Balance of Plant, including OSS Maintenance Program	Structures (Foundations and OSS Topside)	[redacted]	[redacted]
	HV Cables	[redacted]	[redacted]
	HV Systems on OSS	[redacted]	[redacted]
	LV and Utilities on OSS	[redacted]	[redacted]
	SCADA Systems	[redacted]	[redacted]

[redacted]

3.1.1 Foundations and Structures

[redacted]

3.1.2 WTGs

The Preferred Option is the [redacted] and Ørsted has acquired substantial hands-on experience with WTGs, [redacted]

Based on our extensive experience with this technology, the Bidder has designed the inspection and maintenance plan to minimize outages. [redacted]

It is expected that the WTG OEM Service Provider will directly support the Project for up to [redacted] years during the operation ramp-up. The WTGs will be subject to planned maintenance, including general inspection, sampling, testing, and replacement. To improve operability and performance control, the WTGs will be continuously remotely monitored. Uninterrupted monitoring allows for immediate identification and response to any issues that may arise. In case of a failure, a troubleshooting team will service and repair the affected WTG.

This offshore wind industry practice is based on the manufacturer's requirements as it is a precondition for maintaining the initial warranty. By employing components with higher reliability and increasing equipment condition monitoring, the Bidder aims to minimize the amount of service hours required during the annual service, or even reduce service to every

second year or more. This will lead to a significant decrease of outages, maintenance cost and resources, and an increase in PBA.

WTG Operational Experience

As shown in Figure 3.1, [redacted] WTGs were installed in [redacted] and Ørsted's has been expanding ever since, with [redacted] rotor [redacted] and rated capacity [redacted] With a rated capacity of [redacted] MW and a rotor diameter of [redacted] m, [redacted]

Ørsted's experience with [redacted] WTG technology is described in more detail in Section 8.1.2. [redacted]

[redacted]

3.1.3 Offshore Transmission Assets (OSS, Offshore Export Cables and Array Cables)

The offshore transmission assets will be designed for the highest possible time availability target. To realize this target, the Bidder intends to employ a [redacted] approach for inspections of offshore transmission assets. [redacted]

[redacted]

3.1.4 OnSS

The Bidder will monitor the OnSS both remotely and locally on a continuous basis. The equipment in the OnSS will be configured with a condition monitoring system that will sound an alarm upon detecting equipment issues. In addition, the substation will be inspected every month for anomalies with the equipment operation. The Bidder will put in place an established and documented program for the maintenance of all equipment critical to the reliable operation of the station. Maintenance programs will conform to the equipment manufacturer's recommendations.

In addition, a reliability maintenance program will be implemented. Preventive maintenance will be performed to ensure reliability of the substation and line equipment, and planned outages will be conducted in accordance with the NERC/NPCC Standard-TOP-003-1. This equipment will be maintained in accordance with the interconnection agreement. In addition, all protective system maintenance will be performed in accordance with the NPCC PRC 005-2 standard. Substation equipment will be maintained by qualified personnel in accordance with applicable industry standards and good utility practice to provide maximum operating performance and reliability.

All major equipment will be under long-term warranty. During the warranty period, the manufacturers will provide the necessary services to maintain or replace the equipment. The manufacturers will also be responsible for the cost of the equipment as well as any cost incurred by the Bidder to support the repair and/or replacement. Outside contractors will be

secured to augment the in-house workforce as necessary. Eversource has extensive experience maintaining utility substations and routinely services over 300 substations of varying configurations. The company employs highly trained and experienced personnel to install, maintain, and repair equipment as required.

3.2 Operating Constraints

Specify all the expected operating constraints and operational restrictions for the project (i.e., limits on the number of hours a unit may be operated per year or unit of time).

Operating constraints for the Project are primarily related to technical parameters defined by the equipment OEMs, which can be categorized by wind resources and weather conditions (see Section 4.1 for more detailed information), grid outages determined by ISO-NE, and HSE issues.

The individual assets will be operated and maintained in accordance with the Bidder's and subcontractors' safety policies, user manuals, and regulations.

3.2.1 Technical Parameters

The operational constraints for the WTGs are:

- Cut-in wind speed: approximately [redacted] meters per second (m/s)
- Cut-out wind speed: approximately [redacted]
- Equipment operational temperature: [redacted]

For temperatures inside the WTG and related to temperature critical components at ambient temperatures between [redacted] a certain capacity de-rating would be expected, while the WTG will completely stop when the temperature reaches and exceeds [redacted]. Note that these parameters are intended for indicative purposes only, as they will vary depending on the specific WTG technology.

3.2.2 Operating Constraints

Besides maintenance outage requirements as described in Section 3.1 and technical parameters discussed above, [redacted]

3.2.3 Offshore Accessibility, in Case of Assets Failure

In case the offshore assets are down due to failure, offshore accessibility would potentially pose a constraint on the repair and restart of the equipment. Such accessibility is primarily determined by wave height for sailing operations, and wind speed and visibility conditions for flying operations, which have been assessed based on the recent information available.

As described in Section 3.1, the Bidder will seek to optimize all scheduled and unscheduled maintenance as much as possible, especially when outages are required. Typically, outages are planned taking into consideration low wind periods and offshore accessibility

3.2.4 Other Restrictions

Further accessibility constraints may be imposed by the BOEM and other regulatory agencies to protect significant resources such as marine mammals. These could affect sailing and

increase operational cost due to the monitoring activities and overall compliance with the requirements.

Operating constraints and restrictions have been accounted for in the availability and Annual Energy Production (AEP) assessment and do not seem to be problematic.

3.3 Reliability

Describe how the proposal would provide enhanced electricity reliability to Massachusetts, including its impact on transmission constraints.

The Preferred Option Project is designed to markedly enhance electric system reliability, particularly during the winter months when electric and natural gas demand experience a coincidental peak. Since 2000, the share of the electricity supplied by natural gas-fired generation has increased from 12 percent to nearly 50 percent while natural gas transportation capacity has remained relatively static.[2] While gas pipelines have been constructed to serve firm demand for natural gas distribution customers, limited excess capacity to serve the region's natural gas-fired generating fleet remains. Furthermore, nearly 8 GW of non-natural gas-fired generation is expected to retire by 2020, which will amplify the effects of pipeline constraints.

[redacted]

The Project is designed to assist the region in overcoming its winter reliability challenges by delivering energy when it is needed most (e.g., during cold winter periods when natural gas demand is at its peak), helping to reduce peak energy prices and price volatility. Only the Bay State Wind Project will deliver the full extent of these benefits as discussed below. By harnessing the world-class offshore wind expertise of Ørsted in the design, engineering and operation of these complex assets, the Project will fully exploit the excellent wind conditions off the Massachusetts coast.

New Technology Increases Reliability and Capacity Factors:

The Owners' deep experience in offshore wind generation keeps them at the forefront of deploying new technology that helps increase reliability and capacity factors, such as the [redacted] This and other new technologies further increase the stable reliable production profile of the Project, enabling it to play an important role in increasing system reliability in Massachusetts.

[2] Comments of Massachusetts Department of Energy Resource in Docket DPU 15-37, Pg. 11.

The Project's capabilities for enhancing electricity reliability in the Commonwealth are further outlined in Table 3.2 and Sections 3.3.1 through 3.3.7 below. These capabilities will improve the reliability and efficiency of the ISO-NE system.

Table 3.2 Benefits to the ISO-NE System of the Bay State Wind Project

Capability	System Stability	System Balancing	Network Optimization
Sub-second speed of frequency response	✓	✓	
Delivery of reactive power and voltage support	✓		✓
Fast ramp-down/de-load	✓	✓	
Fast ramp-up at all operating ranges	✓	✓	
STATCOM to dampen harmonic distortions	✓		✓
Automated response in system events	✓	✓	✓
Real-time "available power estimation"	✓	✓	

3.3.1 Avoiding Transmission Constraints

As described in Section 6, the Project proposes to interconnect with the ISO-NE system at Brayton Point, in proximity to the main load centers in the region. By doing so, the Project will avoid key transmission constraints that would increase the cost of delivering energy produced by the Project to customers located within these load centers.

3.3.2 Enhancing Electricity Reliability

The scale of the Project will help effectively bridge the gap created by retirement of some of New England's largest generators and increase the diversity of Massachusetts' energy mix, thereby making it more reliable and resilient. Indeed, some of the Project's key reliability benefits stem from the fact that while the nameplate capacity is 800 MW this capacity is spread across [redacted] WTGs, each of which act as an independent power plant. As such, even if one of these power plants fail, the remaining [redacted] will continue to produce power. This reliability strength is amplified by the unparalleled O&M experience of the Owners, which allows the Bidder to maintain availability of the Project at a rate well above industry average. [redacted]

3.3.3 Contribution to Reducing Winter Electricity Price Spikes

Extreme weather patterns have amplified constraints on New England's natural gas pipelines and ultimately have caused periodic spikes in wholesale energy prices, primarily during winter cold snaps. This dynamic was apparent during the Polar Vortex of 2014 when ISO-NE saw wholesale prices soar.

The Project provides more consistent output during the winter months, enhancing reliability, as demonstrated by the Project's capacity factors which approximate [redacted] percent during these months. To the extent offshore wind displaces gas-fired generation during the peak hours of winter months and reduces the fuel demand of natural gas-fired generators, the Project will aid pipeline congestion, exerting downward pressure on delivered gas costs, *i.e.*, the primary driver of wholesale energy prices in New England. The Bidder's winter season production could also supplant the cost and emissions of either oil-fueled or dual-fueled power plants that burn oil when natural gas is unavailable or uneconomic. See Figure 3.2 below, simulating the effect that a 800-MW offshore wind facility connecting into SEMA/RI could have had in displacing thermal generation during the 2014 Polar Vortex event.

[redacted]

To assess the effect of the Project on winter price spikes, the Bidder commissioned LAI to perform an estimate of the effect of the Project on future energy prices. The full report, "Contribution to Reducing Winter Price Spikes by the Bay State Wind Project", can be found in Attachment 3-1.

The price reduction impacts are reported as a reduction of the total cost to load Massachusetts customers and as Massachusetts load-weighted, average price impact.

All prices reported in this report are in real 2016 dollars. Key results of the analyses are summarized below.

With respect to the incremental RE scenario, the winter price reduction in Massachusetts is greatest for the highest decile (10th) of Locational Marginal Prices, about $4.35 to $4.55/MWh, depending on the winter season definition. The top decile includes price spikes

as well as other high prices. For the lower deciles, the absolute price reduction is less, but the percentage reduction is greater than for the top decile.

Based on data for November 2010 through October 2014, the annual price reduction over all hours ascribable to incremental offshore wind averages approximately over $300 million per year for EDCs in the Commonwealth.[3]

3.3.4 Project Benefits to the Forward Capacity Market (FCM)

As outlined is Part VII of the CPPD form (Attachment 1-1), the Preferred Option Project expects to be able to qualify [redacted]-MW of capacity in the summer and [redacted]-MW of capacity in the winter in the FCM beginning with Forward Capacity Auction [redacted] This capacity will diversify the energy mix available in the FCM, thereby increasing reliability in the ISO-NE system over the life of the asset. Furthermore, due to its higher winter capacity factors, the Project will alleviate the price pressure and volatility created by the impact of extreme weather on natural gas pipelines that serve New England.

3.3.5 Project Benefits to the Ancillary Service Market

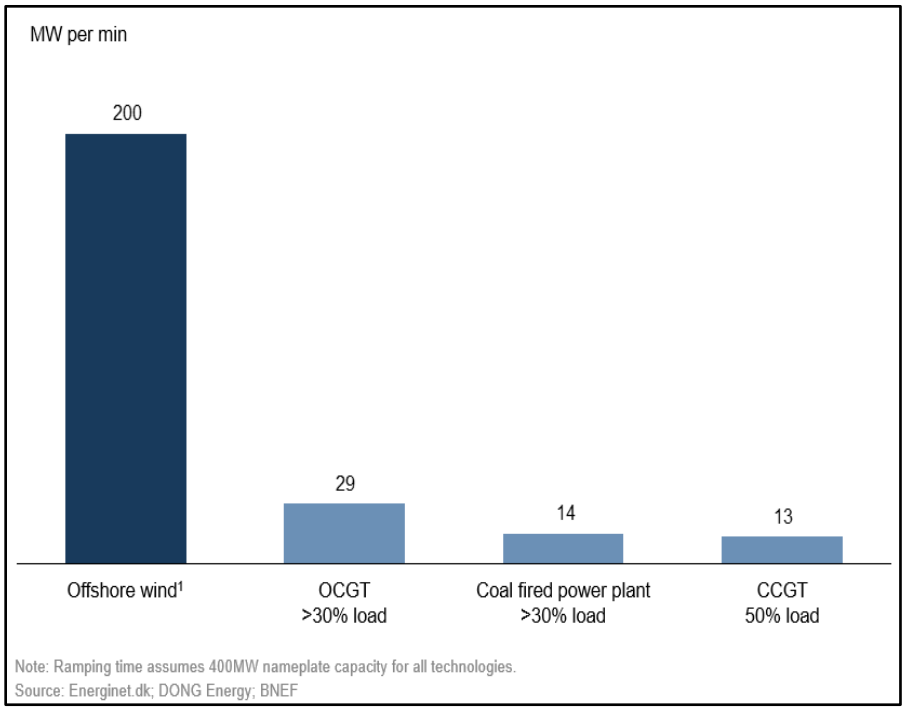
The Project will deploy software that allows it to automatically adjust its power output in response to the onshore grid frequency effectively providing inertial response to the grid. Furthermore, the Project has the capability to inject or absorb reactive power at all operating ranges. By utilizing this capability, the Project will aid ISO-NE in managing voltage on the transmission system without requiring additional reactive compensation. The extent to which the service can be beneficial to the ISO-NE is determined by the length of the cable from shore. The provision of a STATCOM onshore provides greater voltage stability for ISO-NE due to its fast reactive power response unlike other reactive power compensation equipment. This significantly improves the stability of the system and aids ISO-NE in avoiding cascaded trips and partial blackouts.

3.3.6 Project's Operating Flexibility Benefits for ISO-NE

The Project will be capable of quickly changing its power output from the power available at the given wind speed. If required, the Project could undergo a fast power ramp down and operate at lower stable export levels. This would allow ISO-NE to manage system flexibility needs and ensure the security of supply during high renewable production or from excess generation to stabilize the onshore grid frequency. Technically, a faster response provider can offset the need for larger volumes of response (i.e., a 1-MW fast response may have the equivalent impact of a 1.5-MW slow response). Additionally the fast acting capability of WTGs can also help stabilize grid oscillations by damping the power oscillating at certain frequencies. By utilizing this proven capability from the WTGs, ISO-NE will have access to a more flexible resource and can further optimize the frequency response needs (see Figure 3.3).

[3] Savings for the 800-MW project option is a linear scale-up of the estimated savings associated with a 400-MW project. Actual cost savings may differ.

Figure 3.3 Up- and Downwards Regulation of Production



Note: At wind speeds of 8m/s and above. Based on meso-scale data from the four nodes closest to the project site wind speeds were at 8m/s and above 63 percent of the time between 2006 and 2016.

3.3.7 Net Economic Benefits

Based on internal analysis, and using a cost-effectiveness model developed by LAI, **the Bidder has conservatively estimated that the overall net economic benefit of the Bay State Wind Project to ratepayers is more than [redacted] over the life of the Project**. These total net economic benefits are comprised of both **direct benefits** and **indirect benefits**.

Direct benefits are those offsetting credits flowing to the EDCs in connection with the products procured under an 83C PPA. These benefits would offset direct costs and would reduce net costs recoverable from ratepayers through the distribution charge.

- Energy Direct Benefit – Since energy procured under an 83C PPA will be resold into the wholesale market by the EDCs in the ISO-NE Day Ahead or Real Time Market, or both, the value of this benefit is the sum of hourly products of energy delivered and the hourly price (locational marginal price [LMP]) at the injection node (delivery point).
- REC Direct Benefit - Direct benefits from RECs are based on the market value of any RECs sold or the avoided market purchase cost of RECs that otherwise would have been purchased by the EDCs to cover Standard Offer load. Thus, the value may depend on the relative position of the EDCs in any year.

Indirect benefits do not flow directly through EDC tariffs, but rather (1) affect the costs of providing retail energy supply by Standard Offer or competitive providers through changes in wholesale prices of energy, capacity, and RECs.

- Energy Cost-to-Load – The annual sum of the hourly products of EDC loads and corresponding zonal market energy prices (LMPs).
- EDC Share of System-wide Production Cost – The annual sum of hourly variable production costs for all New England Generators, multiplied by a factor representing the Massachusetts EDC share of total load. In certain procurements, this measure has been used in a weighted sum with Energy Cost-to-Load in order to assess the impact on customers, in general, and Massachusetts residents, in particular. The EDC share of system-wide production cost tends to be a more robust indicator than Cost-to-Load both for an individual contract as well as for a portfolio of contracts.
- Capacity Cost-to-Load – The change in annual FCM charges assigned to Massachusetts EDCs attributable to the award of a given project or portfolio. The charges could be affected by the addition of the awarded project as a capacity resource and/or by changes in energy prices affecting the FCM clearing price.
- Transmission Cost – The deferral or avoidance of transmission costs to move renewable energy from Northern New England to Massachusetts load centers.

Although not directly counted in the cost-effectiveness test, these results are amplified when taking into account the 1,250 direct construction jobs; around [redacted] permanent O&M jobs and 10,853 indirect jobs and significant resultant economic activity from the Bidder's material long-term investment in the Commonwealth. These numbers also do not capture the value of avoided emissions, including greenhouse gas (GHG) emission reductions mandated under the GWSA.

3.3.8 Reliability Benefits from Project's Paired Battery Storage System

The Bidder recognizes the Commonwealth's laudable efforts to become a national and global leader in energy storage, including its support for projects that innovatively pair energy storage with offshore wind. The Bidder and its affiliates recognize the value of integrating energy storage with large scale renewable energy resources, and are deploying storage in multiple applications world-wide. For example, Eversource, through its affiliates, is developing one of the largest energy storage demonstration programs in the nation.[4] Similarly, Ørsted has demonstrated a strong commitment to integrating energy storage with large scale renewables including the soon-to-be commissioned (Q1 2018) 2-MW/2-MWh lithium-ion battery storage system at the 90-MW Burbo Bank Offshore Wind Farm. This energy storage system will provide rapid frequency response services thereby helping to maintain system stability at the appropriate frequency.[5] The Burbo Bank project marks the first time an offshore wind farm will integrate a battery storage system to deliver frequency response to the grid.

As part of the Project the Bidder will integrate a 55-MW/100-MWh lithium-ion battery storage unit at the OnSS. Through close collaboration with leading battery storage suppliers, the Bidder has tailored the energy storage system to best support the reliability of the ISO-NE

[4] MA DPU Docket 17-05.
[5] For the European market, the appropriate frequency is 50 Hz rather than the 60 Hz at which the U.S. power grid operates.

transmission system, encourage the development of the energy storage industry in the Commonwealth, and create a foundation for future innovative energy storage projects. These efforts have culminated in a letter of intent with [redacted], the Preferred Option (see Section 8.4 and Attachment 8-2). [redacted] storage solutions around the world including the recently completed [redacted] is committed to advancing energy storage technology through ongoing partnerships with other Massachusetts energy storage technology development vendors and our region's leading academic institutions.[6]

[redacted] Furthermore, as this would be the first time a large battery storage system is deployed alongside a large offshore wind farm in the U.S., the Project would secure a unique competence for [redacted]

As designed, the battery storage unit will function as a time-shifting device, charging in the off-peak hours when demand is low (e.g., hours 10:00 pm – 5:00 am), and releasing the energy during on-peak hours. The battery storage unit will be sized to have a capacity equivalent to approximately [redacted] percent of the Bidder's nameplate capacity (55-MW/100-MWh) and the ability to provide full discharge for 2 hours. This means that the battery will be able to **increase the Project's energy delivery by an average of [redacted] percent** every day during the 2-hour winter peak period. During summer months, the discharge can be spread over the 5-hour summer peak demand period, **increasing the Bidder's average energy delivery during peak demand by an average of [redacted] percent.**

This ability to shift significant amounts of energy to when it is most needed in the system will not only help increase system reliability, it will also have a tangible impact on winter and summer peak prices.

Through its ability to time-shift production, the Project will also support the Commonwealth's goal of maximizing the value of clean, renewable energy and reducing greenhouse gas emissions (see Section 13).

3.4 Moderation of System Peak Load

Describe how the proposal would contribute to moderating system peak load requirements and provide the following information:

i. Estimated average output for each summer period (June- September) from 1:00 - 6:00 pm

ii. Estimated average output for each winter period (October-May) from 5:00 – 7:00 pm

By delivering 800 MW clean energy generating capacity close to Massachusetts' main load centers, the Project will help moderate system peak load requirements throughout its [redacted] This is particularly true due to the Preferred Option's consistently high average production rate, achieved by deploying the WTG [redacted] In addition, the Bidder's proprietary site layout

[redacted]

optimization tools will enable it to minimize the shadowing effect between the WTGs (wake losses) and maximize the wind climate usage. Furthermore, by pairing the Project with a state-of-the-art 55-MW/110-MWh battery storage system, the Project can store production during hours with low demand and deliver them at periods of high demand, thus allowing it to better follow the Commonwealth's anticipated peak load hours (see Section 3.3.8). By doing this, the Project is able to create the most value for Massachusetts ratepayers. In the following section, the Bidder will quantify its contribution to moderating system peak load requirements.

Attachment 3-2 provides:

1) Net hourly energy production, based on the wind resource data (a 12 x 24 energy projection) at P50, with and without impact of battery storage system, the latter has been included solely for purposes of comparison as the Bidder intends to deploy the battery storage system. The attachment also includes the following information:
   - Estimated average output for each summer period (June- September) from 1:00 - 6:00 pm with combined offshore wind farm and battery storage system
   - Estimated average output for each winter period (October-May) from 5:00 – 7:00 pm with combined offshore wind farm and battery storage system

The strategic use of a battery to better cover the peak load demand leads to an uplift of [redacted] in summer and [redacted] in winter compared to the previously presented average productions.

The Project's production profile for an average day (24 hours) in July and March at P50 are provided in Figures 3.4 and 3.5. The peak hours, as defined in the RFP, have been highlighted. The chart displays two production profiles: (1) the blue line is the offshore wind asset in isolation, and (2) the red line shows the combined offshore wind farm and battery storage system and shows the increased energy delivery during peak hours as described above.

[redacted]

[redacted]

[redacted]

Section 4

Energy Resource and Delivery Plan

The outstanding nature of wind resources offshore Massachusetts is well documented. Ørsted has dedicated significant resources to data collection, modeling, and calibration. This work increases the confidence in the energy production projection essential to the Project's business case.

- In June 2017, Bay State Wind became the **first lease holder in New England to receive approval of its Site Assessment Plan** and subsequently **deployed two FLiDAR buoys and one wave buoy** to continuously monitor and assess the wind resource across the Lease Area.
- Bay State Wind uses **proprietary tools to optimize wind turbine layout to ensure maximum output**.
- [redacted]
- Bay State Wind is ready, willing, and able to supply Class-1 RECs.

[redacted]

trical
iency

%
uptime for each wind turbine

[redacted]

%
availability for the offshore substation

%
average net capacity factor

Anholt Offshore Wind Farm

4. ENERGY RESOURCE AND DELIVERY PLAN

In this section, the Bidder discusses the anticipated energy resource profile for the Project and the delivery of RECs, including related efforts in data collection, modeling, and wind climate prediction. Significant meteorological and metocean evaluations already underway are being supplemented by third party evaluations.

4.1 Energy Resource Plan

For Eligible Facilities, the bidder is required to provide an energy resource or fuel supply plan for its proposed project, including supporting documentation. The fuel supply/energy resource profile information should be consistent with the type of technology/resource option proposed and the term proposed. Bidders should respond to all information requests which are relevant to the bid in a timely manner.

A robust wind climate prediction regime is paramount to an accurate assessment of the energy resource profile for the Project. Ørsted has dedicated significant resources to data collection, modeling and calibration. This work increases the confidence in the energy production projection essential to the Project's business case. A constant communication line has been established with potential WTG manufacturers to ensure that the supplied power curve is representative for the site conditions. Finally, a set of assumptions for the expected efficiencies and availabilities has been thoroughly developed based on Ørsted's more than two decades of experience in wind farm operations, combined with Eversource's expertise in local conditions. The following section provides a detailed summary of the data that support the Bidder's prediction: 1) the primary wind data collected to date, plus reference data, summaries of third-party assessments, and other data collection efforts; 2) the projection of net AEP; 3) the Project's power curve; and 4) assumptions relating to physical, environmental, and operational factors affecting energy production.

All Projects

Provide a summary of all collected wind data for the proposed site. Identify when and how (e.g. meteorological mast or LiDAR – for "Light Detection and Ranging") the data was collected and by whom.

4.1.1 Wind Data

The Bidder has compiled Primary and Reference data in assessing the wind energy resource at the Project site. As described in more detail below, because the Primary data set is from a location distant from the Project Area, this dataset is used as a reference source of validated hub height wind speed data. The Bidder relies principally on modelled mesoscale Reference data in deriving its wind resource assessment. To increase the reliability and accuracy of the Reference dataset, it is necessary for the Bidder's wind resource experts to calibrate and adjust the data for known biases and long-term environmental conditions. These steps, and the resulting final climate analysis are described below. These data sources are described in more detail in the following subsections.

Additionally, and as discussed below, the Project has contracted with an unaffiliated third party to provide an independent assessment of the wind resource and energy yield of the Project.

Additionally, in June of this year, Bay State Wind became the first U.S. developer to receive approval from BOEM for deployment of a floating light detection and ranging (FLiDAR) and met ocean buoy. The discussion below describes the status and long-term benefit of this data collection effort.

Primary Data

Air-Sea Interaction Tower Light Detection and Ranging (LiDAR)

Since October 8, 2016, a WindCube V2 profiling LiDAR (unit WLS7 436) has been deployed at the Air-Sea Interaction Tower (ASIT) near Martha's Vineyard by the MassCEC. The ASIT is operated by Woods Hole Oceanographic Institution. The LiDAR campaign is executed by AWS Truepower and the data collected are in the public domain. The LiDAR is located 16 miles (26 km) from the proposed wind farm site area, and the measurement heights available are shown in Table 4.1. The position of the LiDAR on the tower is shown in Figures 4.1 and 4.2.

Table 4.1 Measurement Heights Relative to MSL (m)

Measurement heights relative to MSL (m)
53
60
80
90
100
110
120
140
160
180
200

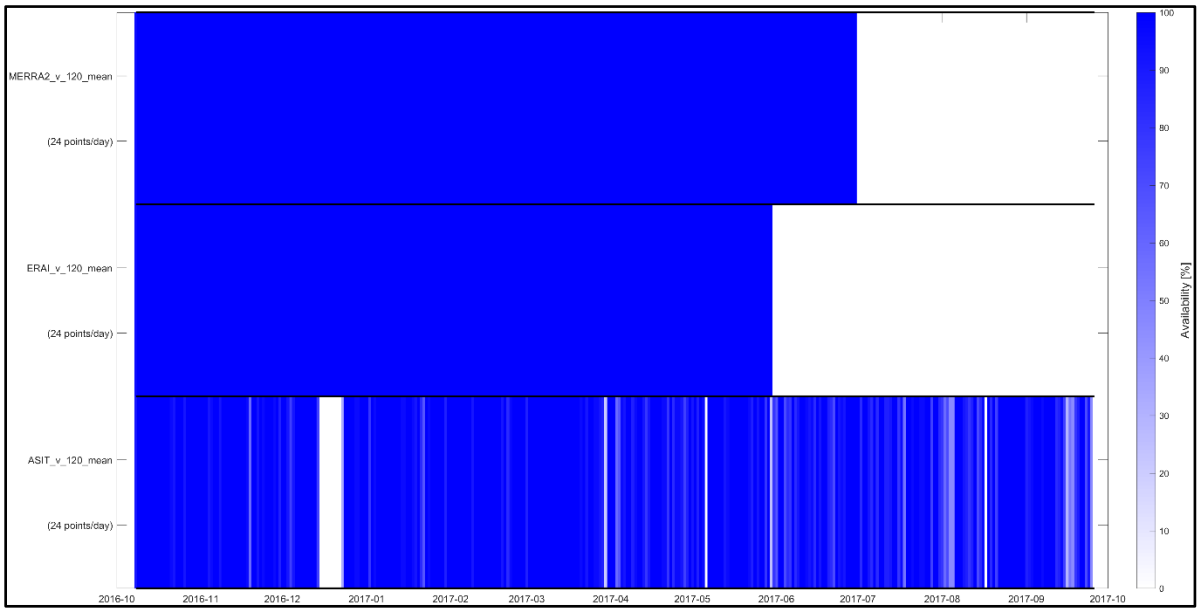
Figure 4.1 Air-Sea Interaction Tower. The location of the WindCube LiDAR is marked with the red circle.

Figure 4.2 The WindCube LiDAR at the Air-Sea Interaction Tower

Before deployment, WLS7 436 was validated by NRG Systems. The reference instrument was another WindCube LiDAR. The reference LiDAR had previously been certified by the Technical University of Denmark in a validation against an onshore met mast. NRG Systems validated the wind speed of WLS7 436 at heights of 40 m, 80 m, 120 m, and 160 m. The wind direction was validated at 100 m. The ASIT LiDAR is too far from the site to serve as a direct measurement of the wind conditions at the wind farm but it is a valuable reference source of validated hub height wind speed measurements.

The ASIT LiDAR data coverage was 92 percent. The data availability over time is plotted in Figure 4.3.

Figure 4.3 ASIT Lidar and Mesoscale Data Coverage



Reference Data

Vortex Mesoscale Data

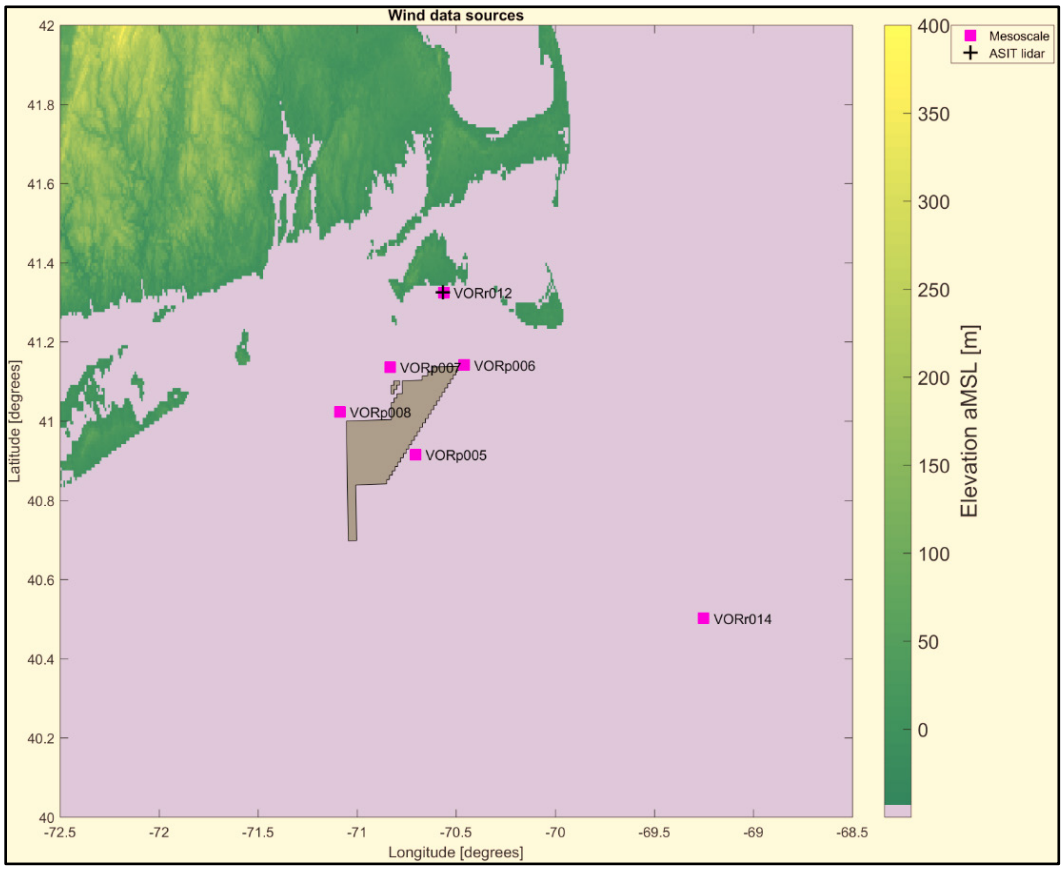
Mesoscale modelled data from the commercial provider Vortex is the primary source of wind data for the project (Table 4.2). The National Oceanic and Atmospheric Administration (NOAA) buoys and the Buzzard's Bay tower provide long-term data sources in the region, but they are at such low heights that vertical extrapolation to hub height would be highly uncertain.

Table 4.2 Vortex Mesoscale Data Summary.

Mesoscale Model Input Data	Parameters Applied	Period	Height [m]
MERRA2	Wind speed, wind direction, temperature, pressure	01/2006 – 06/2017	120 aMSL
ERAI			

The four mesoscale nodes closest to the site area, labeled VORp005, VORp006, VORp007, and VORp008, are used to derive a representative wind climate (Figure 4.4). Modeled data based on two input sources (MERRA2 and ERAI) are available at each node. The mesoscale data are available at heights from 50 m to 150 m above mean sea level (aMSL) in steps of 10 m. The wind climate is derived from the level at 120 m aMSL, as this is closest to hub height.

Figure 4.4 Elevation Map of the Lease Area with the Wind Data Sources



Mesoscale Model Calibration

It is known that mesoscale wind speeds can be biased compared with calibrated reference instruments. Therefore, the mesoscale model is corrected using the wind data from the ASIT LiDAR and the mesoscale node VORr012 co-located with it (Figure 4.5). It is assumed that the corrections derived at the ASIT location are applicable across the region, since the model governing the mesoscale data is the same.

[redacted]

Since the mesoscale data are sampled hourly, the 10-minute LiDAR data are averaged to hourly values. Only LiDAR data with availability higher than 80 percent are included. In addition, for hours where less than 80 percent of the data are usable after filtering on availability, the average is set to not a number (ignored). The concurrent period is the period with simultaneous data for the ASIT LiDAR and *both* mesoscale sources. It is limited by the lag in the mesoscale data, which are only available after some time (Figures 4.3 and 4.5).

Two separate methods for correcting the mesoscale modelled data are used:

- **Scaling:** The scaling method derives a scaling factor as the ratio between the LiDAR mean wind speed and the mesoscale mean wind speed over the concurrent period. Only timestamps where both the LiDAR and the mesoscale wind speeds are defined and less than 25 m/s are included. A separate scaling factor is derived for ERAI [redacted] and MERRA2 [redacted]
- **Calibration:** The calibration method compares mesoscale to LiDAR wind speeds in 30° sectors defined by the mesoscale wind direction. A linear regression with an offset defines the relation between the mesoscale and LiDAR wind speeds. This relation is used to correct the mesoscale wind speeds corresponding to wind directions in the smaller interval of ±2.5° around the center of the sector. A sector-wise calibration is obtained by shifting the regression sector in steps of 5°. A separate calibration is undertaken for the ERAI and MERRA2 mesoscale wind speeds. The sector-wise results are illustrated in Figure 4.6. The scaling parameters and the sector-wise linear regression parameters are then applied to the four mesoscale nodes surrounding the wind farm. The mesoscale wind direction is not corrected.

[redacted]

The correlation between the ASIT LiDAR wind speed and the mesoscale modelled wind speed without correction, with the mean wind speed scaling and the calibration method are shown in Figures 4.7, 4.8, and 4.9, respectively.

[redacted]

[redacted]

[redacted]

From the qualification of mesoscale models in Europe it is known that the mesoscale wind speed distribution is skewed relative to measurements, resulting in a larger Weibull k-factor and a positive bias on the AEP. To correct for this the AEP is calculated for both the mesoscale data and the ASIT LiDAR in the concurrent period.

Figure 4.10 shows that the corrected mesoscale has a positive bias on both the gross and the net AEP, as expected from previous findings in Europe. The average bias over the two correction methods and the ERAI and MERRA2 sources is [redacted]. Hence a gross AEP adjustment with an efficiency of [redacted] is applied in the yield calculation.

[redacted]

Wind Shear

A wind shear is derived by fitting the wind speed profile at each of the four mesoscale nodes to a power law profile. It is assumed that any correction to the mesoscale wind speeds is the same at all heights. Hence the shear is calculated from the uncorrected mesoscale data. A separate shear is calculated for the ERAI and MERRA2 data.

The wind shear from the mesoscale modelled data is divided up in to 12 sectors as can be seen in Table 4.3 and Figure 4.11. The observed variation across sectors is typical of offshore sites.

[redacted]

[redacted]

With an average wind shear of [redacted] the mean wind speed is expected to increase by approximately [redacted] for an increase of 10 m around hub height.

Long-term Wind Climate

Only full data years are included in the wind climate analysis. The mesoscale time series at the four nodes closest to the wind farm site cover the period 2006-2016 at the time of writing. New data become available monthly, but with a lag of a few months.

To correct for any deviation from the long-term mean wind speed over the period 2006-2016 the mesoscale node VORr014 is used, since for this location a time series extending back to 1996 was purchased. A long-term correction factor is derived for both the ERAI and the MERRA2 wind speed data by calculating the mean wind speed at 120 m aMSL at VORr014 in the period 2006-2016, which is concurrent with the data at the four primary mesoscale nodes, and in the period 1996-2016, which constitutes the long-term period. The ratio of former to the latter gives the long-term correction factor, which is applied to the wind speeds. These are summarized in Table 4.4.

Table 4.4 Long-term Correction Factors

Mesoscale source	Long-term correction factor [-]
ERAI	[redacted]
MERRA2	[redacted]

Vertical Extrapolation of Wind Climate

With the assumed power law wind speed profile the wind climate is extrapolated from 120 m aMSL to hub height. This is handled in the energy yield calculation as a function of wind direction. For reference, the mean wind speed at hub height is summarized in Table 4.5.

[redacted]

Final Wind Climate on Site

A representative wind climate is derived by averaging all the corrected mesoscale time series across the four nodes. Similarly, the wind direction, temperature, and pressure time series are also averaged. For the wind directions, a vector average is used.

The evolution of the mean wind speed from the uncorrected mesoscale data to the final wind climate are summarized in Table 4.5. The wind rose is illustrated in Figure 4.12 while Figure 4.13 shows the wind speed distribution considering all wind direction sectors.

[redacted]

[redacted]

Raw wind speed measurements from the ASIT LiDAR and mesoscale data from all used nodes, as well as time series of the final wind climate for the site are shared in Attachment 4-1.

Indicate where the data was collected and its proximity to the proposed site. Include an identification of the location and height for the anemometers and/or "range gate" heights for sensing by LiDAR that were used to arrive at an assessment of the site generation capability.

See the preceding discussion for a description of where the data was collected and its proximity to the proposed site.

Describe any additional wind data collection efforts that are planned or ongoing.

Planned and Ongoing Wind Data Collection Efforts

The Bidder is currently conducting meteorological and metocean evaluations, inclusive of wind speed and direction at multiple heights, as part of the site assessment activities of the Project within the Lease Area. The Site Assessment Plan (SAP) describes how, where and when the data will be collected. A copy of the SAP, as posted on the BOEM website, is included as Attachment 4-2 and the BOEM approval letter from June 29, 2017 is included as Attachment 4-3. On July 8, 2017, the Project deployed two [redacted] and one [redacted] Buoy within the Lease Area. While data will be collected for at least 24 months, the first data is already becoming available for analysis now and demonstrates an encouraging agreement with the wind climate data that the Bidder derived from its mesoscale data and the wind measured from the Woods Hole Oceanographic Institution LiDAR at the Air-Sea Interaction Tower. The Bidder will continue to analyze the floating LiDAR outputs as they becomes available, but the initial data is proving how valuable it is for the Bidder to be the

first lease holder in New England to receive BOEM approval of its SAP and the only one with FLiDAR units deployed within its lease area.

Provide (a) at least one year of hourly wind resource data. Real Data collected from the site is preferred, though projected data is permissible. Methodology must also be included and (b) a wind resource assessment report from a qualified unaffiliated third party wind resource assessment firm. Include an analysis of the available wind data which addresses the relationship between wind conditions and electrical output.

See Attachment 4-1. A discussion of the methodology and analysis of wind resource data is provided above.

In addition to this ongoing data collection, and as discussed above, the Bidder has enlisted [redacted] to provide a third-party wind assessment (Attachment 4-4).

[redacted]

Provide a projection of net annual energy production, including projections of average net hourly energy production, based on the wind resource data (a 12 x 24 energy projection) at both P50 and P90 levels.

4.1.2 Projection of Net Annual Energy Production

As a first step, the gross energy yield is estimated from the wind resource data and the WTG power curve (Section 4.1.3), following the procedure described in the International Electrotechnical Commission (IEC) 61400-12-1 standard.

The gross yield estimate is the theoretical yield that the wind farm can produce based only on the power curve and the wind resource. No losses are included in the number. The gross yield can never be realized as production will be lost due to wake losses, availability, and other losses.

As a second step, the wake losses (see Section 4.1.4) are calculated based on the WTG positions, the wind resource frequency distribution, and the WTG power and Ct curves.

Finally, additional efficiencies and availabilities are applied to derive the net P50 AEP. The net AEP is the annual energy delivered from the wind farm to the interconnection point at the grid. The assumptions for efficiencies in the calculation of projected AEP are provided in Section 4.1.4.

The calculation of the AEP at the P90 level follows the procedures laid out in Guide to the Expression of Uncertainty in Measurement (GUM)[7]. The sensitivity of the AEP on the wind speed is calculated considering the non-linear nature of the power curve. For the uncertainties not depending on the wind speed, the sensitivities are set to the magnitude of

[7] Joint Committee for Guides in Metrology. 2008. Evaluation of Measurement Data – Guide to the Expression of Uncertainty in Measurement. JCGM 100:2008. Available online at: https://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf.

the given loss (i.e., 1-efficiency). The total uncertainty on the production is the square root of the sum of squares of all the individual uncertainties (weighted by their sensitivities). From the total uncertainty, the net AEP at the P90 level (or any other percentile) can be found by assuming that the AEP distribution is a normal distribution with a mean value of net AEP (P50) and a standard deviation given by the total uncertainty.

The Net AEP (P50 and P90) is presented in Table 4.6.

Table 4.6 Net Annual Energy Production (P50 and P90)

Net AEP	GWh/y
P50	[redacted]
P90	[redacted]

The average gross and net hourly AEP for P50 and P90, based on the wind resource data presented in Section 4.1.1, are provided in Attachment 4-5. Note that no energy storage impact is included.[8] Based on the long-term wind climate, a time series of hourly gross production is derived. The P50 and P90 levels for each hour and month are calculated. The P50 (P90) is the median (P90 percentile) of the production values in a given hour and month. The variation represents the fluctuations in the wind speed from day to day within a month and from year to year.

In a second step, the P50 and P90 production in each hour and month is divided by the total gross production over the year to generate the corresponding fraction of the production occurring in a particular hour on a representative day of a particular month. Finally, the fractional production values are scaled by the net AEP, producing a 12x24 matrix of projected hourly energy generation in MW. All losses and availability assumptions are included. The losses are assumed to be distributed evenly across all hours, months and years.

[redacted]

Provide a site-adjusted power curve. Each curve should list the elevation, temperature and air density used.

4.1.3 Power Curve

A site-adjusted power curve is provided below in Table 4.7 and depicted in Figure 4.14.

The power curve is the relation between the wind speed and the produced power for a single WTG. The site-adjusted power curve is specified at the mean air density at the site. This is calculated following the procedure in IEC 61400-12-1, corresponding to the hub height of 119 m aMSL and a mean site temperature of 11.2 degrees Celsius (°C). The resulting mean air density at hub height is [redacted] kg/m^3. The Ct value is the thrust coefficient. It expresses

[8] Similar 12x24h production matrices are included in the third-party wind assessment (Attachment 4-4). Note however, that in the third party report, the entries in the matrices correspond to monthly totals in a given hour reported in GWh, while in Attachment 4-5 the values representing an average day for every hour and month are reported in MWh. Therefore, the values in Attachment 4-5 have to be multiplied by the number of days in a month and divided by 1000 to be compared with the values in Attachment 4-4.

how much force the WTG exerts on the flow as a function of wind speed. This input is necessary for the calculation of the wake losses.

The WTGs in this proposal have a nameplate capacity of [redacted] kilowatt (kW). [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]	[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]	[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]

[9] This is further attested to by the independent engineering company [redacted] in their third party wind resource assessment report (Attachment 4-4) [redacted] (Attachment 4-6).

[redacted]

Identify the assumptions for losses in the calculation of projected annual energy production, including each element in the calculation losses.

4.1.4 Physical, Environmental and Operational Efficiencies and Availabilities

The following physical, environmental, and operational losses are assumed in calculating the Project's projected AEP.

Wake. Each WTG creates a turbulent wake effect which in a wind farm can impact downwind WTGs. The N.O. Jensen model is used to calculate the wake efficiency using the specified power and thrust curves for each WTG. The calculations are based on a wake decay coefficient of [redacted]. Wake losses are calculated to reduce overall WTG efficiency to [redacted] percent.

High-Wind Hysteresis. High wind hysteresis losses occur when the WTG has stopped production at high wind speeds because one of the stopping criteria has been met (e.g., too high wind or too strong gusts).

The WTG will only restart when the wind is below a certain criterion so there will be a period where the WTG could in theory be producing but it is not because it is waiting for the wind to be low enough to initiate the restart. This results in what is called high wind hysteresis loss.

[redacted]

Blade Surface Roughness. Contamination of the rotor by dirt and insects will lead to an increase in the surface roughness, which in turn leads to lower aerodynamic efficiency of the blade. Offshore, due to the remote location, the occurrence of blade contamination due to

dirt and insects is expected to be quite low. In addition, the expected high frequency of sustained periods of rain will act as a very efficient cleaning system for the blades, reducing any contamination to a negligible level. It has been also assessed that the risk of icing is negligible at the wind farm location. Based on all the considerations above, the Blade Surface Roughness efficiency is set to 100 percent.

Representativeness of Wind Conditions. This adjustment factor accounts for potential adjustments to the power curve due to the differences between the wind conditions under which the power curve is measured and under which the wind turbines operate within the offshore wind farm. This is represented by an adjustment of [redacted] on the power curve.

Induction Zone Adjustment. This adjustment accounts for the free wind speed, as measured during power curve tests, being affected by the WTG induction zone, also known as compression zone effect, which have a boosting effect. The adjustment to the power curve is done with a factor of [redacted] percent.

Electrical Efficiency. Modeled electrical efficiencies for the wind farm and electrical system are estimated to be [redacted] percent based on the specific planned wind farm layout. The factor includes efficiencies gained from use of cutting-edge technologies such as the WTG transformer, array cables, export cables and substations (transformer units, reactors and filters).

Turbine Availability. Each WTG's availability is assumed to be [redacted] percent uptime from year [redacted] and [redacted] percent from year [redacted] onwards, which is an estimate based on Ørsted's experience gained from operating wind farms using mature WTG technology (Figure 3.1), furthering improvement and performance management. This factor takes account of scheduled and unscheduled losses due to downtime of the WTGs. Ramp-up adjustments are accounted during the early operation start-up.

Array Cable Availability. The array cables availability is assumed to be [redacted] percent uptime, based on Ørsted's experience gained from operating wind farms. Issues that may affect availability are the design of the cable entry system and ground conditions on the site.

Substation Availability. The OSS is expected to have an availability of [redacted] percent, which accounts for the energy lost in the offshore electrical components including [redacted] transformers and offshore shunt reactors. The OnSS availability is [redacted] percent, which includes losses in the onshore transformers, shunt reactors, harmonic filters and STATCOMs. These factors take account of scheduled and unscheduled losses due to downtime. Scheduled downtime is reduced to an absolute minimum by 1) designing the system with dual transformers and 2) performing scheduled maintenance during the low-wind months and on one transformer at a time.

Export Cable Availability. This factor takes account of losses due to failures of the export cables, both offshore and onshore, and is represented by an availability of [redacted]

Grid Availability. Grid availability can be defined as the losses due to the main onshore transmission grid being unavailable, and it is represented by an availability of [redacted] percent.

[redacted]

[redacted]

4.2 Offshore Wind Energy Generation Delivery Plan

Please provide an energy delivery plan and profile for the proposed project, including supporting documentation. The energy delivery profile must provide the expected Offshore Wind Energy Generation to be delivered into the ISO-NE market settlement system and permit the Evaluation Team to determine the reasonableness of the projections for purposes of Sections 2.2.1.3 Eligible Bid Categories and 2.2.1.7 Minimum Contract Size of the RFP. Such information should be consistent with the energy resource plan provided above and also considering any and all constraints to physical delivery into ISO-NE.

The energy delivery plan is based on the input and methodology presented in Sections 3.4 and 4.1.2, and it is provided as a P50 average year expectation for the hourly profile (see Attachment 3-2). Additionally, the energy delivery plan includes the benefits from the energy storage battery proposed in Sections 3.3.8 and 3.4.

The energy delivery profile provided here confirms that the Project conforms to all requirements set out in Section 2.2.1.3 of the RFP, including:

1. A price schedule for energy delivery conforming to Section 2.2.1.4 of the RFP (see Part III and VI in the CPPD, Attachment 1-1)
2. A proposal that consists of a GLL and ETS project as required by Sections 2.2.1.3.1 and 2.2.1.3.2 of the RFP (see Sections 8 and 15 in the Bid)
3. The Project will propose a battery storage system to create the most value for Massachusetts ratepayers and as such the delivery profile will conform to the request that a Project's energy delivery follows the Commonwealth's load as closely as possible. This is further elaborated upon in Sections 3.3.8, 3.4, 4.1, and 4.2.

Further, the Project conforms to all requirements of Section 2.2.1.7 of the RFP. As described in Section 6.6, the Bidder has already received a queue position from ISO-NE [redacted]), and ISO-NE completed its Feasibility Study for the Project's interconnection at Brayton Point on April 7, 2017. In the study, ISO-NE found that the Bidder could connect 800 MW at the Brayton Point POI with no need for system upgrades. Additionally, ISO-NE has completed a Preliminary Non-Binding Overlapping Impact (PNOI) Study with 800 MW of injection to the Brayton Point 345-kV Substation. This study assesses the Project's ability to provide incremental capacity in a manner that meets the Capacity Capability Interconnection Standard (CCIS). The PNOI Study assessed the injection of 800 MW and identified upgrades. However, given the Project's anticipated Qualified Capacity of [redacted] in summer and [redacted] in winter, the Bidder anticipates that the binding ISO-NE study will find no upgrades will be required. In the event that the ISO-NE binding study does identify upgrades, these will be constructed as necessary. This is also discussed in the CPPD, Part VII.

[redacted]

[redacted]

[redacted]

4.3 REC/Environmental Attribute Delivery Plan

Please provide documentation demonstrating that the project will Deliver GIS Certificates representing those RECs or Environmental Attributes.

As an Offshore Wind Energy Generation proposal, this Project will produce Class-1 Renewable Energy Certificates (RECs) (see Section 7.6). The Bidder will use the New England Power Pool (NEPOOL)-generation information system (GIS) to track these Class-1 RECs and their environmental attributes as they are delivered throughout the lifetime of the Project. While the Bidder has not currently registered with NEPOOL-GIS it will do so at the appropriate time to allow it to deliver GIS Certificates as required by the RFP. As required by the form of PPA, the Bidder will deliver RECs either directly into each EDC's account or execute an irrevocable forward transfer certificate. Documentation will be provided once available.

Section 5

Financial / Legal

Bay State Wind consists of **two of the most stable and diverse energy companies with unrivaled balance sheets** to support the Project. Ørsted and Eversource are committed to this Project and have invested more than [redacted] million to date to support development.

- The Bidder's **financial resilience** will insulate the development, construction, and operation of the Project from the inevitable fluctuations of the business cycle, and eliminate the need for external financing.
- Ørsted and Eversource have the **financial capability** to construct up to 800 MW without the need to bring in tax equity partners, thereby eliminating the need for costly tax equity investment and greatly reducing overall financing execution risk.
- The Project will allow the Commonwealth to **fully utilize the value of the [redacted] Federal Investment Tax Credit**, thereby maximizing considerable cost reductions for Massachusetts ratepayers.
- Across its portfolio, Ørsted has brought 95% of all projects receiving final construction permits to fruition—a **remarkably high success rate**.

Orsted and Eversource Energy Credit Ratings

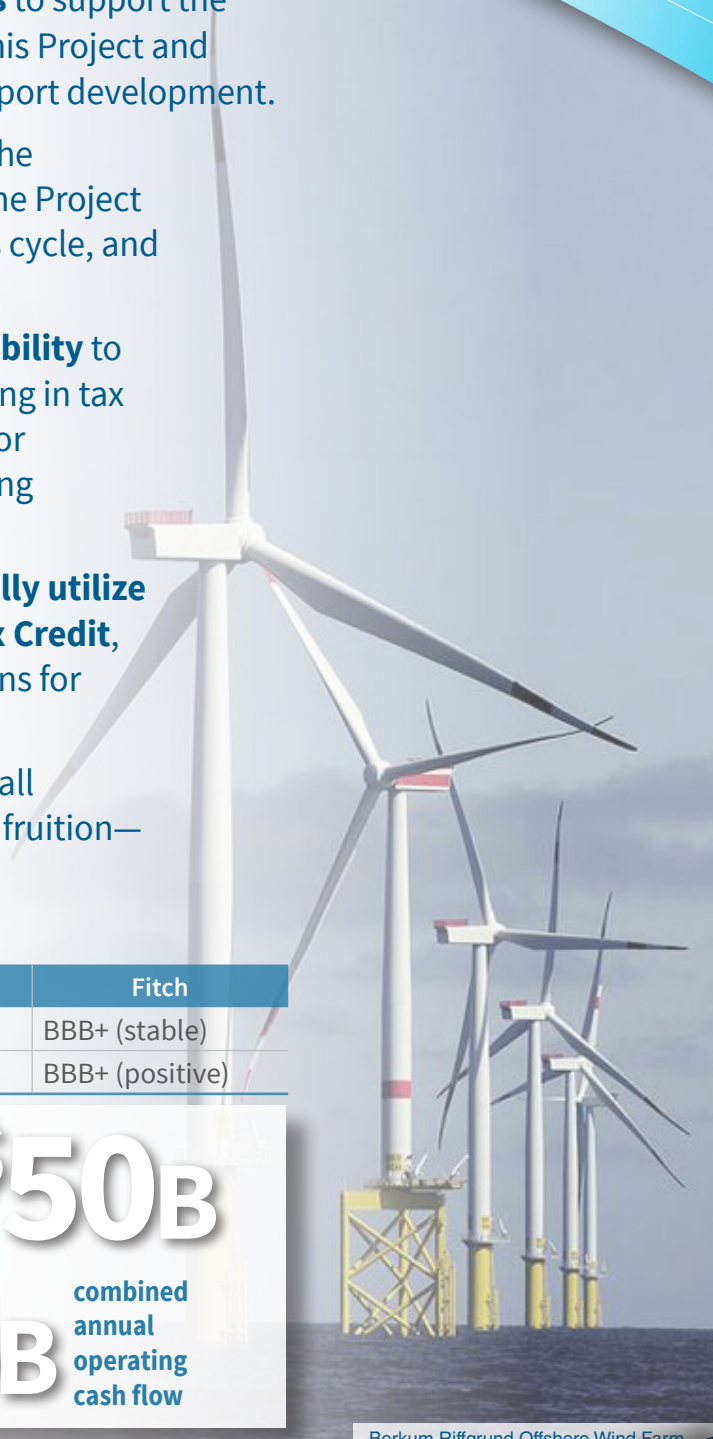
Sponsor	S&P	Moody's	Fitch
Orsted A/S	BBB+ (stable)	Baa 1 (stable)	BBB+ (stable)
Eversource Energy	A+ (stable)	Baa 1 (stable)	BBB+ (positive)

20+ offshore wind farms financed

Owners' assets total more than **$50B**

100% funded by equity contributions

~$4B combined annual operating cash flow



Borkum Riffgrund Offshore Wind Farm

5. FINANCIAL/LEGAL

Bidders are required to demonstrate the financial viability of their proposed project.

The proposed Project's financial viability is based on several factors, primarily the financial strength of Ørsted and Eversource, and their combined experience in financing, constructing, and operating offshore wind generation around the world and electric distribution and transmission facilities in New England. Ørsted and Eversource are publicly traded companies with a combined market capitalization of approximately $40 billion, and combined operating cash flows of approximately $4 billion annually. Their financial strength and proven track record have been, and will continue to be, critical in enabling them to fund project construction and operation, and, where desirable, to attract capital from investors on terms more favorable than less financially robust developers could obtain. The financial strength of Ørsted and Eversource – and by extension the Bidder's financial strength – is described in greater detail in the following responses.

5.1 RFP Provides for Predictable, Long-Term Revenue Stream

5.1 Each bidder is required to submit information and documentation that demonstrates that a long term contract resulting from this RFP Process would either permit the bidder to finance its proposal that would otherwise not be financeable, or assist the bidder in obtaining financing of its proposal.

Long-term PPAs awarded through this RFP Process will create a predictable, long-term revenue stream from credit-worthy counterparties that appropriately value clean, renewable energy from offshore wind generation. The prospect of predictable, long-term revenue will give the Bidder and its affiliates the certainty necessary for them to make the substantial capital contributions needed to finance the Project, not to mention significant flexibility in financing it. This flexibility, combined with the considerable financial strength of Ørsted and Eversource, will give the Bidder and its affiliates access—if needed—to the lowest-cost sources of capital, ultimately reducing the cost of the clean energy delivered from the Project to Massachusetts ratepayers.

5.2 Business Entity Structure

5.2 Please provide a description of the business entity structure of the bidder's organization from a financial and legal perspective, including all general and limited partners, officers, directors, managers, members and shareholders, involvement of any subsidiaries supporting the project, and the providers of equity and debt during project development. Provide an organization chart showing the relationship between the equity and debt participants and an explanation of the relationships. For jointly owned facilities, identify all owners and their respective interests, and document the Bidder's right to submit a binding proposal.

The Bidder is 50 percent controlled by each of ESI and Ørsted NA. Specifically, ESI and Ørsted NA (together, the Owners) jointly own the Bidder's parent company (and sole member-manager), Bay State HoldCo LLC. Bay State HoldCo LLC is managed by a four-person board of directors who constitute "managers" within the meaning of the Delaware Limited Liability Company Act. At the direction and under the supervision of the directors of Bay State HoldCo LLC, the Bidder's project-development activities are facilitated by a four-person steering

committee. The individuals who hold (and have previously) held these positions are listed in Section 5.7.

The Bidder has no subsidiaries, but has two affiliates (in addition to its parent) that are likewise jointly controlled by the Owners: BSW ProjectCo LLC and its sole member-manager, BSW HoldCo LLC. The governance of BSW ProjectCo LLC and BSW HoldCo LLC mirrors that of the Bidder and Bay State HoldCo LLC, with the same individuals serving on the boards of directors and steering committees for both sets of companies. An organization chart depicting the foregoing structure is provided in Figure 5.1.

[redacted]

As previously noted, the Bidder holds a federal offshore wind energy lease (BOEM Renewable Energy Lease No. OCS-A 0500), as well as certain other property rights, and has engaged in permitting activities for the proposed Project. BSW ProjectCo LLC has to date engaged in project development activities for the proposed Project, such as entering into agreements with partners, consultants, and property owners, as well as contributing to the drafting of this proposal. In the event that the proposed Project is selected in this RFP for negotiation, the Bidder intends to: (1) assign the geographic portion of BOEM Renewable Energy Lease No. OCS-A 0500 where the proposed Project will be constructed from Bidder to BSW ProjectCo LLC, as provided by BOEM's regulations (and as further discussed in Section 6.2.1); and (2) sign PPAs associated with the proposed Project with the EDCs in the name of BSW ProjectCo LLC.

The development, construction and operation of the Project will be supported by the Owners and their affiliates. Specifically, Ørsted North America and its affiliates will be supplying construction, operation, and maintenance services for the offshore portions of the Project, while Eversource Investment and its affiliates will be supplying those services for the onshore portions of the Project. Ørsted is the industry leader in offshore wind, having constructed 3.8 GW of generation over the past 25 years across numerous markets (approximately 30 percent of global installed capacity), with another 5.0 GW under construction. Ørsted's 2,000+ employees together possess unparalleled expertise in offshore wind design, engineering, permitting, finance, procurement, construction, and operation that will be put to use for the benefit of the Project. Eversource is likewise an industry leader in its field, having successfully developed hundreds of transmission projects over the past decade. Relying on 8,000 employees across the region, Eversource has unmatched knowledge of New England's electrical system, and extensive experience in interconnecting renewable resources in a reliable and cost-effective manner. Ørsted and Eversource's capabilities, track records, and collective talent pool—all of which are further discussed in Section 12—are invaluable assets, and when paired with the companies' financial strength will ensure that the Project delivers reliable, cost-effective renewable energy to Massachusetts ratepayers.

To date, the Owners have provided funding to the Bidder by providing equity contributions to Bay State HoldCo LLC, which Bay State HoldCo LLC has in turn used to provide equity contributions to the Bidder. The Owners have taken the same approach to funding BSW ProjectCo LLC through BSW HoldCo LLC, and intend to continue funding both the Bidder and BSW ProjectCo LLC in this manner until operation. Section 5.3 provides further explanation of the expected financing plan.

The Bidder has been authorized to submit this proposal by a written consent from its sole member, Bay State HoldCo LLC. A copy of the written consent is included as Attachment 5-1.

5.3 Description of Financing Plan

5.3 Please provide a description of the financing plan for the project, including construction and term financing. The financing plan should address the following:

i. Who will finance the project (or are being considered to finance the project) and the related financing mechanism or mechanisms that will be used (i.e. convertible debenture, equity or other) including repayment schedules and conversion features

The Project will be financed by its Owners, which plan to finance the development, construction, and operation of the Project with 100 percent equity. Since the financing for the Project will solely be equity from its Owners and not reliant upon outside parties, a detailed financing plan is not necessary; however, additional details are included herein. Ørsted and Eversource's combined financial strength eliminates the risk project-level financing imposes on projects of this type, ensuring that financing issues will not delay project construction or otherwise impede the delivery of clean energy to Massachusetts ratepayers.

Ørsted will secure the funds for its portion of the capital contributions to the Project as it does for all the projects across its portfolio of offshore wind farms and non-wind energy projects, through a combination of:

- Cash flow from existing business (~$1.6 billion cash flow from operating activities in 2016);
- Debt issuance by Ørsted; and
- Capital recycling through divestment of assets (~$1.3 billion cash flow from divestments in 2016).

Eversource will secure the funds for its portion of the capital contributions to the Project as it does for its other energy infrastructure investments, through a combination of:

- Internally generated cash flow (~$2.2 billion cash flow from operating activities in 2016); and
- Debt issuance by Eversource

ii. The project's existing initial financial structure and projected financial structure

As discussed in Section 5.3.i, the Project is currently financed with 100 percent equity, equally contributed by Ørsted and Eversource through Bay State HoldCo LLC and BSW HoldCo LLC. The financial structure will be 100 percent equity during development, construction and operation.

iii. Expected sources of debt and equity financing

As discussed in Section 5.3.i, the Project will be financed with 100 percent equity from its Owners.

iv. Estimated construction costs

[redacted]

[redacted]

[redacted]

v. The projected capital structure

As discussed in Section 5.3.i, the Project's projected capital structure will be 100 percent equity.

vi. Describe any agreements, both pre and post commercial operation date, entered into with respect to equity ownership in the proposed project and any other financing arrangement.

Ørsted and Eversource entered into multiple agreements related to the ownership, financing, development, and operation of the Project in December 2016. First, ESI acquired a 50 percent membership interest in Bay State HoldCo LLC (the Bidder's sole member-manager), as well as in BSW HoldCo LLC (the sole member-manager of BSW ProjectCo LLC), through two subscription agreements. Second, the Owners entered into two limited liability company agreements, for Bay State HoldCo LLC and BSW HoldCo LLC, respectively that provide for governance of all four jointly-controlled companies, as well as the mechanics of project financing. (As discussed in Section 5.2, the Bidder intends to assign a portion of its offshore lease to BSW ProjectCo LLC in the event of success in the RFP Process, and for BSW ProjectCo LLC to enter into PPAs with the EDCs.)

In addition, the financing plan should address the status of the above activities as well as the financing of development and permitting costs. All bidders are required to provide this information.

As of December 2017, the Owners have spent [redacted] on the Project, all financed with 100 percent equity equally contributed from the Owners. Remaining funding will be contributed as equity in accordance with approved capital budgets under the applicable agreements referenced above. No other financial agreements or external resources are needed for the Project to move forward.

5.4 Bidder Experience in Securing Financing

5.4 Provide documentation illustrating the experience of the bidder in securing financing for projects of similar size and technology. For each project previously financed provide the following information:

i. Project name and location

ii. Project type and size

iii. Date of construction and permanent financing

iv. Form of debt and equity financing

v. Current status of the project

Ørsted is the world's leader in offshore wind development and construction, with over 25 years of experience executing complex capital projects, including 22 operational offshore wind projects with 3.8 GW of operational capacity. Similarly, with the completion of hundreds of capital projects over the past decade, Eversource has established a successful track

record in delivering customer value and demonstrated expertise in building, financing, owning and maintaining infrastructure for the electric industry. Eversource's annual investment in energy infrastructure has averaged $1.8 billion over the last three years ending 2016.

Tables 5.1 and 5.2 provide lists of offshore wind projects and other large energy distribution projects financed and developed by the Owners.

Table 5.1 Projects Financed and Developed by Ørsted

Project Name	Location	Type	Size (MW)	Construction Start (Year)	Construction Capital Structure / % Ørsted	Commercial Operation (Year)	Permanent Capital Structure (Year)	Permanent Capital Structure / % Ørsted	Status
Borssele 1&2	Netherlands	Offshore Wind	700	TBD	100% Equity / 100% Ørsted	2021	TBD	TBD / TBD	Under Construction
Hornsea 1	United Kingdom	Offshore Wind	1,218	2016	100% Equity / 100% Ørsted	2019	TBD	TBD / TBD	Under Construction
Borkum Riffgrund 2	Germany	Offshore Wind	450	2017	100% Equity / 100% Ørsted	2019	2017	100% Equity / 50% Ørsted	Under Construction
Walney Extension	United Kingdom	Offshore Wind	660	2015	100% Equity / 100% Ørsted	2018	2017	TBD / TBD	Under Construction
Race Bank	United Kingdom	Offshore Wind	573	2015	100% Equity / 100% Ørsted	2018	2017	100% Equity / 50% Ørsted	Under Construction
Burbo Bank Extension	United Kingdom	Offshore Wind	258	2015	100% Equity / 100% Ørsted	2017	2016	100% Equity / 50% Ørsted	Operating
Gode Wind 1	Germany	Offshore Wind	332	2015	100% Equity / 100% Ørsted	2016	2015	100% Equity / 50% Ørsted	Operating
Gode Wind 2	Germany	Offshore Wind	252	2015	100% Equity / 100% Ørsted	2016	2014	100% Equity / 50% Ørsted	Operating
Westermost Rough	United Kingdom	Offshore Wind	210	2014	100% Equity / 100% Ørsted	2015	2014	100% Equity / 50% Ørsted	Operating
Borkum Riffgrund 1	Germany	Offshore Wind	312	2013	100% Equity / 100% Ørsted	2015	2012	100% Equity / 50% Ørsted	Operating
West of Duddon Sands	United Kingdom	Offshore Wind	389	2013	100% Equity / 50% Ørsted	2014	2010	100% Equity / 50% Ørsted	Operating
Anholt	Denmark	Offshore Wind	400	2012	100% Equity / 100% Ørsted	2013	2011	100% Equity / 50% Ørsted	Operating
Gunfleet Sands 3	United Kingdom	Offshore Wind	12	2012	100% Equity / 100% Ørsted	2013	2012	100% Equity / 100% Ørsted	Operating
Lincs	United Kingdom	Offshore Wind	270	2011	100% Equity / 25% Ørsted	2013	2009	100% Equity / 25% Ørsted	Operating

Table 5.1 Projects Financed and Developed by Ørsted (continued)

Project Name	Location	Type	Size (MW)	Construction Start (Year)	Construction Capital Structure / % Ørsted	Commercial Operation (Year)	Permanent Capital Structure (Year)	Permanent Capital Structure / % Ørsted	Status
London Array 1	United Kingdom	Offshore Wind	630	2011	100% Equity / 50% Ørsted	2013	2004	100% Equity / 25% Ørsted	Operating
Walney 1 & 2	United Kingdom	Offshore Wind	367	2010	100% Equity / 100% Ørsted	2012	2009	100% Equity / 50.1% Ørsted	Operating
Horns Rev 2	Denmark	Offshore Wind	209	2008	100% Equity / 100% Ørsted	2010	2007	100% Equity / 100% Ørsted	Operating
Gunfleet Sands 1 & 2	United Kingdom	Offshore Wind	173	2008	100% Equity / 100% Ørsted	2010	2011	100% Equity / 50% Ørsted	Operating
Avedøre Holme	Denmark	Offshore Wind	10.8	2009	100% Equity / 100% Ørsted	2009	2009	100% Equity / 100% Ørsted	Operating
Burbo Bank	United Kingdom	Offshore Wind	90	2006	100% Equity / 100% Ørsted	2007	2006	100% Equity / 100% Ørsted	Operating
Barrow	United Kingdom	Offshore Wind	90	2005	100% Equity / 50% Ørsted	2006	2004	100% Equity / 100% Ørsted	Operating
Nysted	Denmark	Offshore Wind	165.6	2002	100% Equity / 100% Ørsted	2003	2010	100% Equity / 43% Ørsted	Operating
Horns Rev 1	Denmark	Offshore Wind	160	2002	100% Equity / 40% Ørsted	2003	2006	100% Equity / 40% Ørsted	Operating
Middelgrunden	Denmark	Offshore Wind	20	2000	100% Equity / 100% Ørsted	2001	2000	100% Equity / 100% Ørsted	Operating
Vindeby	Denmark	Offshore Wind	5	1991	100% Equity / 100% Ørsted	1991	1991	100% Equity / 100% Ørsted	Decommissioned

Table 5.2 Projects Financed and Developed by Eversource

Project Name	Location	Type	Size (MW)	Construction Start (Year)	Construction Capital Structure[1]	Commercial Operation (Year)	Permanent Capital Structure (Year)	Permanent Capital Structure[2]	Status
Interstate Reliability (NEEWS)	CT	Electric Transmission	345 kV	2013	44% Debt / 56% Equity	2015	2015	44% Debt / 56% Equity	Operating
Long-Term Lower SEMA Upgrades	MA	Electric Transmission	115 kV and 345 kV	2009	44% Debt / 56% Equity	2014	2014	44% Debt / 56% Equity	Operating
Greater Springfield Reliability (NEEWS)	MA / CT	Electric Transmission	115 kV and 345 kV	2011	44% Debt / 56% Equity	2013	2013	44% Debt / 56% Equity	Operating
Middletown to Norwalk	CT	Electric Transmission	115 kV and 345 kV	2003	44% Debt / 56% Equity	2009	2009	44% Debt / 56% Equity	Operating
Glenbrook Cables	CT	Electric Transmission	115 kV	2006	44% Debt / 56% Equity	2008	2008	44% Debt / 56% Equity	Operating
Long Island Replacement Cable	CT	Electric Transmission	138 kV	2006	44% Debt / 56% Equity	2008	2008	44% Debt / 56% Equity	Operating
Stoughton Cables	MA	Electric Transmission	345 kV	2005	44% Debt / 56% Equity	2007 / 2009	2007 / 2009	44% Debt / 56% Equity	Operating
Bethel to Norwalk	CT	Electric Transmission	345 kV	2004	44% Debt / 56% Equity	2006	2006	44% Debt / 56% Equity	Operating

1. During construction, Eversource typically finances projects with a combination of short-term debt and internally generated cash flow. Projects are not financed at the project level with non-recourse debt, but rather on balance sheet at the regulated entity developing the project. Capital structure for the regulated entity is generally maintained at the allowed ratemaking capital structure, which can change over time. The current allowed capital structure has been provided.
2. Once a project reaches commercial operations, short-term financing during construction is typically replaced with long-term debt, but the capital structure will continue to be generally maintained at the allowed ratemaking capital structure, which can change over time. The current allowed capital structure has been provided.

5.5 Financial Resources and Strength

5.5 Please provide evidence that the bidder has the financial resources and financial strength to complete and operate the project as planned.

As discussed throughout Section 5, Ørsted and Eversource are stable and diverse energy companies with robust balance sheets that reflect the financial strength needed to complete and operate the Project in the ordinary course of their respective businesses.

Financial and cash flow data for Ørsted and Eversource is provided in Tables 5.3, 5.4, 5.5, and 5.6.

Table 5.3. Eversource Selected Consolidated Financial Data – Balance Sheet and Income Statement

(Millions of Dollars)	2016	2015	2014
Balance Sheet Data:			
Property, Plant and Equipment, Net	$21,351	$19,892	$18,647
Total Assets	32,053	30,580	29,740
Total Capitalization	20,470	19,542	18,946
Income Statement Data:			
Operating Revenues	7,639	7,955	7,742
Net Income	950	886	827

Table 5.4. Eversource Selected Consolidated Cash Flow Data – Funds from Operations and Debt Issuances

(Millions of Dollars)	2016	2015	2014
Net Cash Flow Provided by Operating Activities	$2,175	$1,434	$1,652
Issuance of Long-term Debt	800	1,225	725
Increase/(Decrease) in Short-term Debt	(12)	(242)	285
Total Debt Issuances	788	983	1,010

Table 5.5. Ørsted Selected Consolidated Financial Data – Balance Sheet and Income Statement

(Millions of Dollars)	2016	2015	2014
Balance Sheet Data			
Total Assets	20,473	22,119	22,487
Capital Employed	9,144	9,140	9,827
Income Statement Data			
Revenue	9,180	9,817	9,192
EBIT	2,082	281	339

From DONG Energy 2016 Annual Report
Assumes DKK to USD exchange rate of 0.15

Table 5.6. Ørsted Selected Consolidated Cash Flow Data – Funds from Operations and Debt Issuances

(Millions of Dollars)	2016	2015	2014
Cash flow from operating activities	1,691	1,128	1,435
Interest-bearing net debt	519	1,379	597

From DONG Energy 2016 Annual Report
Assumes DKK to USD exchange rate of 0.15

As demonstrated, both Eversource and Ørsted are large, growing companies, and have a combined market capitalization of approximately $40 billion. Moreover, both possess deep capital-market expertise, as evidenced by their ability to routinely access the public debt markets. For example, in November 2017, Ørsted successfully issued green hybrid capital securities and green senior unsecured bonds totaling €1.25 billion (approximately $1.5 billion) and over the course of 2017 the Eversource Parent successfully issued $1.2 billion of Series K and Series L Senior Notes.

Eversource– Financial Highlights

- Eversource is a large cap company traded on the New York Stock Exchange, with an equity market capitalization of approximately $20.5 billion.
- Eversource is listed as number 343 on the Fortune 500 2016 list of the largest U.S. corporations (by gross revenues).
- Eversource has a $1.45 billion commercial paper program that is used to fund short-term working capital requirements. Eversource initially draws on its commercial paper program to fund its projects. As short-term debt accumulates, it is refinanced with long-term debt sold in the capital markets.
- Eversource has invested $5.3 billion in new energy infrastructure in the past three years.

Ørsted – Financial Highlights

- Ørsted is traded on Nasdaq Copenhagen Stock Exchange, with an equity market capitalization of approximately $23 billion.
- Ørsted was listed in June 2016. The IPO was the largest in Europe in the last 5 years and the largest IPO ever in Denmark both in terms of deal size and market cap.
- Ørsted has syndicated revolving credit facilities totaling €1.75 billion (approximately $2.1 billion).
- Ørsted has invested approximately $4.7 billion in new energy infrastructure in the past two years

5.6 Audited Financial Statements

5.6 Provide complete copies of the most recent audited financial statement or annual report for each bidder for each of the past three years; including affiliates of the bidder (if audited statements are not available, reviewed or compiled statements are to be provided). Also, provide the credit ratings from Standard & Poor's and Moody's (the senior unsecured long term debt rating or if not available, the corporate rating) of the bidder and any affiliates and partners.

Although the Bidder does not have any audited financial statements or annual reports, the annual reports for Ørsted (formerly known as DONG Energy) and Eversource for the past three fiscal years (ending December 31, 2016) are provided as Attachment 5-2, Attachment 5-3, Attachment 5-4, Attachment 5-5, Attachment 5-6, and Attachment 5-7. Moreover, the unaudited 2014, 2015, and 2016 annual financials for the Bidder and its joint venture affiliates are provided as Attachment 5-8.

The Bidder does not have any outstanding debt and therefore does not have a credit rating. The current senior unsecured (long-term) debt ratings of Ørsted and Eversource are provided in Table 5.7.

Table 5.7 Ørsted and Eversource Credit Ratings

Sponsor	S&P	Moody's	Fitch
Ørsted	BBB+ (stable)	Baa1 (stable)	BBB+ (stable)
Eversource	A (stable)[1]	Baa1 (stable)	BBB+ (positive)

1 Rating for senior unsecured long term debt. Corporate Credit rating is A+

5.7 Board of Directors, Officers, and Trustees List

5.7 Please also include a list of the board of directors, officers and trustees for the past three years and any persons who the bidder knows will become officers, board members or trustees.

The governance of the Owners' four jointly-controlled companies is discussed in Section 5.2. The directors of both Bay State HoldCo LLC and BSW HoldCo LLC are [redacted] The steering committee members for both the Bidder and BSW ProjectCo LLC are [redacted]

There is one former director: [redacted] who resigned effective March 31, 2017. There are two former steering committee members: [redacted] who resigned effective January 1, 2017; and [redacted] who resigned effective April 3, 2017.

5.8 Bid Security

5.8 The bidder should demonstrate its ability (and/or the ability of its credit support provider) to provide the required security, including its plan for doing so.

The Owners have ample resources to provide bid security on behalf of the Bidder. Eversource Investment has an intercompany credit facility with Eversource in the amount of [redacted] million with untapped capacity of [redacted] million. In addition, Eversource has access to a commercial paper program of [redacted] billon, with remaining capacity of over [redacted] million. Ørsted NA has a [redacted] million credit facility with Nordea and a [redacted] million credit facility with [redacted] The Owners will arrange for the security required under the RFP Process to be provided in the form of cash deposits or letters of credit. Ørsted and Eversource are rated by the three major credit rating agencies as set forth in Section 5.6.

5.9 Credit Issues/Credit Rating Downgrade Events

5.9 Provide a description of any current or recent credit issues/credit rating downgrade events regarding the bidder or affiliate entities raised by rating agencies, banks, or accounting firms.

Neither Ørsted nor Eversource have experienced any current credit issues or recent rating downgrade events, and neither is aware of any pending credit issues or credit rating downgrade events, nor any other financial issues raised by rating agencies, banks, or accounting firms. As demonstrated in Section 5.6, all three major credit rating agencies rate Ørsted's and Eversource's credit as stable, and both are well regarded and maintain strong investment grade credit profiles. Additionally, in December 2017, S&P raised Eversource's corporate rating to A+ (stable), reflecting S&P's assessment of Eversource's business risk profile as excellent. Eversource currently maintains the highest credit rating of any company in the Energy and Utility industry in the United States.

5.10 Federal Production Tax Credit or Investment Tax Credit Role

5.10 Describe the role of the Federal Production Tax Credit or Investment Tax Credit (or other incentives) on the financing of the project.

By virtue of the financial strength and proven track record that Eversource and Ørsted possess, the Project is uniquely positioned to qualify for the federal ITC on an accelerated schedule that will maximize value, and to self-monetize that value efficiently, passing resulting cost reductions on to Massachusetts ratepayers.

The Project's efficient self-monetization of tax attributes will maximize cost-savings for Massachusetts ratepayers. Because the Project need not rely on third-party tax-equity investment, it will be unaffected by volatility in the appetite for and—crucially—the pricing of such investment. By eliminating monetization risk in this way, the Bidder can pass the maximum benefit of the ITC on to Massachusetts ratepayers. This attribute is critical to the success of the Project, as it significantly reduces the aforementioned risks to ITC qualification and overall financing execution that other developers could face.

The ITC is available for wind facilities that commence development by December 31, 2019, but its value decreases each year after 2016, as follows:

- By December 31, 2016 – 100% value, or 30% of Qualified Energy Property
- By December 31, 2017 – 80% value, or 24% of Qualified Energy Property
- By December 31, 2018 – 60% value, or 18% of Qualified Energy Property
- By December 31, 2019 – 40% value, or 12% of Qualified Energy Property

Eversource and Ørsted have the financial wherewithal and project-development experience to adopt a strategy that would (subject to timely execution of long-term PPA through this RFP Process) allow the Project to qualify for the [redacted] ITC. The Bidder has been working collaboratively with a number of key potential suppliers and specialist advisors to ensure that the ITC qualification strategy is complaint with guidance from the IRS, is feasible having taken into account suppliers' manufacturing capacity over the relevant timescales and does not sacrifice technical design flexibility. In addition to the ITC qualification strategy, the Bidder holds several key attributes which will re-risk the efficient monetization of the tax credits given that the Bidder can: (1) build on balance sheet; (2) rely on know-how from a proven track record of project execution; and (3) self-monetize the ITC. In contrast, developers that are less financially robust, have less experience, or are subject to constraints imposed by third-party tax-equity investors would face considerably greater challenges in qualifying for the ITC in [redacted].

The Project's 800-MW size has the further benefit of securing the full value of the [redacted] ITC qualification for an additional 400 MW when compared to a 400-MW project. For example, the Bidder expects that its 800-MW proposal will qualify for the [redacted] ITC if awarded in this RFP Process. In contrast, if a 400-MW project is selected in this RFP Process (qualifying for the [redacted] percent ITC) and a 400-MW project is selected in the subsequent RFP (which likely would *not* qualify for any ITC), then, on a blended basis, the combined value of the ITC is only [redacted] percent (as compared to [redacted] percent for the 800-MW project). This ability to utilize an additional [redacted] percent ITC for the proposed Project will directly benefit Massachusetts

ratepayers through a lower cost of electricity. This is a significant cost-reduction driver that a series of 400-MW solicitations would not be able to deliver.

5.11 Pending Litigation

5.11 Bidders must disclose any pending (currently or in the past three years) litigation or disputes related to projects developed, owned or managed by Bidder or any of its affiliates in the United States, or related to any energy product sale agreement.

There is no pending litigation or dispute—nor has there been any in the past three years—related to any project developed, owned, or managed by the Bidder or any of its affiliates in the U.S.

See the annual reports referenced in Section 5.6, which disclose material litigations involving the Owners' respective affiliates. In particular, Ørsted NA's affiliate Elsam Kraft A/S is party to litigation in which the Danish competition authority found that it charged excessive prices in the Danish wholesale power market from 2003 through 2006 (a period when Elsam Kraft A/S was not yet owned by Ørsted NA's ultimate parent company). An appeal of that determination is currently pending before the High Court of Western Denmark. Following the Danish competition authority's finding, consumers also brought claims for damages, for which a litigation provision has been established.

On November 16, 2017, an action captioned Breiding v. Eversource Energy, et al, C.A. No. 17-12274-DJC (the "Action"), was filed in the U.S. District Court for the District of Massachusetts against affiliates of Eversource and Avangrid, Inc., another company engaged in the energy generation and distribution business. The complaint alleges that Eversource and Avangrid, Inc. each possessed and exercised monopoly power that enabled them each to manipulate the wholesale prices of natural gas sold to electric generation facilities in New England that in turn artificially inflated electric rates charged to customers. The Action purports to be brought as a class action on behalf of electric distribution customers, as well as other New England electric customers. The Action asserts claims under the federal antitrust laws as well as certain state law causes of action. The time within which the Eversource has to respond to the complaint has not yet elapsed. Eversource believes that the Action is without merit and intends to contest the matter vigorously.

On October 13, 2017, the Connecticut Public Utilities Regulatory Authority opened Docket No. 17-10-3, entitled "PURA [Connecticut Public Utilities Regulatory Authority] Review of the LDCs' Gas Supply Portfolio, Asset Strategies and Practices". The purpose of the docket is to review the gas supply portfolio, asset strategies, and practices of Connecticut's local gas distribution companies, including Yankee Gas, and will include the Local Distribution Companies' use of load forecasting, daily and intra-daily nominations, deliveries and imbalance, to evaluate compliance with requirements to provide safe and reliable service for gas customers under Connecticut law and in the context of the growing dependency of the electric grid on natural gas resources. A scheduling order has not yet been issued in this docket.

5.12 Expected Operating Life

5.12 What is the expected operating life of the proposed project? What is the depreciation period for all substantial physical aspects of the bid, including generation facilities, transmission lead lines to move power to the grid, transmission proposals, and mandatory and voluntary transmission system upgrades?

The expected operating life for the Project is [redacted]

For tax purposes, the Project will be depreciated in accordance with IRS guidelines. For accounting purposes, the major components of the Project will be depreciated over their operating lifetimes, as outlined in Table 5.8.

Table 5.8 Depreciation Period by Asset Type

Asset Type	Depreciation Period
Generation facilities (WTGs)	[redacted]
Transmission lines (lead lines or expandable transmission)	[redacted]
OSS	[redacted]
OnSS	[redacted]
Battery storage system	[redacted]

5.13 Financing Commitment

5.13 Has the bidder already obtained financing, or a commitment of financing, for the project? If financing has not been obtained, explain how obtaining a long-term agreement as proposed will help you in obtaining financing for the proposed project, in obtaining more favorable terms for the financing of the proposed project, or in supporting the future capital investment.

The Project will obtain development, construction and permanent financing through the Owners in the form of equity contributions. Ørsted and Eversource are committed to financing the Project, which will not need to rely on any external financing for construction or operation.

In all cases, long-term PPAs will enable the Owners to obtain the necessary internal approvals to authorize the substantial capital contributions needed to finance the Project. Moreover, the long-term PPAs will make it easier for the Owners to access the public debt markets at the parent level, as creditors rely on secured revenue streams to achieve the necessary comfort level to make their investments.

See Section 5.3 for details regarding the financing plan.

5.14 Agreements with Respect to Energy

5.14 State whether bidder has executed agreements with respects to energy, RECs and/or capacity for the project (including any agreements that have been terminated) and provide information regarding the associated term and quantities, and whether bidder has been alleged to have defaulted under or breached any such agreement.

The Bidder has not entered into or executed any agreements for energy, RECs or capacity for the Project.

Bay State Wind has been in active discussions with municipal, corporate, and non-profit organizations in relation to the potential purchase of energy or RECs from additional generation constructed in the Lease Area. These discussions are specific to the opportunity for those organizations to procure energy or RECs from new offshore wind energy generation. None of these potential agreements would affect the Project or pose an adverse risk to Massachusetts ratepayers. The key potential impact relevant to this bid submission is the opportunity to develop additional generation capacity at no cost to ratepayers while providing supplemental net economic benefits to the Commonwealth.

At this stage, Bay State Wind has secured a Letter of Intent with Southcoast Health System, as provided in Attachment 5-9.

Bay State Wind believes that building partnerships with local institutions like these will be critical to growing broad awareness and support for an offshore wind industry in Massachusetts. Corporate offtake is also a leading driver of renewable energy growth in the U.S. and Bay State Wind endeavors to see Massachusetts serve as the pace setter for corporate offtake of offshore wind power.

None of the agreements contain any binding commitments with respect to energy, RECs and/or capacity. The discussions that Bay State Wind is having with potential corporate partners have only just begun, and activity in this area will be ramped up over the course of 2018 and beyond. The agreements executed at this stage are indicative of the types of arrangements that Bay State Wind continues to pursue and mature.

5.15 Affiliated Entities and Joint Ventures

5.15 List all of bidder's affiliated entities and joint ventures transacting business in the energy sector.

As detailed in Section 5.2, Ørsted NA and ESI jointly control four companies that are involved in the proposed Project.

Virtually all of Eversource's business is conducted in the energy sector. Ørsted owns, sometimes jointly, over one hundred entities active in the energy sector. Please see Attachment 5-10 for corporate structures for Ørsted and Eversource, as well as Ørsted's and Eversource's 2016 Annual Reports (Attachments 5-4 and 5-7) for a complete list of active affiliated entities and joint ventures.

As discussed in Section 5.17, the Bidder's affiliates include two of the EDCs, and measures have accordingly been put in place to guard against unfairness or undue preference for the Bidder in this RFP Process.

5.16 Statement regarding Bankruptcy/Reorganization Proceedings

5.16 Has bidder, or any affiliate of Bidder, in the last five years, (a) consented to the appointment of, or was taken in possession by, a receiver, trustee, custodian or liquidator of a substantial part of its assets, (b) filed a bankruptcy petition in any bankruptcy court proceeding, (c) answered, consented or sought relief under any bankruptcy or similar law or failed to obtain a dismissal of an involuntary petition, (d) admitted in writing of its inability to pay its debts when due, I made a general assignment for the benefit of creditors, (f) was the subject of an involuntary proceeding seeking to adjudicate that Party bankrupt or insolvent, (g) sought reorganization, arrangement, adjustment, or composition of it or its debt under any law relating to bankruptcy, insolvency or reorganization or relief of debtors?

The Bidder and its affiliates have **not** taken any of the above-described actions in the last five years. For the avoidance of any doubt, this response encompasses not only the Bidder's three affiliates that are jointly controlled by Ørsted NA and ESI, but also Ørsted and Eversource's affiliates.

5.17 Conflicts of Interest

5.17 Briefly describe any known conflicts of interest between Bidder or an affiliate of Bidder and any Distribution Company, or any affiliates of the foregoing.

The Bidder has an affiliate relationship with two of the EDCs (as discussed below), and acknowledges that conflicts of interest are an important issue that the Evaluation Team and the Independent Evaluator must consider. Accordingly, measures have been put in place to ensure that the Bidder and its affiliates comply not only with applicable law, but also with voluntary standards to prevent any actual or apparent instance of unfairness, discrimination, or undue preference toward the Bidder in this RFP Process.

ESI is an affiliate of NSTAR Electric Company d/b/a Eversource Energy and Western Massachusetts Electric Company d/b/a Eversource Energy, two of the Massachusetts EDCs participating in the RFP Process, and both members of the Evaluation Team. See Attachment 5-10 for Eversource's corporate structure. Eversource maintains a rigorous compliance program, Code of Business Conduct, and policies to avoid conflicts of interest and appearances of impropriety, and to ensure compliance with state and federal codes of conduct and affiliate transactions rules. In particular, Eversource has endorsed and supported the use of the Utility Standard of Conduct for the RFP Process, which is binding on all Eversource employees (including ESI), and whose principles are consistent with Eversource's compliance program and Code of Business Conduct.

More importantly, Eversource and Ørsted have also adopted additional measures to ensure and facilitate adherence to the Utility Standard of Conduct. To effectuate the Utility Standard of Content's requirement of a Bid Team and an Evaluation Team, affected Eversource employees receive a copy of the Utility Standard of Conduct and a roster of the employees on each team, and sign a certificate acknowledging and agreeing to follow the Utility Standard of Conduct. Employees assigned to each team are required to wear color-coded identification badge covers that clearly identify Bid Team members (green) and Evaluation Team members (red). Affected employees are given training on—and periodic reminders of—their obligations, with a single point of contact (the Deputy General Counsel & Chief Compliance Officer) identified for any compliance-related questions. In addition, the Eversource Bid Team and Evaluation Team use separate IT server locations that have security limiting access to specific team members as approved by the Chief Compliance Officer and IT. Employees of Ørsted NA and its affiliates also receive an updated Bid Team roster periodically. All meetings of the joint venture steering committees and boards of directors begin with a reminder of the Standard of Conduct and the importance of separation between the Bid Team and the Evaluation Team.

Beyond the Utility Standard of Conduct and internal measures in furtherance of it, Ørsted and Eversource are subject to the following requirements and procedures:

- The fairness measures imposed by Section 83C as well as the Massachusetts Department of Public Utilities' (DPU) implementing regulations thereunder, including

the appointment of the Independent Evaluator responsible for overseeing the RFP Process and authorized to order the setting aside of any winning bid found to be the result of a process that was not fair and objective, and that was substantially prejudiced as result.

- The measures imposed by the Massachusetts Electric Industry Restructuring Act of 1997, as well as the DPU's implementing regulations thereunder, to ensure strict separation between EDCs and any unregulated generation affiliate thereof, including the Standards of Conduct for EDCs and their Affiliates set forth at 220 CMR 12.
- Other measures included in the RFP Process, which the Independent Evaluator determined to have a "design [that] satisfies the statutory standards for an open, fair and transparent solicitation that is not unduly influenced by affiliates." (Peregrine Energy Group, *Independent Evaluator Report on the Proposed Timetable and Method of Solicitation and Solicitation Process under Section 83C of the Green Communities Act* 3–4 [May 5, 2017]) (Independent Evaluator Report).
- Other legal standards designed to ensure fairness in PPAs, such as the Federal Energy Regulatory Commission's (FERC) review of Market-Based Rate Authorization requests and of affiliate transactions under *Boston Edison Co. re: Edgar Elec. Energy Co.*, 55 FERC ¶ 61,382 (1991), *Ameren Energy Generating Co.*, 108 FERC ¶ 61,081 (2004), and *Allegheny Energy Supply Co.*, 108 FERC ¶ 61,082 (2004) (collectively, *Edgar-Allegheny*).
- Additional requirements contained in the joint venture agreements between Ørsted NA and ESI that go above and beyond the measures imposed by existing law and the RFP Process, such as more specific standards for separation between Bid Team Members and Evaluation Team Members, training on fairness measures, and procedural safeguards to reduce the possibility of any actual or apparent unfairness in the bid evaluation and PPA negotiation processes.

5.18 Litigation, Disputes, Claims or Complaints against any Distribution Company

5.18 Describe any litigation, disputes, claims or complaints involving the Bidder or an affiliate of Bidder, against any Distribution Company or any affiliate of any Distribution Company.

The Bidder is unaware of any pending litigation, disputes, claims or complaints involving the Bidder or any affiliate of the Bidder against any of the EDCs or any affiliate of any EDC.

5.19 Litigation, Disputes, Claims or Complaints, or Events of Default

5. 19 Describe any litigation, disputes, claims or complaints, or events of default or other failure to satisfy contract obligations, or failure to deliver products, involving Bidder or an affiliate of Bidder, and relating to the purchase or sale of energy, capacity or renewable energy certificates or products.

Neither the Bidder nor any of its affiliates has been implicated in any litigation, disputes, claims or complaints, or events of default or other failure to satisfy contract obligations, or failure to deliver products, involving, and relating to the purchase or sale of energy, capacity or renewable energy certificates or products in the U.S.

See Section 5.11 on litigation involving Ørsted's NA's affiliate Elsam Kraft A/S.

See Section 5.11 on litigation involving affiliates of Eversource.

5.20 Statement Regarding any Governmental Investigation

5.20 Confirm that Bidder, and the directors, employees and agents of Bidder and any affiliate of Bidder 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 bidding on any contract, or have been the subject of any debarment action (detail any exceptions).

Neither the Bidder, the Owners or their affiliates, nor any of their respective directors, employees, or agents (acting in their professional capacities) is currently under investigation by any governmental agency, or has in the last four years been convicted or found liable for any act prohibited by State or Federal law in any U.S. jurisdiction involving conspiracy, collusion or other impropriety with respect to bidding on any contract, or has been the subject of any debarment action.

See Section 5.11 on litigation involving affiliates of Eversource.

5.21 Regulatory and other Approvals needed to Execute a Binding Sale Agreement

5.21 Identify all regulatory and other approvals needed by bidder to execute a binding sale agreement.

The marked-up form PPAs submitted with this Bid have received the necessary approvals from the managers of the Bidder, Bay State HoldCo LLC, BSW ProjectCo LLC, and BSW HoldCo LLC (although changes to the form PPAs made during the negotiation process may require further such approvals).

[redacted]

5.22 Conformance to FERC's Applicable Regulatory Requirements

5.22 Describe how the project will conform to FERC's applicable regulatory requirements, including, but not limited to, FERC requirements relating to allocation of transmission capacity and open access, the justness and reasonableness of rates, the potential for undue preference or discrimination, and affiliate dealings, if any. Describe how your proposed approach is consistent with FERC precedent and ratemaking principles.

In this section, the Bidder demonstrates that its two categories of bids (Offshore Wind Energy with a Project-Specific GLL and Offshore Wind Energy with an ETS Proposal) conform to applicable FERC regulatory requirements.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

5.23 Direct and Indirect Affiliations and Affiliate Relationships

5.23 Describe and document any and all direct and indirect affiliations and affiliate relationships, financial or otherwise in the past three years between the bidder and one or more of the Distribution Companies and their affiliates, including all relationships in which one of the Distribution Companies has a financial or voting interest (direct or indirect) in the bidder or the bidder's proposed project. These relationships include:

– Corporate or other joint arrangements, joint ventures, joint operations whether control exists or not;

– Minority ownership (50% or less investee);

– Joint development agreements;

– Operating segments that are consolidated as part of the financial reporting process;

– Related parties with common ownership;

– Credit, debenture, and financing arrangements, whether a convertible equity feature is present or not;

– Wholly owned subsidiaries; and

– Commercial (including real property) relationships with any Distribution Company.

None of the EDCs has a financial or voting interest, direct or indirect, in the Bidder or the proposed Project.

As noted in Section 5.17, the Bidder is an affiliate of NSTAR Electric Company d/b/a Eversource Energy and Western Massachusetts Electric Company d/b/a Eversource Energy, two of the Massachusetts EDCs participating in the RFP Process, and both members of the Evaluation Team. See Attachment 5-10 for Eversource's corporate structure.

As discussed in Section 5.3, Ørsted and Eversource entered into multiple agreements related to the ownership, financing, development, and operation of the Project in December 2016. First, Eversource acquired a 50 percent membership interest in Bay State HoldCo LLC (the Bidder's sole member-manager), as well as in BSW HoldCo LLC (the sole member-manager of BSW ProjectCo LLC), through subscription agreements. Second, the Owners entered into limited liability company agreements for Bay State HoldCo LLC and BSW HoldCo LLC that provide for governance of all four jointly-controlled companies, as well as the mechanics of project financing.

Eversource's contribution to ESI to date has been provided in the form of inter-company debt from Eversource. ESI has a revolving credit agreement with Eversource to facilitate the issuance of intercompany debt.

Section 6

Siting, Interconnection, and Deliverability

- Bay State Wind will interconnect 800 MW into the ISO-New England grid at **Brayton Point**.
- The ISO-New England Feasibility Study for Brayton Point indicates that 800 MW of capacity can be interconnected **without any system upgrades**.
- Results of the ISO-New England **System Impact Study** are scheduled for Q1 2018.
- The energy provided by the Project will be delivered to the Commonwealth **without material constraint or curtailment**.
- The proposed point of delivery at Brayton Point is sufficient to ensure **full dispatch of the proposal's Clean Energy Generation profile**.
- Two export cables increases the security of deliverability by providing redundancy in case of cable failure.

First in ISO-New England queue at an ideal interconnection location.

Bay State Wind has secured property rights in Somerset, Massachusetts to support interconnection with the ISO-New England transmission grid.

Burbo Bank Extension Project

6. SITING, INTERCONNECTION, AND DELIVERABILITY

In this section, the Bidder addresses the site locations, property rights, and points of interconnection for the Preferred Option. Since June 2015, the Bidder has invested significant resources into developing contingency plans and optionality across its siting and interconnecting efforts to provide for maximum project viability. Further, ISO-NE has completed the study for an interconnection at Brayton Point ([redacted], and the Bidder has completed an independent feasibility study for a second interconnection at Eversource's 115-kV Bourne Substation (for 880 MW; [redacted]). Information regarding the Bourne POI is provided in Attachment 6-1. The Bidder's primary Point of Interconnection (POI) is Brayton Point with the Bourne POI serving as an alternative and/or to support future solicitations. Studies conducted to date for both POIs indicate sufficient capacity to interconnect a total of 1,600 MW of offshore wind generation (800 MW at each POI – Brayton Point and Bourne).

[redacted]

6.1 Site Plan

This section addresses project location, siting, real property rights and interconnection issues. Bidders should ensure that the threshold criteria outlined in Section 2.2 of the RFP for generation, transmission proposals, and system upgrades are verified in their responses.

6.1 Provide a site plan (or plans) including a map (or maps) that clearly identifies the location of the proposed project site, Delivery Facilities Project route, the assumed right-of-way width, the total acreage for Eligible Facilities, the anticipated interconnection point (or, if applicable, multiple points for a Transmission Project), deployment facilities, and the relationship of the site to other local infrastructure, including transmission facilities, roadways, federal and state waters, and waterways. In addition to providing the required map(s), provide a site layout plan which illustrates the location of all major equipment and facilities on the site.

Figures 6.1 and 6.2 provide a site plan of the Preferred Option, identifying the Lease Area, offshore wind generation facilities, the OSS, OnSS and interconnection point, and export and inter-array cables. The WTGs and array cable layouts are all confined within the Lease Area and have been developed to optimize production, maximize safety during operations, and minimize the environmental footprint. A 'buffer area' between the edge of the Lease Area and the proposed WTGs and OSS has been included to ensure that all installation and maintenance activities take place within the Lease Area, without impacting waters outside of OCS-A 0500. This also ensures that no turbine winglets overhang outside the Lease Area border. The export cable from the OSS to the OnSS also includes a buffer around it within the Lease Area to allow effective and safe maintenance activities to be carried out should they be needed. The proposed layouts do not overlap any known shipwreck, to both minimize safety concerns and to protect cultural resources. Due to expected helicopter support during operations, two helicopter corridors are considered for the OSS (one for take-off and one for

landing). These are aligned with the main wind direction so that pilots can safely fly in and out. Finally, an additional buffer has been considered along the borders with the neighboring lease areas. The purpose is to minimize wake effects between neighboring wind farms thereby maximizing production from all potential operators for the overall benefit of the Commonwealth.

Deployment facilities are identified in Section 10.1 (Figure 10.1).

A site plan for the OnSS is provided in Section 15.1 (Figure 15.4). A site plan for the battery storage system is provided in Attachment 8-3.

These figures should be considered illustrative, with the exception of proposed onshore POI and related facilities.

Assumed right of way width: Not included in Figure 6.1 as it has yet to be negotiated with landowners, and permitted through appropriate federal and state agencies.

Total acreage: The export cable is [redacted] long. The Phase I development area (WTG layout) is approximately 66,080 acres in size. The OnSS site is [redacted] acres and the proposed interconnection corridor is [redacted] long. All of this is depicted in the site plans (Figures 6.1 and 6.2).

Anticipated interconnection point: The Bidder's primary Point of Interconnection (POI) is Brayton Point with the Bourne POI serving as an alternative and/or to support future solicitations.

[redacted]

[redacted]

[redacted]

6.2 Property Rights

6.2 Identify any real property rights (e.g., fee-owned parcels, rights-of-way, development rights or easements or leases) that provide the right to use the Eligible Facility site and/or Transmission Project route, including, for Eligible Facilities, and any rights of way needed for interconnection.

i. Does the project have a right to use the Eligible Facility site and/or Transmission Project route for the entire proposed term of the PPA or tariff (e.g., by virtue of ownership or land development rights obtained from the owner)?

☐ Yes ☒ No If not, please explain:

The Bidder (i) holds a federal lease issued on a competitive basis after January 1, 2012 for an offshore wind energy generation site located on the Outer Continental Shelf and for which no turbine is located within 10 miles (16 km) of any inhabited area; and (i) either (a) has acquired all other real property rights to construct and operate the Facility, to interconnect the Facility to the Interconnecting Utility, to construct the Network Upgrades (to the extent it is Seller's responsibility to do so) and to perform Seller's obligations under this Agreement, or (ii) reasonably expects to acquire such other real property rights (x) as they relate to real property located in State waters or on State- or MassCEC-owned land, upon the completion of any permitting and other licensing procedure required by a Governmental Entity or the MassCEC, and the satisfaction of any conditions precedent contained in an option agreement between Seller and the MassCEC, and (y) with respect to privately owned property, upon the payment by Seller of an amount that represents the fair market value of such real property rights.

ii. If so, please detail the Bidder's rights to control the Eligible Facility site and/or Transmission Project route control.

6.2.1 Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0500)

The Bidder is the Lessee of an offshore commercial lease granting it the exclusive right to subsequently seek BOEM approval for the development of the leasehold in question. The Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0500) (the "Lease"; included as Attachment 6-2[10]) is granted by the United States of America acting through BOEM per the Outer Continental Shelf Lands Act.

In accordance with the Lease, and as discussed in Section 7.4, the Bidder is currently performing the necessary site assessment and planning activities to receive approval from BOEM to construct and operate the Project. As discussed in Section 5.2, in the event that the Project is selected in this RFP for negotiation, the Bidder intends to assign the geographic portion of the Lease where the Project is proposed to be constructed to BSW ProjectCo LLC, as provided by BOEM's regulations (30 CFR §§ 585.408–585.411). Such assignment would not change the terms and conditions of the Lease, to which BSW ProjectCo LLC would become subject. If for any reason BOEM were not to approve the partial assignment of the

[10] Documentation of re-assignment of the Lease to Ørsted (formerly DONG Energy) as well as a clarification on Lease blocks is also provided in Attachment 6-2.

Lease from the Bidder to BSW ProjectCo LLC, the Bidder would proceed with constructing and operating the Project—as well as signing PPAs—in its own name.

The export cable route as shown in Figure 6.1 is currently envisioned to cross federal, Massachusetts State, and Rhode Island State Waters before landing at the OnSS site. The Lease provides for a Project Easement in Lease Addendum D which will grant the rights for the location and operation of the cables to the boundary of Federal and State waters.

6.2.2 State Licenses and Easements

The Bidder will apply to the Massachusetts Department of Environmental Protection (MADEP) for a Chapter 91 Waterways License, which will grant the rights required for installation and maintenance of cables within Massachusetts State waters. The Bidder will apply to the Rhode Island Department of Environmental Management for an easement agreement that will grant the rights for cables in Rhode Island State waters. See Section 7.2 for additional details on Project permitting.

6.2.3 Onshore Easements

The Bidder will acquire real property rights from the [redacted]. and easement rights from the successor to [redacted] See Figure 6.3.

[redacted] The Bidder proposes to build a new substation at this site. Export cables from the proposed OSS will land and be terminated at the new OnSS site, at which power will be stepped up from [redacted]. Underground circuits will be installed to interconnect the new OnSS with the existing 345-kV substation, owned by National Grid and located approximately [redacted] to the south, on land currently owned by [redacted]

On November 9, 2017, the Bidder entered into an Option to Purchase Agreement (Option Agreement) with the [redacted] The Option Agreement [redacted] gives the Bidder the exclusive right to purchase this site, and is valid for an initial term of 18 months (the Option Period). The Option Period may be extended for an additional 12 months.

To complete the interconnection between the new substation and the existing National Grid substation, an easement will be required on lands formerly owned by [redacted] to support installation of underground duct bank, conduit, and cables. The Bidder anticipates that a portion of the required easement will be co-located within an easement area held by National Grid, in which overhead transmission facilities are currently operated and maintained.

The Bidder had previously considered siting its new substation facility on Dynegy property, at the location of the former Brayton Point Generating Station. The Bidder initially contacted representatives of Dynegy in March 2016 to open a dialogue intended to advance acquisition of rights to the property. In June 2016, however, Dynegy informed the Bidder that it planned to conduct a competitive solicitation to sell the Brayton Point site (300+ acres in total), and that only bids to acquire the complete site, accepting any environmental liabilities/risks, would be considered. Because the Bidder does not need 300+ acres, nor was it able to properly characterize environmental conditions of the site (and liabilities related to such conditions), it was not able to put forth a successful bid. As such, the Bidder pursued other site alternatives, resulting in the Option Agreement for [redacted] described above.

[redacted]

[redacted]

If Dynegy is able to complete the sale of its Brayton Point property, the Bidder expects to work directly with the new owner to acquire the necessary easement rights described above, to complete the interconnection to the National Grid Substation.

iii. Describe the status of acquisition of real property rights, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project timeline.

6.2.4 Timeline for Acquisition of all Licensees and Easements

For the interconnection at Brayton Point, and as described above, the Bidder has entered into an Option Agreement for purchase of property [redacted] and proposes to construct a new OnSS at this location. The Bidder anticipates that it will exercise the Option Agreement described above following completion of several key milestones. Factors that may govern the timing for exercising the Option Agreement for the [redacted] include approval of a PPA by the MA DPU, and receipt of permit and siting approvals from federal and state agencies.

The Bidder expects to negotiate acquisition of the easement rights described above, to complete the interconnection between the new OnSS and the existing National Grid substation. At present, such negotiations cannot be completed due to Dynegy's ongoing efforts to sell its property. Dynegy has indicated that any sale is targeted for completion in late 2017. Assuming such a sale is completed, the Bidder will look to immediately commence discussions/negotiations with the new Owner, and will look to complete easement acquisition as expeditiously as possible.

With regard to offshore rights required for the Project, the Bidder anticipates receipt of final approval from BOEM of the Construction and Operations Plan (COP) in [redacted] and receipt of other required federal and state permits by [redacted] A timeline for acquisition of property rights and receipt of necessary permits and/or licenses is provided in Section 7.2 and a schedule is provided in Section 9.

6.2.5 Joint Use of Existing or Proposed Real Property Rights

iv. Identify any joint use of existing or proposed real property rights

The properties identified for the Project include both on- and off-shore components. The Lease Area and export cable routes are currently used for recreational and commercial boating activities; and will continue to be in use during construction and operation of the Project. Potential impacts and mitigation for such impacts to marine and ocean uses in the Project Area are addressed in Section 7.4.

In order to protect the public and the offshore assets of the Project, the Bidder will work with the U.S. Coast Guard (USCG) to establish aids to navigation and Notices to Mariners, with NOAA to map Project areas on nautical charts, and with local fishing and boating organizations and community leaders during construction, as spotters and spokespersons emphasizing the need to avoid use conflicts and maintain safety.

For onshore facilities at Brayton Point, the Bidder intends to construct the landing and substation site entirely upon the [redacted] in Somerset, Massachusetts. The [redacted] will be vacated in its entirety upon closing, and all existing buildings/structures will be removed. As such, this site will be used exclusively in support of the proposed Project.

There will be no other/joint uses of the site. It is expected that any easements secured from Dynegy (or subsequent owner), to complete the interconnection between substation facilities will be made use-exclusive to the Bidder in order to protect public safety. As noted above, a portion of the proposed easement will be co-located in an existing easement held by National Grid, within which other transmission structures and uses will continue to exist. The Bidder expects to coordinate closely with National Grid, through the ongoing ISO-NE Interconnection Review process, and during negotiations to acquire said easement, to ensure that all existing facilities can continue to be operated and maintained safely.

[redacted]

6.3 Proper Zoning or Permitting

6.3 Provide evidence that the Eligible Facility site and/or Transmission Project route is properly zoned or permitted. If the Eligible Facility site and/or Transmission Project route is not currently zoned or permitted properly, identify present and required zoning and/or land use designations and permits and provide a permitting plan and timeline to secure the necessary approvals.

Detail the zoning and permitting issues:

Offshore, the Project (i.e., the generation assets) will be located within the designated Lease Area (Figure 6.1). A proposed export cable route is currently being assessed with regard to environmental constraints and technical requirements. Once approved by BOEM in the COP, the easements will be included in Addendum D of the Lease. As discussed in Section 6.2, the export cable route will cross Federal, Massachusetts State, and Rhode Island State Waters before landing at the OnSS site. The Bidder will receive the necessary state permits (Massachusetts Chapter 91 Waterways License; Rhode Island Department of Environmental Management [RIDEM] Easement Agreement) prior to construction. See Section 7.1 and Attachment 7-1 for additional details on Project permitting.

Onshore, the portion of the site on which the Bidder will construct its substation and a portion of its underground interconnection facilities is zoned Residential by the Town of Somerset. Portions of the area for which an easement will be required for interconnection to the existing National Grid substation facility are also zoned Residential, while other portions are zoned Industrial. The National Grid substation is located on property zoned Industrial (the Dynegy site).

Local zoning for the Town of Somerset is displayed in Figure 6.4. The current version of the Town of Somerset Zoning By-Laws is provided in Attachment 6-3.

Section 4 of the Zoning By-Law sets forth Use Regulations within each of the Town's zoning districts, and Section 5 identifies applicable Dimensional Requirements by district. Section 4.2.6 of the By-Law discusses industrial uses and indicates where such uses are allowed by district. This section specifically identifies electrical substations as a use that is allowable by Special Permit within Residential district. The Planning Board is the Special Permit granting authority in Somerset. This same section, 4.2.6, indicated that substations are an allowable use within Industrial Districts.

Figure 6.4 Local Zoning Map for the Town of Somerset

[redacted]

Based on the foregoing, the Bidder expects to be required to obtain a Special Permit from the Somerset Planning Board for construction of the proposed substation and associated ancillary facilities (i.e., underground transmission interconnections) since those facilities will be located, in part, in a Residential District. Facilities proposed to be built on land currently held by Dynegy are allowable uses as these would be located in an Industrial District. The Bidder will coordinate and work closely with local officials, including those responsible for review and enforcement of local zoning requirements, and will endeavor to comply with local zoning requirement and procedures. It is not anticipated at this time that zoning exemptions under Massachusetts General Law (M.G.L.) Chapter 40A will be required, however, a final determination to that effect will be made in due course, as the Project proceeds.

Permitting Plan and timeline:

Start Date: June 2015 **End Date:** [redacted]

A permitting plan for the Project is provided in Section 7.2 and a critical path schedule is provided in Section 9.

6.4 Description of the Area Surrounding the Eligible Facility Site

6.4 Provide a description of the area surrounding the Eligible Facility site and/or Transmission Project route (including landfall), including a description of the local zoning, flood plain information, existing land or waterway use, and setting.

Local zoning and floodplain information is not applicable for the offshore portions of the Project. Permitting requirements including COP approval and receipt of a Massachusetts Chapter 91 Waterways License and a RIDEM Easement Agreement, are described in Section 7.1. In general, the waters off of southern New England experience high levels of commercial, military, and recreational vessel traffic. The Lease Area is to the north of the Nantucket-Ambrose Traffic Separation Scheme (TTS) and to the southeast of the Narragansett Bay and Buzzards Bay TTSs. Although there is some commercial traffic passing through the Lease Area, the heaviest trafficked routes into and out of southern New England waters are to the west and outside of the area proposed for the first phase of development. Similarly, vessel trip report data illustrate that the areas with the highest levels of recreational fishing activity are to the west of the Lease Area. Therefore, this is not expected to conflict with the construction and operation of the Project. Existing waterway use in the Project Area is further described in Section 7.4.

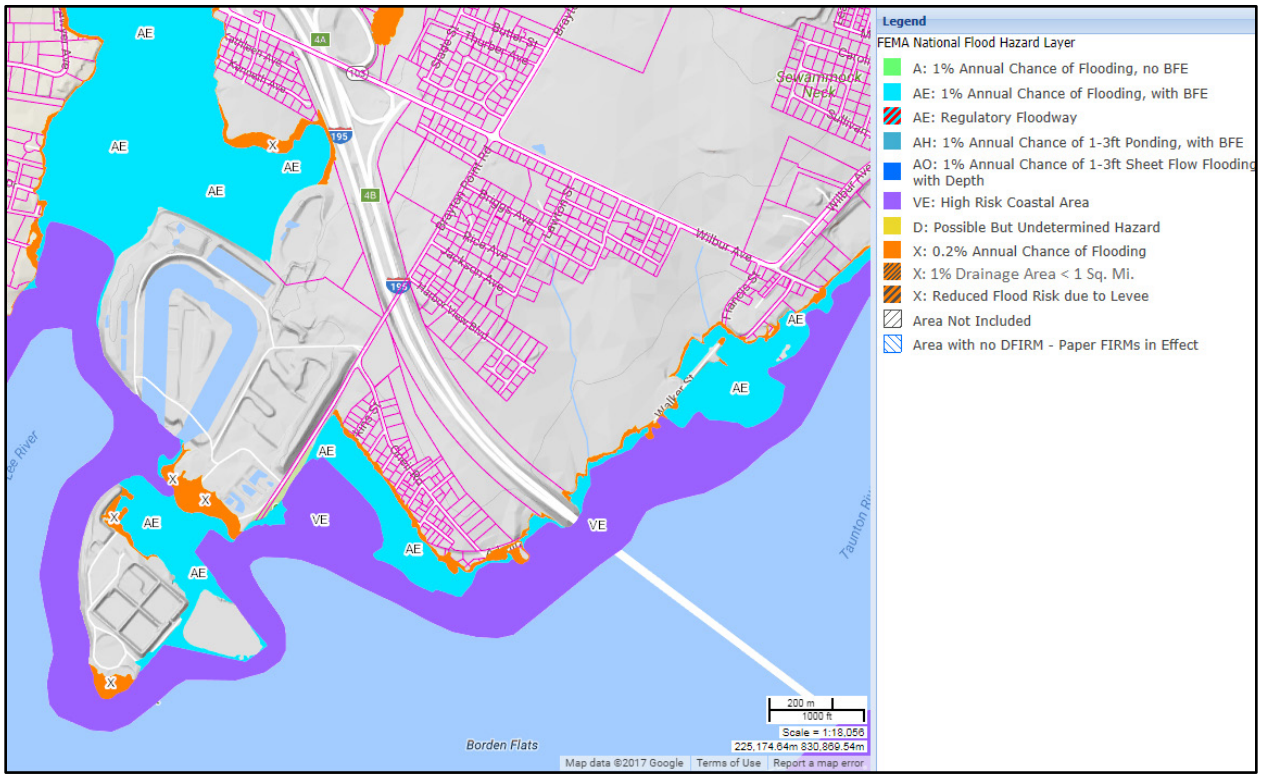
The site on which the Bidder proposes to construct its OnSS is currently owned by [redacted] Current uses of the site are related to [redacted]

The site is bounded to the north by residential uses; to the east by largely undeveloped land owned by Dynegy including an existing electric transmission corridor with structures/uses maintained by National Grid; to the south by land owned by Dynegy (principally, the site of the former Brayton Point Generation Station), and to the west by Lee River.

The Bidder proposes to construct underground transmission facilities to interconnect to National Grid's existing 345-kV substation on the Dynegy/Brayton Point site. The lands on which these underground facilities will be constructed are owned by Dynegy (at present) and would be partially co-located within the existing National Grid right-of-way that runs north from the Brayton Point site.

According to published data by the Federal Emergency Management Agency (FEMA), portions of the site on which the Bidder proposes to construct its OnSS and interconnection facilities is within Zone [redacted] (see Figure 6.5). This area is designated as a Special Flood Hazard Area, which is an area subject to inundation during the 100-year flood event (i.e., 1 percent chance of flooding on an annual basis). The Bidder will construct all facilities to withstand such storm/flood events and to ensure the safe and reliable operation of its facilities.

Figure 6.5 FEMA Flood Mapping, Brayton Point, Somerset, Massachusetts



6.5 Interconnection Path Site Control

6.5 Describe how the bidder plans to gain interconnection path site control and describe the status of the plan.

The plan to obtain site control of the interconnection path is detailed in Section 6.2.

6.6 Interconnection Request to ISO-NE

6.6 Please provide documentation to show evidence of the interconnection request to ISO-NE, the applicable New England Transmission Owner, or any neighboring control areas, to interconnect at the Capacity Capability Interconnection Standard. Please describe the status of any planned interconnection to the grid. Additionally, any studies undertaken by ISO-NE or the bidder must be provided.

The Bidder filed for interconnection relatively early in the process and is significantly more progressed than the other offshore wind queue positions involved in this RFP Process. On August 1, 2016, the Bidder filed a Capacity Network Resource Interconnection Service request with ISO-NE for the Project to interconnect 800 net MW capacity at Brayton Point in Somerset, Massachusetts, under the ISO-NE Open Access Transmission Tariff Schedule 22-Standard Large Generator Interconnection Procedures (LGIP). A copy of the interconnection request confirmation is included as Attachment 6-4. The Bidder received Queue Position [redacted].

ISO-NE completed its Feasibility Study for the Project's interconnection at Brayton Point on April 7, 2017. The Feasibility Study shows that the Bidder can connect up to 800 MW at the Brayton Point POI with no system upgrades required. The Feasibility Study is Critical Energy/Electric Infrastructure Information (CEII) and can be made available to persons with the required clearance upon request. On September 4, 2017, ISO-NE started the System Impact Study, which is slated for completion in Q1 2018.

ISO-NE performed an evaluation of the PNOI studies for Queue Position [redacted] Capacity Commitment Period, and issued its findings on March 24, 2017. The PNOI Study is CEII and can be made available to persons with the required clearance upon request. Based on the results of the PNOI Study no system upgrades were assumed.

The Bidder encourages the Evaluation Team to request that ISO-NE provide the PNOI Study and Feasibility Study to the Evaluation Team in accordance with Section 1.7.4.1 of the RFP.

[redacted] The Bidder will work towards executing a Large Generator Interconnection Agreement (LGIA) with ISO-NE for the offshore wind generation facility which ISO-NE is currently studying under [redacted] after completion of the System Impact Study. [redacted]

6.7 Electrical System Performance Studies

6.7 The studies should describe the Project's electrical system performance, its impact to the reliability of the New England Transmission system, and how the project would satisfy ISO NE's I.3.9 requirements. The studies must also provide the status of any interconnection studies already underway with ISO-NE and/or the transmission owner. Provide a copy of an interconnection agreement, if any, executed by the bidder with respect to the proposed project. If an interconnection agreement has not been executed, please provide the steps that need to be completed before an interconnection agreement can be executed and the associated timeline.

Performance and its impact:

Attachments:

To date ISO-NE has completed the project Feasibility Study and PNOI Study. The Feasibility Study and PNOI Study are CEII and can be made available to persons with the required clearance upon request. The Bidder encourages the Evaluation Team to request that ISO-NE provide the Feasibility Study and PNOI Study to the Evaluation Team in accordance with Section 1.7.4.1 of the RFP.

ISO-NE started the System Impact Study on September 4, 2017 and expects to complete it in Q1 2018. The Feasibility Study, based on N-1 and N-1-1 thermal and voltage analysis, shows that the Project can interconnect 800 MW to the POI at the Brayton Point 345-kV Substation without any upgrades to the transmission system. The Feasibility Study also assessed the performance of the wind farm start-up, power factor requirements, and short-circuit requirements. During startup, the windfarm does not violate any high or low voltage criteria. The power factor analysis shows the windfarm fully meets the power factor requirements of

the LGIA Appendix G. The short-circuit analysis showed no significant impact on the ISO-NE grid circuit breaker duty as a result of interconnecting the Project.

After completion of the System Impact Study the Bidder will submit, in Q1 or Q2 2018, Proposed Plan Applications for Project I.3.9 approval. Based on the ISO-completed Feasibility Study the Bidder expects no upgrades to the ISO-NE transmission system, aside from expanding the Brayton Point 345-kV Substation. However, if the System Impact Study identifies any upgrades, the Bidder, after review of the System Impact Study results, will submit together with the Transmission Owner additional Proposed Plan Applications for the required upgrades on the transmission system and will commit to construct such required upgrades.

Upon completion of the System Impact Study, the Bidder may request ISO-NE to undertake a Facilities Study. A Facilities Study will provide the detailed costing estimates of the network upgrades which National Grid must build at Brayton Point, the decision will not be made until the completed System Impact Study has been reviewed with ISO-NE. If the Facilities Study is waived, the Bidder can begin working towards signing a LGIA after the System Impact Study. If successful, the Bidder expects to execute an LGIA in [redacted].

The PNOI Study is discussed in Section 6.15.

Large offshore windfarms undertake harmonic studies to determine the level of harmonic distortion within the windfarm interconnection facilities and at the onshore POI. Harmonic assessments are required to determine if harmonic filters are required and if so, their technical specifications. To undertake a harmonic assessment Bay State Wind has engaged National Grid to begin a harmonic measurement campaign at the onshore POI at Brayton Point in order to record the background harmonic measurements. This is required for the harmonic assessment and to complete a harmonic filter design.

6.8 Multiple Interconnection Requests

6.8 If multiple interconnection requests have been made, please specify all such active requests which have not been superseded by subsequent requests and information regarding the status of each. Provide copies of any requests made and studies completed.

In addition to [redacted] which is currently at the System Impact Study assessment stage with ISO-NE, the Bidder has also filed an additional Interconnection Request for 880 MW in the Cape Cod area with a POI at the Eversource Bourne 115-kV Substation, with the Canal 345-kV Substation as a backup POI. A copy of the interconnection request confirmation is included as Attachment 6-1 which was assigned Queue Position [redacted]. The Bourne POI serves as an alternative and/or could support future solicitations. The Bidder has elected for ISO-NE to perform a Feasibility Study for [redacted] which ISO-NE has said is expected to be studied in Q3 2018. Since the ISO-NE Feasibility Study could not be performed in time for submission with this proposal, [redacted] performed, for the Bidder, an independent feasibility type study for [redacted]. However, ISO-NE did complete a Preliminary Non-Binding Overlapping Impact Analysis (PNOI) for [redacted] which showed that no transmission elements are overloaded for each scenario evaluated. The PNOI Analysis report is CEII and can be made available to persons with the required clearance upon request.

[redacted]

6.9 Technical Reports or System Impact Studies

6.9 Projects that do not have I.3.9 approval from ISO-NE must include technical reports or system impact studies that approximate the ISO-NE interconnection process, including but not limited to clear documentation of study technical and cost assumptions, reasoning, and justification of such assumptions. All studies must assume the project will interconnect using the Capacity Capability Interconnection Standard, must use the current ISO-NE interconnection process (including network impact scenarios from multiple projects interconnecting), and must also detail any assumptions with respect to projects ahead of the proposed project in the ISO-NE interconnection queue and any assumptions as to changes to the transmission system that differ from the current ISONE Regional System Plan. Please include a scenario analysis that shows how changes in the project interconnection queue could impact interconnection costs.

ISO-NE started the System Impact Study on September 4, 2017. The scheduled completion is Q1 2018. The feasibility study has been completed and this shows the project can inject 800 MW to the POI at the 345-kV Brayton Point Substation without any network upgrades required and no adverse impact to the reliability of the onshore system. A description of the ISO-NE studies is provided in Sections 6.6 and 6.7. The feasibility study includes all prior queued projects; hence earlier queued projects are not impacting the bidder. If withdrawal of an earlier queued project were to impact the interconnection request, the bidder will make the necessary upgrades required.

The ISO-NE has completed the project Feasibility Study (on April 7, 2017) and PNOI Study (on March 24, 2017). The Feasibility Study results show that based on N-1 and N-1-1 thermal and voltage analysis the Project can interconnect 800 MW to the POI at National Grid's Brayton Point 345-kV Substation without any upgrades and adverse impact to the onshore transmission system. The Feasibility Study also assessed the performance of the wind farm start-up, power factor requirements, and short-circuit requirements. During startup, the windfarm does not violate any high or low voltage criteria. The power factor analysis shows the windfarm fully meets the power factor requirements of the LGIA. The short-circuit analysis showed no significant impact on the grid circuit breaker duty as a result of interconnecting the wind farm. The Feasibility Study technical assumptions are described in the study report. The Feasibility Study evaluated a 2021 transmission system representation. Steady state analyses were completed for summer peak, shoulder and minimum load levels based on the NEPOOL 2016 Capacity, Energy, Load and Transmission (CELT) Report, issued in May 2016. The feasibility study includes all relevant prior queued planned projects. The non-binding cost estimate to expand the 345-kV Brayton Point Substation in order to interconnect the Bidder's project [redacted] is [redacted]. This cost estimate, provided by National Grid, is in current year (2017) dollars with (-50 percent/+200 percent) accuracy. The bidder does not have additional cost estimate details.

If an earlier queued project were to withdraw this would in general result in less thermal stress on the transmission system in the area. Therefore no adverse thermal impact would be expected. Also, the Project has adequate voltage control capability and therefore the withdrawal of an earlier queued project would have no adverse impact on the Bidder's project. However, if the withdrawal of an earlier queued project were to impact the interconnection request, the bidder will make the necessary upgrades required. The Bidder is not expecting any impact on the interconnection costs from the withdrawal of an earlier queued project.

The Project has significant dynamic reactive capability and the bidder is not expecting the System Impact Study to result in any required upgrades to the transmission system. However, if any such required upgrades are identified in the presently ongoing System Impact Study the Bidder will commit to making such required upgrades.

In general the Feasibility Studies and the System Impact Studies are performed in accordance with the Network Capability Interconnection Standard (NCIS), where local generation displacement is acceptable. In these two studies the Bidder selected for Capacity Network Resource Interconnection Service (energy capability and capacity capability).

ISO-NE has also completed, in accordance with the Capacity Capability Interconnection Standard, a PNOI Study for Brayton Point. In the PNOI Study three generation dispatch and system configuration scenarios were evaluated. Scenarios #1 and #2 did not include the SEMA/RI area identified system upgrades and were therefore not further considered. Scenario #3, which included the preferred transmission system upgrades identified in the recently completed wide area SEMA/RI study, identified potential minor overloads (3 percent) on two 345 kV overhead transmission lines. The rating of these two 345 kV lines will need to be verified since the ratings used in the PNOI Study for these two lines may be sag limited. The 3 percent overloads on these two lines was due to a single stuck breaker contingency at the West Farnum Substation. As described on Page 10 in the Notes Section of the ISO-NE PNOI Study report, under less conservative stressed system conditions, the violations identified in Scenario #3 may not be an issue. Therefore, based on the above considerations no significant network upgrades were assumed for the purpose of participating in the FCM.

6.10 Studies Using the ISO-NE Proposed Interconnection Process Changes

6.10 To the extent that you provide an alternative interconnection scenario based on ISO-proposed interconnection process changes, you must also include studies using the proposed ISO-NE-proposed process. Any such studies must be accompanied with clear documentation of study technical and cost assumptions, reasoning, and justification of such assumptions.

ISO-NE has not notified Bay State Wind of any interconnection request process changes while the project has been under study. If any process changes are proposed by ISO-NE Bay State Wind will complete any necessary studies per ISO-NE requirements. Accordingly, since there is not an alternative interconnection scenario being provided at this time, there are not additional studies using the proposed ISO-NE-process applicable for integration into the proposal.

Furthermore, if additional studies are necessary, ISO-NE does have an ongoing process whereby interconnection requests that are submitted within 180 calendar days of each other may be studied as part of a cluster study, allowing the studies to be completed in parallel as opposed to sequentially in order to speed up the study process. This is not applicable to the Project because the System Impact Study has already commenced without any involvement of other queue positions. The Feasibility Study is CEII and can be made available to persons with the required clearance upon request. The Bidder encourages the Evaluation Team to request that ISO-NE provide the Feasibility Study to the Evaluation Team in accordance with Section 1.7.4.1 of the RFP.

6.11 Electrical Models

6.11 Provide the electrical models of all energy resources supporting the proposed project in accordance with the filing requirements of the ISO-NE Tariff Schedule 22 and 23.

Electrical models are proprietary to a third-party WTG manufacturer and the Bidder has a limited right of use. The Bidder is not authorized to release these models to the Evaluation Team. If the Evaluation Team needs access to these models, the Bidder will help applicable parties obtain access to such documents pursuant to a multi-party non-disclosure agreement.

6.12 Electrical One-Line Diagram

6.12 Provide a copy of an electrical one-line diagram showing the interconnection facilities and the relevant facilities of the transmission and/or distribution provider.

A one-line diagram for the Preferred Option's transmission system is provided as Figure 6.6 and Attachment 6-6. In the diagram, WTGs are abstracted and do not appear, and the diagram is oriented with the array system at the bottom and grid interconnect at the top.

[redacted]

6.13 Current or New Interconnection Facilities Owned by Bidder

6.13 Specify and describe the current or new interconnection facilities (lines, transformers, switching equipment, system control protection, etc.) that bidder owns or is intending to construct or have constructed in order to deliver the proposed energy.

A full description of the planned interconnection facilities is provided in Section 8.1 and Section 15.1.

In the Preferred Option, the proposed Project will consist of the following major components:

Wind Farm Array System and WTGs – [redacted] The individual WTG size and total number of WTGs may change in order to optimize Project cost and performance. However, the total generation delivered at the Brayton Point 345-kV Substation will remain at 800 MW. Each WTG will be equipped with its own dedicated [redacted] generator step-up transformer. These transformers have a no-load tap changer. Refer to Section 8.1.2 for further information on the WTGs. The individual WTGs and their generator step-up transformers will be connected to a [redacted] submarine array cable network, which will terminate at an OSS. Section 8.1.4 provides further information on the array cables.

[redacted]

OSS – The OSS contains the transformers and switchgear required to connect the array cables and transform the voltage up to [redacted] kV for export to shore. For the 800 MW generation to Brayton Point, the OSS will consist of [redacted] transformers; each transformer will have [redacted] switchgear sections [redacted] in total), with [redacted] submarine cables terminating at each switchgear section [redacted] There are [redacted] installed to compensate for the export cable charging current. The [redacted] transformers will be interconnected with [redacted] tie switches. Section 8.1.6 and Section 15.1 provides further information on the OSS.

[redacted] **kV Circuits** – [redacted] circuits will connect the OSS to a new OnSS, with each [redacted] circuit connecting 400 MW of offshore WTGs. Each [redacted] circuit will consist of a submarine cable portion, approximately [redacted] long, and an underground cable portion (the length will depend on routing). Each [redacted] circuit will have approximately [redacted] which will be compensated by [redacted] Section 8.1.5 provides further information on the export cables.

OnSS – A new onshore air insulated substation will be constructed to terminate the [redacted] circuits from the OSS. The OnSS will consist of the following equipment:

- [redacted] submarine/underground circuit from the offshore wind generation
- [redacted] switchgear housing circuit breakers and disconnect switches
- [redacted] fixed shunt reactors
- [redacted] variable shunt reactors
- [redacted] harmonic filters
- [redacted] STATCOMs
- 55-MW with 110-MWh Battery Energy Storage Device
- [redacted] transformers equipped with load tap changers

The two halves of the 800-MW OnSS will be connected with a [redacted]

[redacted] will connect the new OnSS to the 345-kV Brayton Point Substation.

Section 8.1.7 provides further information on the OnSS.

Brayton Point 345 kV Substation Upgrades – The upgrades of the existing Brayton Point 345-kV Substation are subject to the System Impact Study not yet finalized by ISO-NE. The Feasibility Study, also performed by ISO-NE prior to the System Impact Study, shows that Brayton Point 345-kV Substation will be expanded with a number of 345-kV gas-insulated system bay positions. This will include the installation of new circuit breakers at the Brayton Point 345-kV Substation. The underground cables from the new OnSS will terminate at the new bay(s) at the Brayton Point 345-kV Substation.

Upgrades to the Existing ISO-NE Transmission System – Aside from the upgrades required at the Brayton Point 345-kV Substation, no other system upgrades will be required.

Voltage Control – The WTG step-up transformer no-load tap will be set at 1.015 pu boost, based on the Feasibility Study conducted by ISO-NE. A power plant controller will dispatch the WTG reactive power in order to regulate the [redacted] voltage at the OSS to [redacted] The [redacted] transformers at the new OnSS will be equipped with load tap changers which will control the voltage at the [redacted] bus.

6.14 Incremental Data Requirements

6.14 Incremental data requirements for Projects that include Transmission facilities:

1. IDV file(s) in PSSE v32 format modelling only the new/modified Transmission components of the project.

The IDV file is provided as Attachment 6-7. The IDV file is suitable for steady state analysis of the windfarm.

2. If the Bidder does not use PSSE, provide in text format necessary modeling data as follows:

Line Data:

Voltage: Thermal Ratings:

Impedances (r, X and B)

Line Length/to and from bus numbers and names

Not applicable; data for the line characteristics and electrical properties are provided in the IDV file in Attachment 6-7.

- Transformer data: (including Phase shifting transformers if applicable):

Terminal Voltages: Thermal Ratings:

Impedance

From: To:

(bus numbers and names)

Not applicable; data for the onshore and offshore transformers are provided in the IDV file in Attachment 6-7.

- Reactive compensation models as necessary

Not applicable; data for the reactive compensation are provided in the IDV file in Attachment 6-7.

- Other changes to the model that would occur due to a Project such as terminal changes for lines/transformer/generator leads/loads etc.

The IDV file provided in Attachment 6-7 represents the offshore windfarm electrical system for steady state analysis. No changes to the existing onshore electrical system are necessary, subject to the results of the ISO-NE feasibility study discussed in Section 6.7.

[redacted]

6.15 Energy Delivery

6.15 Please detail with supporting information and studies (as available) that the energy contemplated in your proposal is able to be delivered to the Distribution Companies without material constraint or curtailment.

The energy provided by the Bidder is able to be delivered to the EDCs without material constraint or curtailment as studied in the ISO-NE Feasibility Study and System Impact Study and described in Section 6.7.

ISO-NE has completed a PNOI Study for Brayton Point in accordance with the capacity capability interconnection standard (CCIS), and issued its findings on March 24, 2017. The ISO-NE PNOI Study modeled three generation dispatch and system configuration scenarios. Scenario #3 included the preferred transmission system upgrades identified in wide area SEMA/RI study recently completed. Scenarios #1 and #2 did not include the SEMA/RI area identified upgrades and were therefore not further considered. In Scenarios #3 the PNOI Study identified two minor overloads (3 percent) on two 345 kV overhead transmission lines. The rating and possible mitigation for these two lines will need to be verified. Also, under less conservative stressed system conditions, the violations identified in scenario #3 may not be an issue. Therefore, based on the results of the PNOI Study, it is not expected that any network upgrades will be required for the Project to connect at the CCIS.

The PNOI Study is Critical Energy/Electric Infrastructure Information (CEII) and can be made available to persons with the required clearance upon request.

The Bidder encourages the Evaluation Team to request that ISO-NE provide the PNOI Study and Feasibility Study to the Evaluation Team in accordance with Section 1.7.4.1 of the RFP.

Additional detail on the Bourne POI and associated studies is provided in Attachment 6-1.

In addition, the integration of a battery system as proposed herein will further ensure that the Bidder will be able to deliver the contemplated energy without material constraint or curtailment.

6.16 Sufficiency of Proposed Point of Delivery into ISO-NE

6.16 Please provide sufficient information and documentation to demonstrate that the proposed point of delivery into ISO-NE, along with their proposed interconnection and transmission upgrades including any transmission upgrades beyond the point of interconnection, is sufficient to ensure full dispatch of the proposal's Clean Energy Generation profile.

The proposed point of delivery at Brayton Point is sufficient to ensure full dispatch of the Project's generation profile without any system upgrades. The existing 1.5 GW coal power station at Brayton Point was shut down in May 2017; this frees up sufficient capacity for the Project. This is supported by the results of the Feasibility Study performed by ISO-NE, as described in Section 6.7, and further detailed below.

ISO-NE completed a comprehensive Interconnection Feasibility Study for [redacted] in the spring of 2017. The Feasibility Study evaluated steady-state thermal and voltage performance of the ISO-NE transmission system following N-1 (single contingency events) and N-1-1 (two independent contingency events). The analysis was performed in accordance with NPCC and ISO-NE transmission planning standards. The study results showed no violations of voltage or

thermal reliability criteria and no violations of ISO-NE line-out criteria with the proposed Project delivering up to 800 MW at the Brayton Point POI.

To be conservative, the two Preferred Option Project STATCOMs were modeled out of service in the steady state voltage and thermal analysis. This approach was taken to demonstrate that the Project has sufficient reserve reactive power capability, which is further assessed in ISO-NE's System Impact Study. The additional reactive power reserve capability modeled in the Feasibility Study will ensure that the results of ISO-NE's System Impact Study will not require the Project to incorporate additional equipment to meet acceptable dynamic system performance.

The steady-state analysis evaluated the Project impact on the New England transmission system reliability performance at summer peak, shoulder, and minimum load levels. Heavy transfers in and out of SEMA and Rhode Island were used to stress the Project area.

The following dispatches were tested:

- Peak Load with high SEMA/RI Import
- Peak Load with high West to East Transfers
- Shoulder load with high SEMA/RI Export
- Minimum load for HV stress

In all cases, the Project was dispatched against western Massachusetts generation remote to the Brayton Point study area.

The Feasibility Study results showed no violations of voltage or thermal reliability criteria. As well, the Feasibility Study determined that the Project meets the power factor requirement at the POI in accordance with the Appendix A requirements of the LGIA.

A short-circuit assessment was also performed as part of the Feasibility Study to determine the Project's impact on the transmission system fault current levels and breaker duty. The short-circuit study found no significant impact as a result of interconnecting the Project at the 345-kV Brayton Point Substation.

The Feasibility Study further assessed the start-up sequencing of the Project to demonstrate the Project would not violate voltages at the 345-kV Brayton Point Substation during Project startup. The assessment confirmed that voltages would not be violated.

The Feasibility Study also performed a project collector system analysis to demonstrate that the settings of the WTG voltage control, WTG transformer taps, offshore and onshore load tap changer taps, variable shunt reactor taps, and STATCOM voltage control were selected for optimum performance.

The results of the Feasibility Study, with some possible adjustments, are generally used in the steady-state portion of the ISO-NE System Impact Study. Therefore, the results of the Feasibility Study are a very good indication that the Project will have no impact on the steady-state performance of the ISO-NE transmission system.

Section 7

Environmental Assessment, Permit Acquisition Plan, and New Class I RPS Certification

Ørsted and Eversource are **industry leaders** in permitting complex energy projects.

- Since December 2015, the Project has been conducting **assessments of biological, cultural, socioeconomic, geophysical, and geological conditions across the Project Area**.
- **The Bidder has led a proactive stakeholder engagement process** with regulatory agencies, tribal nations, local communities, universities, fishermen, environmental groups, low income populations, labor and local business interests, and recreational users.
- The Bidder is applying best science, working with stakeholders, and incorporating lessons learned from offshore wind projects in Europe to **avoid, minimize, and mitigate** potential environmental impacts.

The Bidder received the industry-first approval of a Site Assessment Plan by the Bureau of Ocean Energy Management in June 2017, and deployed two FLiDARs and a wave buoy to collect valuable wind resource and metocean data.

The Bidder has signed a Memoranda of Understanding with Massachusetts Maritime Academy, Bristol Community College, Action for Boston Community Development, South Shore Community Action Council, International Brotherhood of Electrical Works, and others.

Conditional upon PPA award, the Bidder is committing more than $2 million to support New England's preeminent institutions with collaborative research and programmatic initiatives to protect the region's indigenous fisheries and whale populations.

Deployed FLiDAR Buoy

7. Environmental Assessment, Permit Acquisition Plan and New Class I RPS Certification

In this section, the Bidder outlines the status of efforts related to the Project's environmental assessment and the acquisition of required permits, licenses, authorizations, and certifications. The preliminary environmental site characterization indicates that the Bidder will be able to deliver the Project, while minimizing environmental impacts throughout construction and operation of the Project. The Project has also garnered a significant level of public support through direct stakeholder engagement.

[redacted]

7.1 Permits, Licenses, Environmental Assessments and/or Environmental Impact Statements Required

This section addresses environmental and other regulatory issues associated with project siting, development and operations for both generation and transmission projects, as applicable.

7.1 Provide a list of all the permits, licenses, and environmental assessments and/or environmental impact statements required to construct and operate the project. Along with this list, identify the governmental agencies that are responsible for issuing approval of all the permits, licenses, and environmental assessments and/or environmental impact statements. If a bidder has secured any permit or has applied for a permit, please indicate this in the response.

The permit matrix included in Attachment 7-1 lists the permits, licenses, and environmental assessments and/or environmental impact statements required to construct and operate the Project, and identifies the regulatory agencies responsible for issuing approval of same. The list also details the status relating to any permit applications or permits that have been secured by the Project at this stage.

Furthermore, the schedule provided in Section 9 is based on a robust understanding of the necessary permits, licenses, environmental assessment and/or environmental impact statements required for construction and operation of the Project. This understanding is informed by consultation with federal and state regulatory agencies, previous environmental assessment experience (see Section 7.3), and a thorough review of the U.S., Massachusetts and Rhode Island regulatory framework.

7.2 Anticipated Timeline for Seeking and Receiving Required Permits

7.2 Provide the anticipated timeline for seeking and receiving the required permits, licenses, and environmental assessments and/or environmental impact statements. Include a project approval assessment which describes, in narrative form, each segment of the process, the required permit or approval, the status of the request or application and the basis for projection of success by the milestone date. All requirements should be included on the project schedule in Section 10.

The Bidder has reviewed federal, state, and local permitting requirements to identify the applicable regulatory framework for the construction and operation of an offshore wind energy project. As detailed in Sections 7.3 and 7.5, the Bidder has extensive experience in permitting projects of similar complexity and has undertaken significant activities in advancing the permitting process ahead of responding to this RFP. A summary of milestones achieved to date is provided in Table 7.1.

Table 7.1 Timeline of Completed Project Activities and Milestones

Activity/Milestone	Date
Lease OCS-A 0500 went into effect	April 1, 2015
12-month extension of the Preliminary Term granted by BOEM	April 27, 2016
Submitted SAP Survey Plan	June 16, 2016
SAP Survey Plan accepted by BOEM	August 10, 2016
Completed preliminary site assessment activities including geophysical and geotechnical surveys	September – October 2016
Submitted SAP to BOEM	20 December, 2016
Interagency kick-off meeting with federal and Massachusetts and Rhode Island state agencies as well as the Federally Recognized Tribes	February 7, 2017
Submitted COP Survey Plan	February 28, 2017
Submitted Cable Route Survey Plan, Avian Survey Protocol, and Marine Mammal & Sea Turtle and Fisheries Baseline Characterization Approach Memos	March – April 2017
SAP was approved	June 29, 2017
Deployed FLiDARs to assess meteorological conditions at Lease Area in support of Project engineering and design	July 8, 2017
Completed avian surveys across the Lease Area	May – October 2017
Completed export cable route reconnaissance survey	May – October 2017
Completed reconnaissance wetlands and cultural resources surveys at Brayton Point	August – September 2017

The complete timeline for seeking and obtaining all required permits, licenses, and environmental assessments and/or environmental impact statements is detailed in Section 9.1 and is summarized below in Table 7.2. The Bidder anticipates approval of the COP with BOEM's Record of Decision in [redacted] however, all permits and approvals will not be received until [redacted] given that certain permits can only be issued 6 months before the start of construction. This projection is based on multiple factors including engagement with the regulatory community, understanding of the federal and state permitting process, milestones achieved to date, as well as Ørsted's and Eversource's experience in conducting environmental impact assessments and permitting complex projects.

Table 7.2 Projected Timeline for Receipt of Project Permits, Licenses, and Environmental Assessments and/or Environmental Impact Statements

Activity/Milestone	Date
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[1] Note that certain federal and state agency approvals have a statutory "start" date such that receipt of approval must be timed to within 6-12 months of start of construction even if the materials needed to support permit application are available.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The permitting process is comprehensive with multiple agencies and other stakeholders involved at the federal, state, and local level. A matrix of applicable regulations and permits, including the current status and/or anticipated date of receipt, is provided in Attachment 7-1.

[redacted]

The applicable federal and state regulatory requirements for development within the Lease Area and interconnection in Massachusetts are summarized in Attachment 7-4.

7.3 Prior Experience in Environmental Impact Assessment Process

7.3 Provide information detailing prior experience in environmental impact assessment process.

The Bidder's Owners, Ørsted and Eversource, have extensive experience in permitting of complex infrastructure projects across Europe and New England, including the undertaking of Environmental Impact Assessments (EIAs) as part of the development process.

Ørsted has a proven track record for successfully leading the development process including EIA work involving approximately 25 offshore wind farm projects. The extensive experience Ørsted brings to the Project team through producing or managing the EIA or being the responsible lead for obtaining or amended existing permits for construction and/or operation of offshore wind projects across Europe is illustrated in Figure 7.1 and Table 7.3.

Figure 7.1 Projects where EIA or Major Permitting Work was carried out by Ørsted

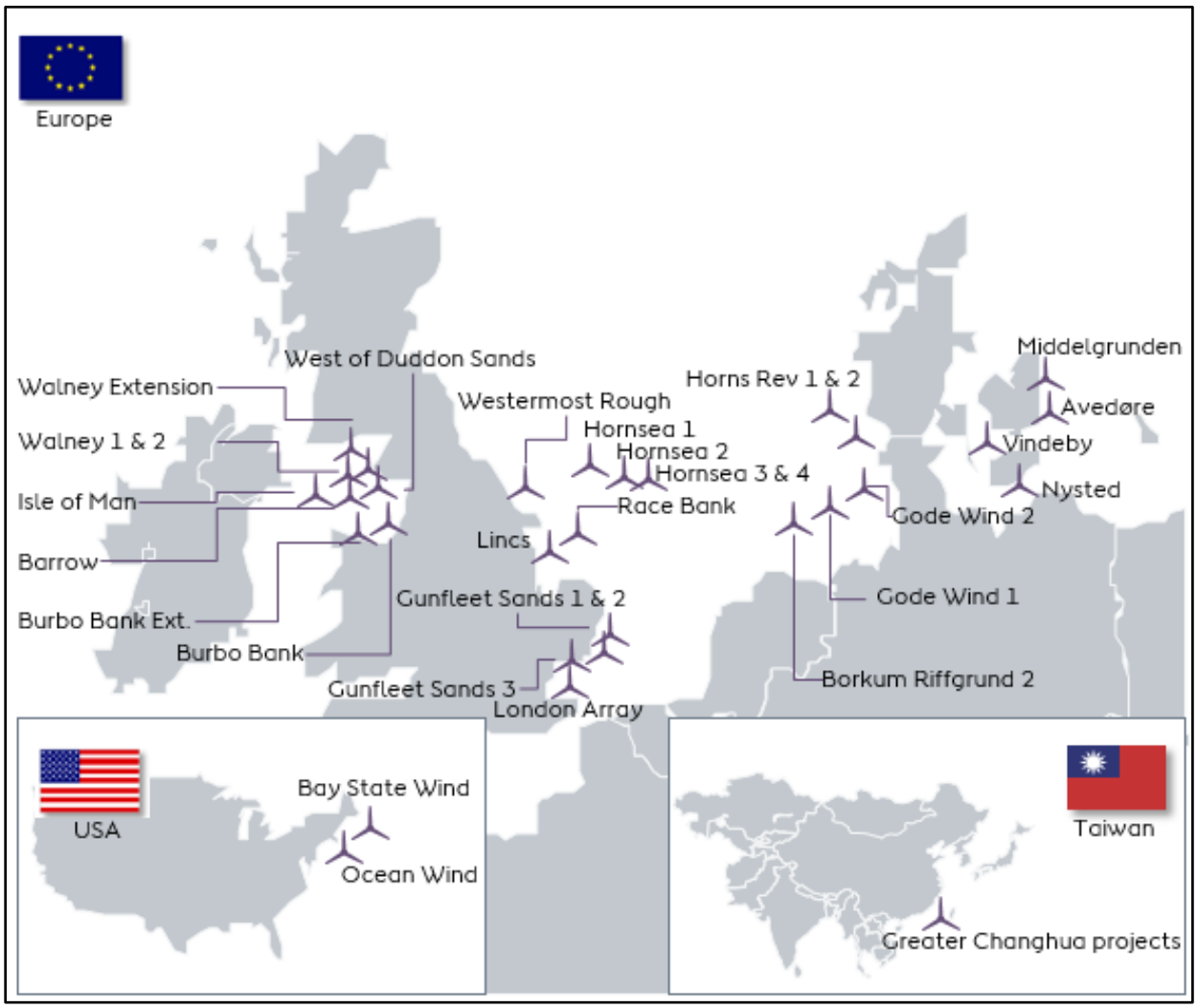


Table 7.3 Ørsted Experience in Permitting Offshore Windfarms

Project	Country	Permit approval	Ørsted permitting involvement	Capacity (MW)	Construction Completed
Vindeby	DK	1990	First-ever offshore windfarm in the world. Project was successfully decommissioned by Ørsted in 2017.	4.95	1991
Middelgrunden	DK	1999	Ørsted responsible for permitting process for the WTGs located close to Copenhagen.	20	2000
Horns Rev 1	DK	2001	Ørsted responsible for permitting process.	160	2002
Nysted	DK	2001	Ørsted responsible for permitting process.	166	2003
Horns Rev 2	DK	2005	Ørsted responsible for permitting process.	209	2009
Avedøre	DK	2008	Ørsted responsible for permitting process for intertidal-based WTGs.	7	2009
Gunfleet Sands 1 + 2	UK	2004	Ørsted responsible for permitting process for offshore and onshore parts of the development.	108 + 65	2011
Walney 1+2	UK	2008	Ørsted responsible for permitting process for offshore and onshore parts of the development.	184+ 184	2012
London Array 1	UK	2006	Ørsted responsible for permitting process for offshore and onshore parts of the development.	630	2012
Anholt	DK	2010	Consent provided by Authority. Ørsted responsible for specific stakeholder agreements (e.g. with fisheries) and environmental monitoring.	400	2013
Gunfleet Sands III Demo	UK	-	Ørsted responsible for permitting process for offshore and onshore parts of the demonstration project.	12	2013
West of Duddon Sands	UK	2008	Ørsted responsible for permitting process for offshore and onshore parts of the development.	389	2014
Borkum Riffgrund 1	DE	2004/ 2014	Permitted by other developer. Ørsted applied for amendment of existing consent to allow for the first-ever suction buckets in Germany. Successfully managed challenging noise requirements during construction.	312	2015
Westermost Rough	UK	2012	Ørsted achieved amendment of existing consent under the Section 36 regime to allow for bigger WTGs. Achieved local planning consent for OnSS at very short timescale.	210	2015
Gode Wind I+II	DE	2013	Ørsted applied for amendment of existing consent to allow for bigger WTGs. Successfully managed challenging noise requirements during construction.	332+252	2016

Table 7.3 Ørsted Experience in Permitting Offshore Windfarms (continued)

Project	Country	Permit approval	Ørsted permitting involvement	Capacity (MW)	Construction Completed
Burbo Bank Extension	UK	2014	Ørsted responsible for full Development Consent order (DCO) process including consultation with all stakeholders. Onshore infrastructure constructed in Wales requiring local permits.	258	2017
Walney Extension	UK	2014	Ørsted responsible for full DCO process including consultation with all stakeholders for the offshore and onshore aspects of the development. Managed various issues related to offshore and onshore environmental impacts.	660	Under construction
Hornsea Project 1	UK	2014	Ørsted involved in DCO process with previous project owner. Managed various issues related to offshore and onshore environmental impacts.	1218	Under construction
Race Bank	UK	2015	Ørsted achieved amendment of existing consent from 2012 under the Section 36 regime to allow for bigger WTGs and changed cable route. Managed crossing of protected area in intertidal zone using bespoke installations tools.	565	Under construction
Borkum Riffgrund 2	DE	2016	Ørsted applied for amendment of existing consent to allow for bigger WTGs and foundation choice to include both MPs and suction bucket.	450	Under construction
Hornsea Project 2	UK	2016	Ørsted responsible for full DCO process including consultation with all stakeholders for the offshore and onshore aspects of the development. Managed various issues related to offshore and onshore environmental impact.	1300	Under construction
Hornsea Project 3	UK		DCO in process by Ørsted.	-	Under development
Bay State Wind	US		COP under preparation by Ørsted	-	Under development
Ocean Wind	US		COP under preparation by Ørsted	-	Under development
Greater Changhua	TW		EIA under preparation by Ørsted	-	Under development

Similarly, Eversource has experience in the development of large, complex energy projects that require robust EIAs. Over the past 10-15 years, Eversource has planned, designed, permitted, and constructed over $2.8 billion of major transmission upgrades in southern New England. Eversource has developed extensive relationships with local, state, and federal agencies with whom it is necessary to work to successfully site and permit such projects, and is intimately familiar with the regulatory framework in the New England states. Table 7.4 provides an overview of several illustrative projects for which Eversource was required to complete the robust EIA process with either federal and/or state oversight.

Four of the five projects highlighted below are interstate transmission projects. These projects demonstrate Eversource's experience in completing permitting and siting efforts for multi-State projects and is directly applicable to the Bidder's proposed solution. This experience demonstrates Eversource's ability to complete these processes successfully, and to secure approvals/authorizations that are consistent across multiple jurisdictions.

Relying on these strengths, the Bidder is supported by a very experienced team, combining permitting and EIA expertise and knowledge from the European wind markets with local knowledge of the regulatory regime and the EIA process in the U.S.

Table 7.4 Eversource EIA Experience – Project Highlights

Environmental Permitting Scope	Permit / Siting Challenges	Outcome/Status
Martha's Vineyard Hybrid Submarine Cable Project – Construction of a 4.5-miles (7.2-km)-long cable across Vineyard Sound from Falmouth MA to Tisbury MA. This was a first-of-its-kind collaboration between Comcast and NSTAR.		
• National Environmental Policy Act (NEPA) review by lead federal Agency (U.S. Army Corps of Engineers [USACE]) • Section 106 consultation with Massachusetts Historical Commission and Bureau of Underwater Archaeological Resources (BUAR) • Section 401 Water Quality Certification by the MADEP • M.G.L. Chapter 91 Waterways Licensing from MADEP • Massachusetts Environmental Policy Act (MEPA) review, including preparation of Draft and Final Environmental Impact Reports (EIRs) • Massachusetts Department of Public Utilities (DPU) Siting Division Section 72 License • Consultation with Massachusetts Office Coastal Zone Management and review under the Massachusetts Oceans Management Plan • Consultation with Massachusetts Division of Fisheries & Wildlife's Natural Heritage & Endangered Species Program (NHESP) • Consultation with Massachusetts Division of Marine Fisheries • Cape Cod Commission Development of Regional Impact (DRI) review • Martha's Vineyard Commission DRI review • Local Conservation Commission approval under the Wetland Wetlands Protection Act	• First infrastructure project permitted under the Massachusetts Ocean Management Plan (implemented on Dec 31, 2009) • Underwent three project siting reviews (DPU, Cape Cod Commission, and Martha's Vineyard Commission DRI review) • Collaborative effort with Comcast Cable company • Traversed busy public ferry service route during installation • Protected eelgrass beds along shoreline	• Successful installation on time and on budget • Avoided protected eelgrass beds • Awarded the Environmental Business Council's Nicholas Humber Environmental-Energy Award for Outstanding Collaboration (2013)

Table 7.4 Eversource EIA Experience – Project Highlights (continued)

Environmental Permitting Scope	Permit / Siting Challenges	Outcome/Status
Greater Springfield Reliability Project – High-voltage transmission project involving construction of a new 39-mile (63-km) 345-kV circuit from Bloomfield, CT to Ludlow, MA. This multi-State project included multiple system upgrades with over 600 new transmission structures and 13 new or rebuilt substations and switching stations.		
• NEPA review by lead federal Agency (USACE) • MEPA review, including preparation of Draft and Final EIRs • Section 401 Water Quality Certification by MADEP and the CT Department of Energy and Environmental Protection (CT DEEP) • Section 404 Permitting under the Clean Water Act by the USACE • Siting Approval by the Massachusetts Energy Facilities Siting Board and the CT Siting Council (CSC) • M.G.L. Chapter 91 Waterways Licensing from MADEP for crossing of the Connecticut River • Local Conservation Commission approval under the Wetland Wetlands Protection Act in the cities/towns of Agawam, West Springfield, Springfield, Chicopee and Ludlow	• Consultations with multiple environmental agencies in MA, including the Massachusetts Historical Commission (MHC), NHESP, and the Massachusetts Department of Conservation and Recreation • Avoidance and minimization of wetland impacts • Development of compensatory wetland mitigation plan • Acquisition of land and land rights to support expansion of transmission rights-of-way, including land rights needed from Massachusetts Department of Conservation and Recreation • Section 106 consultations with Native American Tribes	• Development of cultural avoidance and mitigation plans approved by all Tribes, USACE, MHC, and the Advisory Council on Historic Preservation • All siting approvals and permits received • NEPA Finding of No Significant Impact (FONSI) • Project completed and placed in service in 2013 • Project was finished on time and under budget, despite challenging weather events that included Superstorm Sandy and the blizzard of 2013
Long Island Replacement Cable Project – Replacement of a 139-kV submarine cable system within Long Island Sound, between Norwalk (CT) and Northport (Long Island, NY). The existing system was installed in the late 1960s and consisted of seven (7) fluid filled cables surface laid on the floor of Long Island Sound. Due to a history of cable impacts and leaks, Eversource (CL&P) proposed to replace the system in the early 2000s with three cross-linked polyethylene (XLPE) cables (3-phases per cable, 3 circuits in total) buried in sediments using jetting methodologies.		
• NEPA review by lead federal Agency (USACE) • Section 404 Permitting under the Clean Water Act by USACE • Section 401 Water Quality Certification by New York State Department of Environmental Conservation • Section 401 Water Quality Certification by the CT DEEP, and Office of Long Island Sound Programs Permitting by CT DEP • Siting Approval by the CSC • Article VII Siting Approval by the Public Service Commission	• Active use of shellfish aquaculture beds in Norwalk Harbor and south of Sheffield Island (CT) • Long term monitoring of impacts to shellfish resources • Water quality impacts associated with removal of existing cables and jetting/burial of new cables • Disruption/effects on CT and NY Lobster industry in Long Island Sound • Effects on fisheries and marine mammals during construction	• Successful consultations with lobstermen and shellfish interests/organizations and development of construction mitigation to minimize/avoid impacts • All siting approvals and permits received • NEPA FONSI • Project completed and placed in service in 2008, on time and on budget

Table 7.4 Eversource EIA Experience – Project Highlights (continued)

Environmental Permitting Scope	Permit / Siting Challenges	Outcome/Status
Interstate Reliability Project – This Project spanned 3 States: Connecticut, Rhode Island, and Massachusetts and was completed in cooperation with National Grid. In Connecticut, the Project included 37 miles (59 km) of new 345-kV transmission lines in 11 CT Towns: Lebanon, Columbia, Coventry, Mansfield, Chaplin, Hampton, Brooklyn, Pomfret, Killingly, Putnam, and Thompson. The Project also included upgrades at three existing substations: Card Street Substation (Lebanon), Lake Road Switching Station (Killingly), and Killingly.		
• NEPA review by lead federal Agency (USACE) • Section 401 Water Quality Certification by CT DEEP • Section 404 Permitting under the Clean Water Act by the USACE • Siting Approval by the CSC	• Consultations with multiple environmental agencies in CT, including the Natural Diversity Data Base, the CT State Historic Preservation Office (SHPO), • Avoidance and minimization of wetland impacts • Development of compensatory wetland mitigation plan • Acquisition of land and land rights to support expansion of transmission rights-of-way • Section 106 consultations with Native American Tribes	• Development of cultural avoidance and mitigation plans approved by all Tribes, the USACE, MHC, and the Advisory Council on Historic Preservation. • All siting approvals and permits received • NEPA FONSI • Project completed and placed in service in 2015 • Project was finished on time and on budget
Northern Pass Transmission (NPT) Project - NPT is a 192-mile (309-km) transmission line project that will bring over 1.0 GW of clean power (hydro-electric) from Canada to New Hampshire. The Project will include a new direct current (DC) transmission line from the Canadian border to Franklin, NH, where a converter terminal will be built to convert the power to alternating current (AC) and a new AC transmission line will carry power to the Deerfield, NH substation.		
• Presidential Permitting by the U.S. Department of Energy (DOE) • NEPA review, including Draft and Final Environmental Impact Statements (EISs), with DOE as lead federal agency • Section 404 Permitting under the Clean Water Act by the USACE • NH Site Evaluation Committee (SEC) siting review • Consultation with multiple State environmental agencies in NH – State agencies participate in the NH SEC review process	• Avoidance and minimization of visual/scenic impact in White Mountain National Forest • Route selection to NH resident concerns regarding potential environmental/visual effects • Inclusion of 60 miles (96 km) underground in response to public and agency concerns • 32 miles (51 km) of new right-of-way acquisition from willing landowners	• The Project has completed all environmental permitting efforts and awaits only receipt of approval from the NH SEC.

7.4 Preliminary Environmental Characterization of the Site and Project

7.4 Provide a preliminary environmental characterization of the site and project, including both construction and operation. In addition, the bidder should identify environmental impacts associated with the proposed project and any potential impediments to development. A plan to avoid, minimize, or mitigate such impacts or impediments should also be included. The analysis should address each of the major environmental areas presented below, for the proposed project:

i. Air quality
ii. Community
iii. Cultural resources
iv. Fishery, avian, and marine mammal impacts
v. Other ecological biological resources (including endangered species)
vi. Landscape and visual
vii. Oceanography
viii. Sound, noise and vibration
ix. Socio-economic and land use
x. Traffic and transportation (including Navigation)
xi. Water resources (including quality and flood risk)

Since receiving the Lease in June 2015, the Bidder has been actively evaluating and characterizing the Project and assessing potential impacts through desktop assessments, field surveys, agency consultation, and stakeholder outreach. As discussed in Sections 7.2 and 7.5, the Bidder is working with federal and state agencies, the Tribes, and other stakeholders to appropriately assess environmental resources of concern, avoid and/or mitigate potential effects, and obtain the necessary permits and approvals to support the construction and operation of the Project.

The Bidder benefits from the experience that Ørsted and Eversource have in incorporating innovative minimization and mitigation measures to reduce potential impacts to the extent practicable, as discussed in Section 7.3. The following section provides a preliminary environmental characterization of construction and operation of the Project, based on existing data as well as the field surveys conducted to date for the Project. While potential mitigation measures are identified below, the Bidder understands that appropriate measures will be identified during the permitting and outreach process in collaboration with federal and state agencies and other stakeholders.

A summary of the Project's preliminary environmental assessment, including proposed approaches to avoid and/or minimize potential effects during construction and operation of the Project, is provided in Table 7.5, as well as preliminary identification of measures to avoid, minimize, or mitigate such impacts.

The details summarized in the table below are only preliminary details because the Project has not yet completed its environmental assessment and therefore the identification of potential mitigation measures can only be preliminary. The final identification of adequate and appropriate mitigation measures cannot be addressed before detailed knowledge about the site is obtained. The Project is currently undertaking further site characterization in the form of survey activities and desktop studies that will enable the final environmental assessment of potential impacts and the identification of appropriate, adequate, and site-specific mitigation measures for the Project.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

7.5 Documented Level of Public Project Support

7.5 Provide documentation identifying the level of public support for the project including letters from public officials, newspaper articles, etc. Include information on specific localized support and/or opposition to the project of which the bidder is aware. Provide copies of any agreements with communities and other constituencies impacted by the project, and a stakeholder map with a plan for community engagement activities. Please discuss the status of the stakeholder plan.

The Bidder views community engagement as a critical and integral part of the siting and development process and, as such, it is closely connected to such work streams as environmental permitting and supply chain development. Since the announcement of the Project in September 2015, the Bidder has undertaken a comprehensive public engagement and media campaign.

7.5.1 Public Project Support

The public response to the development of an offshore wind industry in Massachusetts and to the Project specifically has been overwhelmingly positive. In fact, multiple articles and press releases have been published providing direct support for the industry and the Project, highlighting the numerous benefits of offshore wind energy[13]. In September 2016, the National Wildlife Federation, the Environmental League of Massachusetts, Massachusetts Audubon Society, Environment Massachusetts, Massachusetts Sierra Club, and Clean Water Action issued a statement praising "the visionary, collaborative, and bipartisan leadership"[14] in Massachusetts for its support of this new industry, highlighting the benefits of clean energy and local, high-quality jobs. These and other materials praising the Project and offshore wind energy in Massachusetts are highlighted in Figure 7.2.

[13] http://www.mass.gov/governor/press-office/press-releases/fy2017/governor-baker-signs-comprehensive-energy-diversity-law.html
[14] https://www.nwf.org/News-and-Magazines/Media-Center/News-by-Topic/Global-Warming/2016/09-06-2016-MA-Offshore-Wind-Power-Takes-Another-Step-Forward.aspx

Figure 7.2 Bay State Wind in the News

"Massachusetts is always at the forefront of adopting innovative clean energy solutions …the Commonwealth has taken another major step towards providing residents and businesses with a cost-effective and reliable clean energy future.

— Charlie Baker
Governor of Massachusetts

"By utilizing renewable sources of power generation, Massachusetts will continue to lead the nation in embracing economic and environmentally friendly methods to generate electricity to meet the needs of our communities.

— Karyn Polito
Lieutenant Governor of Massachusetts

Gode Wind Project

"Massachusetts is now an important step closer to reaping the rewards of our massive offshore wind power potential. It's appropriate that the Whaling City, which once lit the world, will now help launch America's next clean energy chapter from its Marine Commerce Terminal. New Bedford is a model for cities and states up and down the Atlantic Coast looking to grow their economies while acting to protect their communities and wildlife from the worsening impacts of climate change. We applaud the visionary, collaborative, and bipartisan leadership at all levels of government that has made it possible for New Bedford, and the Commonwealth as a whole, to be a guiding light for America's next energy chapter. The developers are ready to get to work and we look forward to rolling up our sleeves alongside them to ensure this clean energy industry and its local, high-quality jobs swiftly and responsibly come to fruition.

— The National Wildlife Federation, Environmental League of Massachusetts, Mass Audubon, Environment MA, MA Sierra Club, and Clean Water Action

"The ability to procure clean hydroelectric power and off-shore wind is another important milestone in the Commonwealth's transition to a diversified energy portfolio… By embracing renewable energy generation technologies, the Baker-Polito Administration continues to make progress in achieving the emissions reductions targets set forth by the Global Warming Solutions Act.

— Matthew Beaton, Secretary of Energy and Environmental Affairs of Massachusetts

"Most certainly."
John F. Quinn, former member of the Massachusetts House of Representatives and current chairman of the New England Fisheries Management Council, when asked if he could see evidence that offshore wind is compatible with the fishing industry.

— South Coast Today

Vindeby

"The South Coast is perfectly situated to host this new, clean energy industry and we are encouraged that Bay State Wind has made a financial commitment to the economic resurgence of the region and Commonwealth as a whole. We look forward to working with Bay State Wind and all other offshore wind developers in facilitating future investment for long-term economic growth."

— Representative Patricia A. Haddad

Figure 7.2 Bay State Wind in the News (continued)

"The site selection [for the Bay State Wind Project] was based on including public input. It didn't ignore the fishermen. It didn't ignore the tribes.

— WBUR News

"Since 2000, the amount of energy generated by onshore wind has risen twenty-fold, yet, despite many years of preparations, the U.S. is still awaiting its first offshore wind farm. DONG Energy, which already supplies offshore wind power to 18 million Europeans, will now help to change that.

— Triple Pundit, in response to the Bay State Wind Project

Borkum Riffgrund Selection

"Danish energy company DONG Energy now ranks number 11 on the Carbon Clean 200 list – a ranking of 200 companies from around the world... Helping Denmark slash its carbon emissions and earning a high ranking on the Carbon Clean list are just a few ways the company is leading the black-to-green energy transition.

— Sustainable Brands

"It's an astonishing transformation. It is hard to think of many other oil and gas companies that have made as big a shift as Dong has away from fossil fuels towards renewable energy.

— Jens Houe Thomsen
Analyst at Denmark's Jyske Bank, Financial Times

"Bay State Wind is expected to "drive economic growth across the supply chain" and generate port traffic at the New Bedford Marine Commerce terminal.

— MassLive LLC

"As the technology has improved and demand for renewable energy has risen, costs have fallen… Turbines today are bigger, produce much more electricity and are deployed on much larger sites than in the past. The result is more clean power and extra revenue.

— New York Times

"With three gigawatts of installed offshore wind capacity, the company [DONG Energy] is a leader in offshore wind farm construction. This capacity corresponds to roughly one quarter of the world's offshore wind capacity.

— Sustainable Brands

Horns Rev 2

"We are excited to increase RENEW's focus on offshore wind development in the Northeast with their [Dong Energy] election to the board.

— Francis Pullaro
Executive Director of RENEW Northeast, North American Wind Power

"Over the past decade…Denmark's DONG Energy has become a champion of green energy.

— The Financial Times

As discussed above, the Bidder's initial outreach and engagement has resulted in letters of support for the Project from several individuals and organizations, as identified in Table 7.6. Copies of these letters are included in Attachment 7-6.

Table 7.6 Project Support Letters

Organization	Individual
Action for Boston Community Development (ABCD)	John Wells, Vice President, Real Estate & Energy Services
Action, Inc.	Elliott Jacobson, Vice President for Energy Services
Bristol Community College (BCC)	Laura L. Douglas, President
Cape & Vineyard Electric Cooperative, Inc.	Leo Cakounes, President
Cape Cod Chamber of Commerce	Wendy K. Northcross, Chief Executive Officer
House of Representatives	Representative Antonio F.D. Cabral, 13th Bristol District
House of Representatives	Representative Dylan Fernandes, Barnstable, Dukes, and Nantucket District
House of Representatives	Representative Patricia A. Haddad, 5th Bristol District
House of Representatives	Representative Paul A. Schmid, 8th Bristol District
Immigrants' Assistance Center, Inc	Helena DaSilva Hughes, Executive Director
Massachusetts Senate	Senator Julian Cyr, Cape and Islands District
Massachusetts Senate	Senator Mark Montigny, Assistant Majority Leader, Second Bristol and Plymouth District
Massachusetts Senate	Senator Michael J. Rodrigues, First Bristol and Plymouth District
New Bedford Economic Development Council	Anthony R. Sapienza, Chair, Board of Directors
New Bedford Wind Energy Center	Paul L. Vigeant, Managing Director
New England Aquarium	Scott D. Kraus, VP, Senior Science Advisor
People Acting in Community Endeavors (PACE), Inc.	Bruce Morell, Executive Director
South Shore Community Action Council (SSCAC), Inc.	Daniel Shannon, President, Board of Directors
SouthCoast Chamber	Rick Kidder, President/CEO
The Lobster Foundation of Massachusetts	Mike Bartlett, President
Town of Aquinnah	James Newman, Chairman, Aquinnah Board of Selectmen
United Way of Greater New Bedford	Michelle N. Hantman, President/CEO

7.5.2 Community Agreements

As detailed in this section, the Bidder has entered into several agreements with interested and affected constituencies. These include:

- Massachusetts Maritime Academy (MMA)
- Action for Boston Community Development (ABCD)
- Action Inc. (Action)
- South Shore Community Action Council (SSCAC)

- People Acting in Community Endeavors (PACE)
- Bristol Community College (BCC)
- International Brotherhood of Electrical Workers (IBEW)

Copies of these agreements can be found in Attachment 14-2.

7.5.3 Stakeholder Engagement and Communications Plan

Relying on Ørsted's and Eversource's experience in developing multiple major infrastructure projects across New England and Europe, the Bidder has developed an extensive outreach program. Project outreach efforts draw on the dedicated public relations and subject matter expertise and resources resident within the Ørsted and Eversource teams, supplemented by a team of industry and community liaison officers with well-established relationships with and the trust of the stakeholder communities. The purpose of this program is to both create positive awareness of the Project by highlighting local community and statewide benefits and to solicit feedback from Project stakeholders. The following section describes in more detail the outreach efforts aimed to foster dialogue with, and address the distinct interests of, the range of interested and affected stakeholder groups.

The planning and development of a large-scale offshore wind project touch on a diversity of interests to ensure that all user groups can co-exist. The Bidder is therefore implementing a stakeholder engagement and communications program that identifies the range of interest and user groups along with the main mechanism to engage with each group. It is reviewed and updated on a regular basis. As described more fully below, these interests include but are not limited to:

- Regulatory agencies
- Tribal Nations
- Local communities in proximity to the Project area
- Universities
- Fishing communities
- Environmental groups
- Low income populations
- Labor and local business interests
- Recreational boating groups

Bay State Wind at the Gay Head 10K, October 2017

The following sections provide a summary of the Bidder's efforts to date and plans for continued engagement with these important stakeholders.

<u>Regulatory agencies:</u> Federal and state agencies with a jurisdictional interest in the Project are identified in Section 7.1. The Bidder has been actively engaged with the regulatory community since acquiring the Lease in June 2015.

In accordance with the Lease and 30 Code of Federal Regulations (CFR) 585, the Bidder has been communicating regularly with BOEM about pre-survey meetings, the SAP Survey Plan, and the SAP for the deployment of metocean buoys in the Lease Area. The Bidder's SAP

Survey Plan was accepted by BOEM on August 10, 2016 and the SAP was approved on June 29, 2017 after completion of preliminary site assessment activities in September/October 2016. Notably, this marked the first time BOEM has ever approved a SAP for offshore wind development, and the agency commended this milestone as "a pioneering effort". With SAP approval completed, the Bidder successfully launched two FLiDAR buoys and a wave buoy in July 2017 and is now collecting metocean data in the Lease Area that will be used in the development and design of the proposed wind farm.

The Bidder has engaged with BOEM, NOAA NMFS, U.S. Fish and Wildlife Service, MADEP, Massachusetts Department of Marine Fisheries, BUAR, MHC, Rhode Island Coastal Resources Management Council, Rhode Island Department of Environmental Protection, RI HPHC and other state and local agencies, as well as the Tribes, regarding site characterization and assessment plans for specific resources. In February 2017, the Bidder's permitting team met with federal and state regulatory agencies in Boston to:

- introduce the Bidder's project and permitting team;
- outline the key components of the development process, scope, project definition, and timeline;
- review the proposed survey rationale and methodology for site and resource characterization;
- gain a common understanding of the agencies' and developer's roles, responsibilities, objectives and information needs; and
- seek regulatory agency input and agree on next steps.

The meeting was the first opportunity to meet with the regulatory community critical to the success of the Project and engage in constructive dialogue about the Project scope and the road ahead. Subsequently, the Bidder has continued to engage with federal and state regulatory agencies regarding specific survey protocols and the Project's approach to the COP as well as providing updates on Project status. An overview of our engagement efforts with the regulatory agencies is provided in Attachment 7-7. The Bidder anticipates working closely with federal and state regulators throughout the Project development process.

Tribal Nations: The Bidder has identified the three federally recognized tribes in Massachusetts and Rhode Island (Mashpee Wampanoag, Wampanoag Tribe of Gay Head [Aquinnah] and the Narragansett Tribe) and has developed a special engagement program relating to Tribal interests. Additionally, the Bidder is committed to following direction provided in the Renewable Energy Program Regulations (30 CFR 585), Section 106 of the National Historic Preservation Act, and in the terms and stipulations of the Lease, which require engagement with the Tribes and consideration of Tribal interests. The Bidder has conducted the necessary pre-survey meetings and has engaged with a Qualified Marine Archaeologist to review the potential for impacts associated with site assessment activities completed to date. Although not required by the Lease, the Bidder has also reached out to the Tribes to present survey results. Additionally, the Bidder is actively engaged in exploring other opportunities to support Tribal initiatives related to cultural resource investigations. An overview of outreach with the Tribal Nations is included in Attachment 7-8.

Local communities in proximity to the Project area: The Bidder recognizes the benefits of building strong working relationships with communities proximate to its offshore wind projects. Through these relationships, local community members can identify concerns as well as opportunities to benefit from Project development. To support this effort:

- The Bidder has proactively reached out to local communities through informational meetings throughout 2016 and 2017, press releases, website promotion and a significant presence on social media.
- The Bidder held four open houses November 27 – 30, 2017 to share Project information with the public and solicit feedback from the local community. Open houses were held in Somerset, New Bedford, and Falmouth, and on Martha's Vineyard.

Bay State Wind Holds Open Houses with Massachusetts and Rhode Island Communities

Meetings organized in Somerset, New Bedford, Martha's Vineyard and Falmouth were hosted by 12 members of the Bay State Wind team, providing attendees with access to the full range of skills and expertise that Bay State Wind brings to the offshore wind market and a valuable opportunity for in depth discussion with specialists on the team. Over 100 members of the public attended the meetings, representing the fishing community, local Economic Development Boards, academic institutions, fabricating companies, marine engineers and boat builders, seafood processors, State agencies (EPA, MA DMF), elected officials, environmental consultants, city councils, local press, the Rotary Club, local residents and an onshore wind developer. Attendees were most interested in the impacts on the region's commercial fishery interests and job opportunities, and were supportive of the Project.

- The Bidder supports and participates in community events such as the Save the Harbor/Save the Bay Annual Gala and the Red Sox STEM Event. The Bidder has committed a budget of nearly $200,000 for calendar year 2017 in support of these activities, and plans to continue this activity on a continuing basis.
- Bay State Wind gave $2,500 to the United Way of Greater New Bedford, whose Hunger Heroes Project is distributing 800 turkeys and 1,000 meals for Thanksgiving with the assistance of more than 300 volunteers across 15 food pantries and agencies in the region.
- The Bidder also gave $2,500 to the Immigrant's Assistance Center of New Bedford, which provides an array of services to more than 7,000 immigrants annually.
- The Owners maintain involvement with several local and regional organizations including Northeast Energy and Commerce Association, New England Women in Energy and Environment, Massachusetts Business Roundtable, Cape Cod Chamber, Martha's Vineyard Chamber, and Boston University for Sustainable Energy.
- Additionally, the Bidder has appointed separate Community Liaison Officers for Martha's Vineyard and South Coast (New Bedford). These Community Liaison Officers serve as "on-the-ground" ambassadors for the Project. Both Community Liaison Officers,

Bay State Wind supports United Way of Greater New Bedford, November 2017

[redacted], are highly respected members of their respective community with an extensive network of local contacts with civic institutions and opinion leaders. [redacted] They will work with local residents, representatives, organizations and businesses to provide information about the Project. They will leverage business, municipal, and community service experience on the region to develop community programs and work with residents to ensure local voices are heard throughout all phases of the Project.

- If awarded this PPA, the Bidder will sustain its community engagement strategy for 2018 and beyond. We will consider the merits of establishing a Community Benefits Fund, comparable to those proposed by Eversource for the Northern Pass Project in New Hampshire and those now in place for several of Ørsted's UK windfarm projects. These Community Benefit Funds are funded by Ørsted and Eversource as project proponents but are administered by a third-party to allocate available grant funds to eligible civic organizations based on pre-defined categories of support and individual grant limits.

Fishing communities: The Bidder recognizes the benefits of building strong working relationships with communities proximate to its offshore wind project. A partner in Bay State Wind, Ørsted has pioneered outreach and trustworthy communications with European fishermen interests and that experience informs our approach to working with the American fishing industry as well. Eversource has done likewise for many of its projects in southern New England, most notable for the Long Island Replacement Cable project, on which Eversource engaged directly with commercial fishing interests in multiple states to address their concerns, and to integrate their expertise in the development of construction methods and communications protocols. The Bidder's goal is to establish a "good neighbor" working relationship with commercial and recreational fisheries operating in and nearby to the Lease Area and cable routes. The Bidder has developed a fisheries outreach program to minimize disruption of fishing activities during Project data collection and construction phases and maximize ease of access and safe navigation for fishing activities in the Bidder's long-term

Ørsted Collaborates with Lobster Fishery on Offshore Wind Farm

The Westermost Rough offshore wind farm site, operational since 2015, is located 5 miles (8 km) off the east coast of England in the heart of the largest lobster fishery in the United Kingdom. The fishery represents approximately 20% of national lobster landings with a first-sale value of several million U.S. dollars per annum. After listening to the concerns raised by fishermen, Ørsted collaborated with both the Holderness Fishing Industry Group (HFIG) and Hull University to develop and undertake a joint study examining the potential impacts of the wind farm on crab and lobster stocks. The study is the first of its kind to be conducted anywhere in the world and is proving to be of significant value in assuaging fishermen's concerns. The use of a fishing industry owned and managed research vessel has allowed local fishermen to assume a lead role in the data collection process, and the study has highlighted the positive effects of the two industries collaborating to conduct high quality, scientifically robust research that fishermen feel affinity towards.

operations. To achieve these goals, the Bidder has developed the following objectives:

1. Identify major and incidental fisheries with a history of operations in or near the lease area.
2. Map these fisheries' likely presence in spatial and temporal scales.
3. Identify and map the economic and social structure of these fisheries, taking into account likely points of landing, shore-side services, and professional service institutions.
4. Identify and attend various fisheries working groups organized by state organizations.
5. Identify peer leaders and respected voices within the communities of interest.
6. Through face-to-face communications, identify individuals curious about offshore wind power development and technology, and open to opportunities for engagement.

The Fisheries Communications Plan (FCP) consists of three methods of approach as detailed below. Through all of these engagements, the Bidder is gathering available data including local knowledge, from management, academic, industry, and non-profit sources as well as collecting data directly through observation during surveys or from local fisherman. These data will be aggregated and presented in the COP submission.

1. Fisheries Liaison Officer

   The Bidder has employed [redacted], a regional commercial fisheries expert, to act as a business representative as the Fisheries Liaison Officer (FLO) for the Project. As the first step in engagement, the Bidder has identified and engaged with over 25 agencies, regulatory agencies, trade associations, and fisheries research institutes as well as over 100 fisheries businesses and individual fisherman that broadly encompass the fishing industry in the region. This list will expand as the Bidder continues to map the economic and social network of regional fisheries. In this process, the FLO will continue to engage and gather input from fisheries stakeholders.

2. Fishing Industry Representative

   The FCP also includes Fishing Industry Representatives (FIRs), experienced local fishermen and women who act as representatives for the industry on board the Bidder's survey vessels. This program is ongoing, and has proven successful with real time engagement and mitigation of potential gear conflict situations reducing impacts to fishing activity as well as survey activity. The FIRs also have identified and mapped current patterns of fishing activity in the Lease Area.

3. [redacted]

> ***"HFIG has sought to work with various other sea users. Of these, by far the most positive response has come from Ørsted, which has collaborated with us on a study of the ecological effects of the construction and operation of the Westermost Rough wind farm [...] The wind farm study is the first of its kind to be conducted anywhere in the world and is proving to be of significant value in assuaging fishermen's concerns about offshore wind development."***
>
> **Mike Cohen, CEO of HFIG and Chairman of the National Federation of Fishermen's Organization**

[redacted]

Environmental groups: The Bidder has engaged and consulted with several major national and regional environmental organizations (including Natural Resources Defense Council, National Wildlife Federation, International Fund for Animal Welfare, and Conservation Law Foundation) on a number of occasions to understand the issues, exchange data and information and discuss the proposed approach to data collection and impact assessment relating to the protection of North Atlantic Right Whales and other protected marine mammal species found off the northeast Atlantic coast and, more specifically, within the Lease Area and close proximity. To support this effort, the Bidder participates in externally-led initiatives including the ad hoc Habitats Working Group established by the Massachusetts Office of Coastal Zone Management (in collaboration with the Mass CEC, the American Wind Energy Association's (AWEA's) Offshore Committee, and BOEM. Semi- monthly meetings have been held to gather input, hear concerns, and share updates regarding the Bidder's plans and activity status. In addition, the Bidder has and will have opportunities to engage with representatives of these organizations at marine science conferences including OCEANOISE2017, the Biennial Conference on the Biology of Marine Mammals, and the North Atlantic Right Whale Consortium annual meeting as well as industry-specific conferences sponsored by AWEA. The Bidder will continue to engage in the semi-monthly meetings as well as meet one on one with representatives of these organizations as opportunities allow.

On a going forward basis, and conditional upon PPA award, Bidder is making a major resource commitment towards the support of New England's preeminent research, philanthropic, educational and advocacy institutions in implementing a portfolio of collaborative research and programmatic initiatives for the protection the region's indigenous whale populations. This multi-year commitment will be comprised of the following elements:

1. Woods Hole Oceanography Institute (WHOI) ($500,000, multi-year)

   Bay State Wind will fund a technology advancement/study for development and improvement of real-time detection systems for right whales for potential use during construction. This will include utilization of digital acoustic monitoring buoys and slocum gliders and potentially include an oceanographic sensor suite. The system will be linked to the Whale Alert system. See Attachment 7-10 for a Letter of Support from WHOI.

2. New England Aquarium Right Whale Project/Lobster Foundation of Massachusetts ($500,000; multi-year)

   Bay State Wind will provide financial support to the New England Aquarium Right Whale Project and to the Lobster Foundation of Massachusetts for use in mitigating right whale gear entanglements. The funding is conditional on full cooperation and approval of all project spend between the two organizations and additional approval of the South Shore Lobster Fishermen's Association. Bay State Wind seeks to support

initiatives that improve the North American Right Whale population status, but as importantly does so in a manner that is supportive of our fishing industry neighbors.

First launched in 2012, the Whale Alert network comprises regional efforts to reduce ship strikes and other human activities that threaten whale species recovery. Network members utilize various areas of expertise including technology, research, outreach, and education to increase the effectiveness of whale strike preventive measures. Ørsted is proud to be a financial backer and a key representative of a network of energy partners. http://www.whalealert.org/

3. Whale Alert System ($25,000 annually)

   Bay State Wind will continue with annual support of the APP with the intent to improve and progress the system for utilization during construction and operation

4. Marine Mammal Mitigation Advisory Panel ($50,000 annually to cover costs)

   Bay State Wind will develop a Mitigation and Monitoring Advisory Panel that includes right whale specialists, acousticians, and E-NGO representation to provide input for a mitigation and monitoring plan for federal authorizations. Agreement on measures is not a condition of the panel process but it is a goal. Dr. Scott Kraus (New England Aquarium) and Dr. Mark Baumgartner (WHOI) have agreed to participate in the panel.

5. Center for Coastal Studies (CCS) ($5,000/year; up to 5 years)

   Bay State Wind will provide financial support to the CCS Marine Debris program to support development of the marine debris program for marine waste reduction, removal and recycling initiatives.

6. National Ocean Science Bowl/Blue Lobster Bowl ($5,000/year; up to 5 years)

   Bay State Wind will provide support to the National Ocean Science Bowl to support the highly regarded high school ocean science education program. Bay State Wind hopes to encourage local students to enter into the renewable energy field and sees this as a great opportunity to cultivate local talent.

Marine Users: The Bidder places significant importance on providing marine users such as commercial and recreational fishing, navigation and boating interests and tourism groups with information about the project and specific survey activities. This is achieved through public meetings and public notifications (such as local Notices to Mariners). In addition, the Bidder recognizes that, as a new marine industry, all ocean users need to be play a role to improve ocean management and avoid potential conflicts of use and has engaged in regional approaches to ocean management with involvement of federal agencies, states and stakeholders. All meetings with stakeholders are logged and recorded as part of Bay State Wind's stakeholder outreach plan, which is reviewed on a regular basis. As part of the process, the Bidder is also committed to a number of Open House events at key stages in the development of the Project to provide an opportunity for stakeholders and user groups to engage with the Project team.

> ***"Bay State [Wind]'s commitment [in opening a Project office in New Bedford] today marks another concrete step towards realizing the economic potential of this emerging industry."***
>
> **Massachusetts Assistant Senate Majority leader Mark C. Montigny**

Low income populations: In support of the Energy Diversity Act's goal of encouraging development of offshore wind projects that benefit low-income ratepayers, Bay State Wind initiated in February 2017 an ongoing dialogue with two of the area's preeminent organizations in the field of low income consumer advocacy and support service delivery – the National Consumer Law Center (NCLC) and the LEAN regarding cost-effective support for low-income ratepayers in Massachusetts. This dialogue resulted in a groundbreaking MOU in which the Bidder has committed to up to $17.55 million in lifetime funding toward the statewide delivery of energy efficiency upgrade and arrearage management services to low-income communities in Massachusetts. MOUs have been established with four of the Department of Housing and Community Development-sanctioned Community Action Agencies for the funding and administration of these grants – ABCD and Action, for implementation of a statewide program; PACE, targeting New Bedford and the South Coast; and SSCAC, to address the energy challenges of the Cape and Islands low income population. These MOUs are provided as Attachment 14-2 and are summarized in Section 14.6.

Labor and local business interests: The Bidder is committed to using local labor wherever possible, with due consideration to requisite skill sets and cost effectiveness. To identify opportunities for economic development and job creation, a dialogue has been initiated with the major trade groups with potential relevance to the construction and operation of Project – the International Brotherhood of Electrical Workers (IBEW), International Association of Bridge, Structural, Ornamental, and Reinforcing Iron Workers, Utility Workers Union of America, Maritime Trade Council, Laborers International Union of North America, Massachusetts Building Trades Council, and New England Regional Council of Carpenters.

On September 2, 2017, the Boston and New England Trade Council convened a meeting between representatives of the Project and 14 representatives of several organized trades with an interest in offshore wind development, including electricians, carpenters, pile drivers, millwrights, operating engineers, seafarers and longshoremen. The Bidder looks forward to continued discussions with these union representatives on the scope of future engagement in staging, construction and O&M activities.

In addition, beginning in March 2017, the Bidder convened a series of meetings with the IBEW with a focus on the onshore elements of the Project. This latter dialogue leverages Eversource's longstanding relationship with the IBEW in the development of land-based transmission and other electrical infrastructure projects and the goodwill that this has generated. These discussions resulted in the execution of a Project Labor Agreement (PLA) and a MOU.

The PLA establishes a framework for the use of Union Labor to support relevant/jurisdictional work. The PLA

> ***"The Port of New Bedford is the hub of the commercial fishing industry on the East Coast, and we are positioning ourselves likewise to become a center for offshore wind energy in the years ahead. The establishment of an office here by one of the industry's leaders, Bay State Wind, is another important step forward in this effort."***
>
> **New Bedford Mayor Jon Mitchell**

establishes the protocol by which construction contractors will work with IBEW local unions, and to prioritize the use of Massachusetts-based union workers. If Bay State Wind is the selected Bidder under the current RFP, the PLA will be included in all relevant contracts between the Bidder and construction contractors, and all construction contractors will be required to sign onto and accept the terms of the PLA.

Further recognizing that certain offshore work requires specialized skills and experience, and that a shortage of such skilled workers currently exists in Massachusetts, the Bidder and the IBEW have also entered into an MOU to accompany the aforementioned PLA. This MOU establishes a mutual commitment between the Parties to collaborate in the development of a training program to help developed a skilled labor force to support offshore wind construction in Massachusetts. Both the proposed Project, assuming the Bidder is successful, and the growing offshore wind industry in Massachusetts (and likely beyond) can be expected to reap the benefits of such a training program.

The PLA and MOU documents can be amended to allow other trade groups/organizations to become Parties as the Project advances.

Universities and research institutions: The Bidder has undertaken several separate but interrelated initiatives with area universities and institutions to support workforce development, training, and primary research in offshore wind-related fields of study:

1. Massachusetts Maritime Academy (MMA)

   The Bidder has entered into an MOU with the MMA, a fully accredited, four year, co-educational state university offering Bachelor and Master of Science degrees that are highly regarded in the worldwide maritime industry and beyond. As the MOU attests, the partnership between the Bidder and MMA will serve as a vehicle for "building a strong workforce development system aligned with state education policies and economic development goals. This partnership will focus on gateway communities to ensure educational academic opportunities for K-12 students, technical training and hiring of skilled workers in the emerging U.S. offshore wind industry, and provide citizens with knowledge, skills, and education to be well trained members of the community who are afforded the opportunity to apply for and retain competitive jobs, high wages, social mobility and satisfying careers." The Bidder has made an unconditional grant of $25,000 for 2018 to support scholarships to underprivileged students who come from Gateway Cities; four additional annual grants of $50,000 will be contingent upon a PPA award. Lastly, in the event the Bidder is awarded an 800-MW contract, they have pledged, as an in-kind contribution, to donate a TP full-scale mock-up that can be used by students on the campus for hands-on training of offshore electrical procedures. The fair market value of this contribution is approximately $650,000 - $900,000.

2. New Bedford Wind Energy Center

   A grant of $25,000 has been made to support the New Bedford Wind Energy Center. The New Bedford Wind Energy Center is a partnership of the city's Harbor Development Commission, the New Bedford Economic Development Council, and Bristol Community College. The center's mission is to capture all the benefits possible, including local job creation and investments, from the development of the offshore wind industry in Massachusetts. Grant funds will be applied to support the

Center's research and training efforts, furthering the development of a large-scale offshore wind industry in Massachusetts.

3. Massachusetts Research Partnership

   The Bidder is a regular participant in the stakeholder meetings and discussions convened by Mass CEC with regard to research priorities and academic collaboration.

   The Bidder is supportive of the research agenda progressed by Mass CEC, in particular the establishment of the Massachusetts Research Partnership (MRP), and has been actively engaged in discussions with members to set priorities, as well as attendance at workshops and associated events. The Project team has met individually with a number of key institutions including Woods Hole Oceanographic Institute, the University of Massachusetts (UMass) Amherst, UMass Dartmouth, and other Massachusetts-based research organizations to consider synergies and collaborative initiatives.

   The Bidder is supportive of MRP's involvement in the national academic institution network, POWER US, formed in 2017, as demonstrated by its participation in a national 2-day workshop organized by National Renewable Energy Lab in Boulder, Colorado (October 2017) in order to help set the national offshore wind research agenda. The Bidder will draw upon its extensive European experience in industry-university collaboration to help identify the most effective mechanism for working together for the benefit of innovation in the offshore wind sector.

4. Bristol Community College

   The Bidder signed a Memorandum of Understanding (MOU) with Bristol Community College (BCC) to begin in December 2017. The purpose of this MOU is for the Bidder and BCC to work collaboratively together in the development of a wind energy educational component at the college. The MOU includes:

   - Participating in the BCC "Women in STEM" series
   - Serving on the BCC STEM advisory board
   - Participating in BCC's K-12 initiative to train middle school and high school science teachers on developing an offshore wind energy curriculum
   - Hosting BCC student interns
   - Serving as a guest lecturer in BCC's offshore wind courses
   - Exploring a collaboration with BCC and other industry stakeholders to develop an offshore wind training center in New Bedford, Massachusetts

   In addition, the MOU contains a pledge of $1 million contingent upon a PPA to use for various initiatives such as; scholarships, classroom needs, training programs, infrastructure projects as they relate to a new campus location.

7.5.4 Conclusion on Project Support

As documented above, the Bidder has made a concerted effort to better understand and genuinely address the concerns of a diverse group of stakeholders through a comprehensive outreach effort. This effort is already paying dividends, as evidenced by the overwhelming and documented support for the Project from individual opinion leaders and institutions across the Commonwealth. This work does not end with the submission of this bid; rather the

Bidder will ramp up its efforts consistent with the stakeholder engagement plan as we move into the more visible development stages of the Project. This should give the Evaluation Team confidence – as it does for the Bidder – that the Bidder is building up a strong base of community goodwill, and ensures that the Project delivers clean power for all of Massachusetts while respecting the communities it impacts.

7.6 New Class I Renewable Portfolio Standard Eligible Resource Documentation

7.6 Provide documentation demonstrating that the project was or will be qualified as New Class I Renewable Portfolio Standard Eligible Resource under M.G.L. c. 25A, § 11F, and 225 CMR 14.00.

As a new offshore wind energy facility, energy from the Project will qualify as a New Class I Renewable Portfolio Standard (RPS) Eligible Resource because it meets the standards defined in M.G.L. c. 25A, § 11F, and 225 CMR 14.00.

While the Bidder has not currently submitted its Class 1 RES application with the DOER it will do so at the appropriate time, and provide documentation once available.

7.7 Appropriate Tracking System Information and Documentation

7.7 All bidders must include sufficient information and documentation that demonstrates that the bidder will utilize an appropriate tracking system to ensure a unit-specific accounting of the delivery of Offshore Wind Energy Generation, to enable the Department of Environmental Protection, in consultation with DOER, to accurately measure progress in achieving the commonwealth's goals under chapter 298 of the acts of 2008 or Chapter 21N of the General Laws. The RECs associated with Offshore Wind Energy Generation must be delivered into the Distribution Companies' NEPOOL GIS accounts.

The Bidder will utilize the NEPOOL GIS tracking system for attribute tracking, which will allow MADEP, in consultation with DOER, to accurately measure progress in achieving the Commonwealth's goals under Chapter 298 of the Acts of 2008 or Chapter 21N of the General Laws.

The Bidder agrees to deliver the RECs associated with offshore wind energy generation into the EDCs' NEPOOL GIS accounts.

7.8 Existing, Preliminary, or Pending Claims of Litigation

7.8 Identify any existing, preliminary or pending claims or litigation, or matters before any federal agency or any state legislature or regulatory agency that might affect the feasibility of the project or the ability to obtain or retain the required permits for the project.

There are no existing, preliminary, pending, or foreseeable claims or litigation, or adversarial matters before any federal agency or any state legislature or regulatory agency against the Bidder, the Owners, or their affiliates that would affect the feasibility of the Project. The Bidder is aware of *Fisheries Survival Fund v. Jewell*, Civ. No. 16-2409 (D.D.C. filed Dec. 8, 2016), a pending lawsuit in which plaintiffs challenged the adequacy of environmental analyses for BOEM's December 2016 auction for its "New York lease area".

Section 8

Engineering and Technology; Commercial Access to Equipment

Bay State Wind's unrivaled experience allows us to **offer the lowest cost to ratepayers**. The Bid **anticipates future price reductions and passes those savings on to the ratepayers of the Commonwealth**. Bay State Wind is the most advantageous option for the Commonwealth, applying **state-of-the-art technical solutions, optimizing supply chain and logistics, and offering safe and environmentally acceptable design solutions**.

- Ørsted is leveraging its market-leading global position and U.S. project pipeline to give suppliers greater certainty in making long-term decisions to invest in the Commonwealth and the United States, resulting in a major boost to the local economy.
- In the Preferred Option, the Bidder intends to deploy the [redacted] ith a monopile foundation. The Bidder has extensive experience with the [redacted] platforms and has installed more than 1,000 monopile foundations.
- With more than 25 years of experience in the industry, 22 operational wind farms at a total capacity of 3.8 GW, and an additional 5.0 GW to be delivered by the end of 2022, the Bidder has a proven track record of successfully delivering its projects as committed.

25+ years of experience in the offshore wind indusry

22 operational wind farms of 3.8 GW capacity

7 projects under construction

8.8 GW of installed capacity by the end of 2022

1,000 monopile foundations installed

Anholt Offshore Wind Farm

8. ENGINEERING AND TECHNOLOGY; COMMERCIAL ACCESS TO EQUIPMENT

This section includes questions pertinent to the engineering design and project technology. This section must be completed for a project that includes new facilities or capital investments for both generation and transmission components if applicable. Bidders should provide information about the specific technology or equipment including the track record of the technology and equipment and other information as necessary to demonstrate that the technology is viable.

This section discusses how the Bidder is bringing together the accumulated experience of Ørsted and Eversource designing, procuring, building, and operating offshore wind farms and power transmission solutions. Recent auction results in Germany and the UK have demonstrated Ørsted's commitment to lowering price and the power of focused efforts to reduce all costs and optimize production. Ørsted was a successful bidder in the most recent auctions in UK, Germany and the Netherlands, setting a new global price level.

The Bidder's unique in-house engineering capabilities, unrivaled know-how and deep experience allows it to reduce costs along a broad front, such as optimizing the design of foundations resulting in significantly lighter structures and large cost reductions. Ørsted has previously demonstrated this with several projects including:

- **Walney 1 & 2 offshore wind farms: original design was redesigned internally resulting in 200 tons lighter structure (22% difference); and**
- **Race Bank offshore wind farm: original foundation design was redesigned resulting in reduced average foundation weight by 180 tons (21% difference).**

Ørsted's multi-disciplinary *Product Line* team is dedicated to scrutinizing all cost items, and providing improved engineering solutions where they have impact to cost and performance. This scrutiny is brought to bear on the supply chain as well, in collaboration with suppliers, enabling them to reduce costs and provide higher value with their products. The Bidder is determined to bring this process of continual refinement and cost reduction to bear on the Bay State Wind Project. Moreover, Bidder is committed to developing a U.S.-based supply chain. Ørsted's long-term, synergistic relationship with suppliers enables us to provide suppliers with greater visibility into our entire portfolio of future U.S. projects and to secure commitments to incrementally growing a local manufacturing presence. This confidence in Ørsted's role in shaping U.S. market development has enabled some of Ørsted's trusted suppliers, most notably foundation and WTG suppliers and vessel owners, to make firm commitments for this project, expressed in their written support (see Section 8.2).

In past years, Ørsted has consistently been instrumental in bringing technological advances into projects, for example:

- The first offshore wind project applying battery technology. (Burbo Extension)
- The first project with the present Siemens D6/D7/D8 platform (Westermost Rough).
- The first project with the MHI Vestas V164 platform (Burbo Bank Extension). It brought MHI Vestas back as a supplier to the offshore wind market.

Ørsted's in-house *Product Line* team will apply the most recent technological advances; an optimized design, supply chain, and logistical train; and safe and environmentally sound solutions and work methods to the U.S. offshore wind market, thus delivering cost savings to

Massachusetts's ratepayers. The Bid anticipates future price reductions and passes those savings on to the ratepayers of the Commonwealth.

The Preferred Option. As of this bid submission the Bidder has not finalized its supply decisions, and final supplier decisions will be made following a rigorous competitive bidding process for all major components. However, the Preferred Option described in this Bid represents our current view of the most advantageous solution for this project, based upon the Bidder's deep understanding of the state of the supply market and technical experience. Supply or installation contracts are not in place because prices tend to become more attractive once an award is in place. The Preferred Option sets a high bar for what needs to be achieved by the Bidder in the procurement phase. Table 8.1 below shows a summary of the technical solution in the Preferred Option.

The suppliers expected to offer the optimum contribution to the above criteria are listed where most relevant, but the final selection is ultimately contingent upon the supplier's ability to deliver competitive proposals.

In addition to the suppliers of major equipment, Bidder is evaluating its options for transport and installation. In an effort to further drive cost reduction and the establishment of a local supply chain, Bidder has entered into discussions with vessel owners on their interest and capacity to timely build the first Jones Act-compliant installation and transport vessels serving the U.S. offshore wind market. As described in more detail in Section 8, the Bidder is pleased to report that these efforts have yielded tangible progress as solutions are presently being offered by [redacted] (see Section 9.2).

[redacted]

Table 8.1 Summary of Proposed Generation and GLL Proposed Assets in the Preferred Option

Generation	
Foundations	Monopile/Transition Piece (MP/TP) solution by [redacted] TP installation with new built Jones Act-compliant vessel
Wind turbines (WTG)	[redacted] Installation with new built Jones Act-compliant vessel [redacted] in New Bedford
Transmission	
Array Cables	[redacted] cables Stored in New Bedford Installed with foreign installation vessel
OSS topside	Sub-assemblies cut and manufactured in [redacted] Topside main assembly in [redacted] Barged from yard to site on Jones Act-compliant barge, installed with non U.S. crane vessel
OSS jacket substructure	Jacket substructure manufactured in U.S. Barged from yard to site on Jones Act-compliant barge, installed with non U.S. crane vessel
Offshore Export Cable	[redacted] kV cable(s) Installed with foreign installation vessel and U.S. barge
Onshore Export Cable	[redacted] kV cables Installed with traditional methods
OnSS	Traditional open air solution; to be built at or near Brayton Point
Battery Storage	55 MW/110 MWh, built at OnSS, supplied and delivered by [redacted] Assembled in Massachusetts

8.1 Preliminary Engineering Plan

8.1 Provide a reasonable preliminary engineering plan, which includes the following information:

i. Type of generation and transmission technology

ii. Major equipment to be used (including nacelle, hub, blade, tower, foundation, transmission structures and platforms, electrical equipment and cable)

iii. Manufacturer of each of the equipment components listed above as well as the location of where each component will be manufactured.

iv. Status of acquisition of the equipment components

v. Whether the bidder has a contract for the equipment. If not, describe the bidder's plan for securing equipment and the status of any pertinent commercial arrangements

vi. Equipment vendors selected/considered

vii. Track record of equipment operations

viii. If the equipment manufacturer has not yet been selected, identify in the equipment procurement strategy the factors under consideration for selecting the preferred equipment

The Bidder is currently evaluating several manufacturers for equipment procurement and has initiated dialogue with these providers. The following discussion identifies the Preferred Option. However, final selections will be made based on competitive tenders conducted post-award. An overview of the manufacturers under consideration, including a track record of equipment operations, is provided in Sections 8.2 and 8.3.

The Project design can be broken down into several key components:

- Foundations;
- WTGs;
- Array and export cables;
- OSS and OnSS; and
- Battery storage.

These are designed to generate and bring power to a suitable grid injection point operated by a Transmission Authority (Figure 8.1).

Figure 8.1 Project and Transmission Authority Scope

8.1.1 Foundations

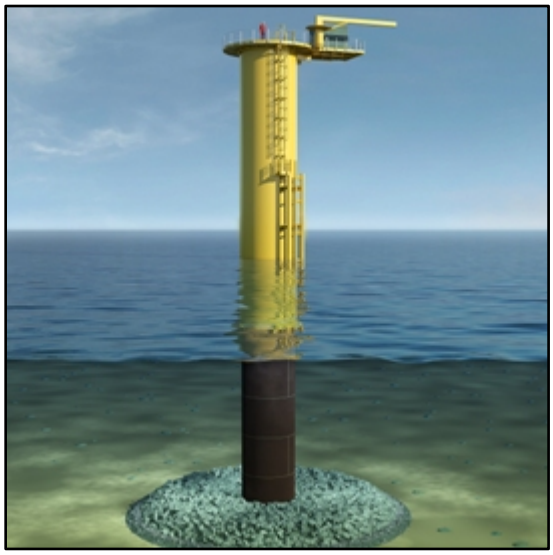
A MP/TP design is assumed for all WTG positions based upon the preliminary site data obtained. This foundation method is well-known and very mature, being Ørsted's preferred foundation method in Europe over the past 17 years. Ørsted has placed more than 1,000 MP-based foundations and will, in the coming years before the Massachusetts project goes online, add another 500 new positions through its existing pipeline. Based upon the early site investigation results, the Preferred Option is the MP, because it the most economical solution and the simplest and least time consuming to install.

This foundation is based on a large steel pipe (MP) that is driven into the seabed. A TP is bolted to the top of the MP. Key details are highlighted in Table 8.2 and shown in Figure 8.2.

Table 8.2 Key Foundation Details

Foundation Component	Size
MP (metric tons)	[redacted]
TP including skirt	[redacted]
MP diameter top/bottom (m)	[redacted]

Figure 8.2 MP and TP with Scour Protection Stone Bed



The Bidder is also evaluating the use of piled jackets and suction bucket jackets, all of which could potentially be used as alternatives. The final foundation package selected will depend on the water depth, WTG size, and the results of detailed geotechnical investigations.

8.1.2 WTGs

In the Preferred Option, the Bidder is using the [redacted] as shown in Figures 8.3 and 8.4.

[redacted]

[redacted]

[redacted]

This WTG type is [redacted] with as demonstrated in Table 8.3 and Figure 8.5).

[redacted]

[redacted]		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]

For this Project the WTG will be modified to meet specific U.S. conditions (e.g., grid frequency and voltage level), [redacted]

While the above-described [redacted] platform is currently the Bidder's Preferred Option, a final decision has not been taken yet, and as such, other suppliers are under consideration. These include [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]
[redacted]	[redacted]	[redacted]
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[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]	[redacted]	

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

8.1.3 Electrical System

Electrical system specifications are provided in Table 8.7.

Table 8.7 Electrical System Specifications/800 MW Case

Installed WTG Capacity	[redacted]
POI (Point of Interconnection)	[redacted]
Number of circuits (number of export cables)	[redacted]
Grid voltage level (OnSS to Grid)	[redacted]
Transmission system voltage level (OSS to OnSS, export cable)	[redacted]
Array voltage level (WTG to OSS, array cable)	[redacted]

8.1.4 Array Cables

The array cables connect the WTGs to the OSS. The WTGs are arranged in “strings”, with a number of WTGs on one cable, based on the power capacity of the platform connecting the cables and the WTG rating.

The use of [redacted] to be connected to the OSS. [redacted] is used as the array system voltage in order to reduce the system losses compared to lower voltages and to connect more WTG per array string. [redacted] The construction of the array cables is shown in Figure 8.6 and design specifications are provided in Table 8.8.

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

A map showing the cable layout can be found in Figure 6.1.

The Bidder has utilized similar equipment in previous projects.

8.1.5 Export Cables

The export cable system connects the OSS to the OnSS, delivering High Voltage power to Brayton Point for the Grid. The export cable system is comprised of [redacted]

Cable specifications are shown below in Table 8.9. A cross-section of the armored, insulated, highly engineered 3-core subsea cable design is shown below (Figure 8.7)

A map showing the export cable route can be found in Figure 6.2

The Bidder has utilized similar equipment in previous projects.

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

8.1.6 OSS

The OSS will be located within the Lease Area and will serve to convert and package energy for transfer from the WTGs to the OnSS. The 800-MW substation will consist of a topside structure and a jacket substructure. The final dimensions of the OSS will be determined by the Project capacity, as the jacket substructure is dependent on water depth and wave and swell exposure.

The Bidder is considering the use of pin piles or suction buckets to fix the jacket to the seabed. The OSS will carry equipment for high-voltage transmission and distribution, along with other equipment such as a backup diesel generator, batteries, and panels for WTG control.

The topside structure will be equipped with a crane, helicopter deck, and boat landing for maintenance of the OSS and WTGs. The structural system for the topside is a steel brace column system with architectural walls (climate shield) that are non-load-carrying except for local wind load. The main braces and columns are tubulars (circular members) whereas members in the decks are wide flange H profiles. This type of structural system has been used on 15 of Ørsted's previous OSSs. This method has also been used at the majority of oil and gas installation in the Gulf of Mexico and elsewhere.

The reasons for choosing the system are:

- Many fabricators from which to choose ensuring selection of a proven structural solution (as well as competitive pricing);
- Allows for parallel fabrication as each deck can be fabricated separately; and
- Robust system offering the flexibility needed to incorporate changes as design proceeds and/or if required by permits/siting agencies.

The cable and cellar deck will be open decks and the remaining rooms will in general be closed, climate-controlled rooms with the exception of the transformer and shunt rooms, which will be natural ventilated via openings in the walls.

A photo of an Ørsted project OSS is provided in Figure 8.8.

Figure 8.8 380 MW OSS (Gode Wind 01, Germany)

8.1.7 OnSS

The OnSS will be located at [redacted] on an approximately [redacted] acre site near the export cable landing point. The substation will be sized for 800 MW of offshore generation capacity. Please refer back to Section 6 for additional information regarding the OnSS site, including the system interconnection point (the existing National Grid Brayton Point Substation) and other alternatives considered. Overall, the equipment selected to be utilized in the substation is extremely reliable. Eversource has extensive

experience utilizing this equipment, most of which has demonstrated an average useful life of forty years.

The engineering of the OnSS will be based on open air structures using insulated 345kV equipment. The Bidder is considering both gas and air insulated equipment. The substation will be equipped with [redacted] from the offshore platform, and [redacted] to the National Grid substation at Brayton Point. A control center will be equipped with protective relaying and control systems, as well as local and remote control of equipment. The primary equipment, including electrical components is provided in Table 8.10.

[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]

The OnSS will be equipped with harmonic filtering and reactive compensation equipment. The harmonic filters are present to mitigate any impact of harmonics on the onshore grid from the WTGs, or dampen any amplification of existing harmonics present in the 345-kV grid due to amplification by the export system cable circuits. Variable and fixed shunt reactors compensate for the export cable charging and harmonic filters. The variable shunt reactor in connection with the STATCOM will serve to control the Brayton Point 345-kV bus to a target voltage determined by ISO-NE.

Both the onshore and OSSs are equipped with Supervisory Control and Data Acquisition (SCADA) systems. The SCADA system main task is to provide Monitoring, Control and Protection of the HV and MV components. The secondary task is to provide interface to external systems, and monitor and control the LV system and Auxiliary Systems. Ultimately

presenting all information on a Human Machine Interface (HMI flat screen presentation) allowing also alarms and system events to be logged and managed.

Overall, the equipment Bay State Wind has selected to be utilized in the substation is extremely reliable and is expected to perform to its project life of [redacted]. Eversource has extensive experience utilizing this equipment.

8.1.8 Battery Storage

The OnSS will be equipped with a battery storage system which will be configured to charge with renewable wind energy during off-peak hours and discharge into the grid during peak hours. The 55-MW/110 MWh battery system can discharge over a 2-hour period. The battery system utilizes parallel stacks of battery cells connected to power inverter systems which convert the electrical energy from AC to DC and vice versa. The parallel configuration means the battery system is inherently very reliable because individual battery modules can be isolated and serviced as required. Isolation transformers will transform the low voltage of the battery system up to a medium voltage collection grid which connects the battery system to the main auto transformers. To ensure maximum availability of the battery system, it will be interconnected to each autotransformer, ensuring the battery system is available during a transformer outage and equipped with sectionalizers which allow the battery energy to be supplied to/from either or both auto transformers.

Under the Preferred Option, [redacted] will construct and install the Project's battery storage system. [redacted] has extensive experience installing and commissioning commercial grid energy storage solutions with over [redacted] MW of energy storage installed, under construction or in late stages of development at numerous sites around the world.

8.2 Equipment Suppliers Under Consideration

8.2 If bidder has not yet selected major equipment for project, please provide a list of key equipment suppliers under consideration

Ørsted helps drive local economic growth through its 'multi-contract developer' approach which retains full control of the supply chain. As overall construction contracts are not subcontracted, the Bidder is able to secure high levels of local supplier engagement. This control also allows monitoring of the supply chain in an area and active engagement by the Bidder where there may not be sufficient competition. By engaging directly with suppliers we can help lower barriers to entry for new players. This, in turn, helps create local jobs and greater competition, and reduce the costs of electricity from offshore wind. Concrete examples of how Ørsted works to remove barriers to entry for new supply chain companies include:

- Splitting contracts into smaller scopes to enable new or specialized suppliers to more easily bid and thus enter the market;
- Facilitating discussions between our established suppliers and new potential sub-suppliers;

- Arranging regional supply chain events to highlight commercial opportunities for potential suppliers; and
- Spending time with suppliers to improve their understanding of our requirements and terms and conditions.

Ørsted prides itself on its credentials as a long term investor and is deeply committed to the regions and local areas where it constructs and operates offshore wind farms. The 'multi-contract developer' approach is therefore important as it allows Ørsted to better realize the potential that offshore wind development can have on a region's economy; and to reduce the cost of electricity through increased competition.

Consistent with Bidder's standard practice, equipment suppliers have not yet been selected and firmly contracted. Rather, the Bidder has entered into detailed dialogues with many suppliers concerning 1) technology available for the Project, 2) possibilities for localizing manufacturing, and 3) pricing. The Bidder is committed to supporting development of the supply chain in the United States, and across the industry driving decreased costs and increased safety and quality. Experience gained during many offshore wind farm projects and other large scale utility projects show that the best way of obtaining these goals is through a combination of long term collaboration and an open competitive approach, allowing the most optimal solutions to be chosen for the project while making room for new and innovative players to enter the industry. Due to this approach – together with the known lead times of the different components - suppliers are not yet firmly contracted.

While it is not possible to list a chosen supplier per component, the known potential suppliers are listed in Attachment 8-1. The Bidder expects that additional suppliers with operations in Massachusetts will be identified during the development phase, and invited to submit qualifications and participate in the open competitive approach.

In addition, the Bidder has committed to a dedicated full-time Massachusetts-based employee, with the sole role of identifying and supporting local suppliers through the tender processes and development of the supply chain; and continuing to employ a multi-contract approach to the development and construction of our offshore wind projects. Beginning in 2018, in addition to the Head of Procurement based in Boston, the Bidder will hire a local contract manager to strengthen resources and engagement in the local supplier qualification and negotiation processes. It is expected that in the coming years the Bidder will hire several procurement staff locally who will work with different supplies and services sourced in Massachusetts and throughout the industry in the U.S.

To even further deepen the local supply chain, the Bidder generally requests major suppliers to set forth similar requirements for their sub-supplier markets. These goals include achieving a maximum of local supply and jobs by focusing on the right opportunities for local potential suppliers; collaborating with suppliers across tiers and across markets to develop a sustainable and competitive offshore wind supply chain; and identifying, developing, and sharing (e.g. via project specific supply chain events) opportunities to increase business for Massachusetts-based suppliers.

In selecting the equipment for the Project, the Bidder will focus on, in no particular order, the supplier's or manufacturer's:

- Ability to develop the local supplier market;

- Track record and references;
- Financial rating;
- Safety and quality records; and
- Price level of their proposals.

8.2.1 Ongoing Dialogue Regarding Supply of Key Project Components

Geotechnical Investigations

The Bidder has secured a Letter of Intent with [redacted] in respect to the geotechnical investigations Phase 1B to be initiated [redacted] (Attachment 8-2).

Foundations Suppliers

The Bidder has entered into an exclusive Letter of Intent with [redacted] a global leader in the manufacture of [redacted], for the local manufacturing of a critical [redacted] component (see Attachment 8-2). Under this arrangement, [redacted] will be performed in Massachusetts, which will support a large number of local jobs and economic growth. The agreement with the key supplier is exclusive to the Project due to the long and trusting relationship between developer and supplier and is emblematic of the Ørsted philosophy of using its buying power to leverage local economic development activity and cost reduction. This key supplier has delivered [redacted] large-scale Ørsted in Europe on time, budget and according to quality and safety requirements. The supplier is also dedicated to continual cost reduction and development of a sustainable long term U.S. manufacturing base in order to eliminate transportation cost.

In addition, WTG tower manufacturer [redacted], which is expected to add 150-200 jobs when the plant is operating at full capacity. This comes in addition to the direct and indirect jobs assessed in this section, since the commitment has come in after completing the calculations. See Attachment 8-2 for a Letter of Intent.

WTG Suppliers

The Bidder has run a Request for Information process and has had very close dialogue with the three major WTG suppliers over the last year – [redacted] - concerning the supply of WTGs for the Project.

As part of this process, all three manufacturers have committed to being ready to participate with binding offers containing:

- Maximum production at the lowest total cost over the life of the project;
- Capacity to deliver on schedule; and
- Commitments to work with a staged localization of manufacturing for future projects in order to create a sustainable industry in the U.S.

The clear support and commitment to contribute with the above is documented in the attached Letters of Support from all three manufacturers (Attachment 8-2).[15]

OSS Suppliers

Over the past year, Bidder has received budget proposals from several capable OSS suppliers, both U.S.-based and abroad. A minimum of three of those are committed to participating in our competitive tender. A Letter of Support from [redacted] a potential U.S.-based OSS design firm is included as Attachment 8-2. In addition, one of these OSS suppliers, [redacted] is located in New England with parts of its manufacturing in Massachusetts. This supplier has submitted to us their Letter of Support in participating in the future competition, which is included as Attachment 8-2.

Cable Suppliers

The Bidder is currently engaged with several possible suppliers to deliver cables for the Project, and plans to finalize the selection and contract signing for the supply cables by early [redacted]. Based on the Bidder's extensive global experience and knowledge of cable suppliers from 20+ offshore wind projects, the Bidder is confident that this approach will deliver the highest value for rate-payers and help develop a U.S. offshore wind supply chain while ensuring a high level of project viability. The Bidder's preferred and back-up solutions are outlined below:

Array Cables

The Bidder is engaging with [redacted]

The Bidder is also monitoring the U.S. market to identify [redacted] capable U.S. suppliers. [redacted]

Export Cables

The Bidder will collaborate with a broad range of cable suppliers including pre-selected suppliers for ongoing projects such as Hornsea 02 (1,386 MW offshore UK) to ensure the greatest degree of competition and leverage potential scale benefits when negotiating with suppliers. [redacted]

[15] [redacted]

[redacted]

1. [redacted] based global expert in cable systems with over [redacted] employees in [redacted] countries. Ørsted has a longstanding relationship with [redacted] in the EU market and has the added benefit of bundling procurement with the array cable purchase;
2. [redacted] headquartered in [redacted] with over [redacted] experience in the cable industry and approximately [redacted] employees;
3. [redacted], a state-of-the-art supplier based in [redacted] with over [redacted] employees; and
4. [redacted] a world leader in the energy and telecom cables and systems industry, with over [redacted] employees across [redacted] countries.

Onshore Suppliers

The Bidder has long-standing relationships with both equipment suppliers as well as civil and electrical construction contractors that will be utilized for the onshore work. To the extent possible, contracts will be executed with local suppliers for the onshore construction scope as well as the equipment.

Battery Storage Suppliers

Over the past year, the Bidder has received proposals from several U.S. based battery storage suppliers, which are committed to participating in our competitive tender for this equipment. [redacted]

Vessel Suppliers

Procurement of vessels, including the construction of two new-built Jones Act-compliant installation and transport vessels, is a key component of project planning with regards to equipment; installation and transport vessel suppliers are discussed in Section 9.2.

8.3 Same or Similar Equipment in Operation

8.3 Please identify the same or similar equipment by the same manufacturer that are presently in commercial operation including the number installed, installed capacity and estimated generation for the past three years.

The Bidder's strategy for supplier selection in terms of technology risk is to use proven technology. The critical equipment components for this Project are based on earlier versions that have been manufactured and operated with success on various large-scale offshore wind farms by the Bidder as well as the general offshore wind industry. As such, all equipment used in this Project has a long history of reliable operation and poses no practical technological risk. Furthermore, the Bidder has installed, operated and maintained equipment from the majority of the manufacturers referenced in the table provided in Attachment 8-1. Table 8.11 identifies similar equipment in use by the same manufacturers.

Table 8.11 Same or Similar Equipment in Operation *(based on Preferred Option)*

Equipment	Supplier	Number installed	Total capacity (MW)	Est. Generation Past 3 Years (GWh)
WTG	[redacted]	[redacted]	[redacted]	[redacted]
MP foundation	[redacted]	[redacted]	[redacted]	[redacted]
Array cables	[redacted]	[redacted]	[redacted]	[redacted]
Offshore transformer	[redacted]	[redacted]	[redacted]	[redacted]
Export cable	[redacted]	[redacted]	[redacted]	[redacted]
Battery Storage System	[redacted]	[redacted]	[redacted]	[redacted]

1 Estimate based on data from the 4C Offshore Wind Farm Database.

[redacted]

3 Based solely on projects where Bidder constructed OSS. However, it is worth noting that, barring corrosion and climate protection, the transformer technology employed offshore is similar to transformers deployed onshore across the globe, meaning the real figure numbers in the thousands.

4 Estimate based on data from the 4C Offshore Wind Farm Database, using fully commissioned offshore wind projects. While there will have been some variations across different suppliers the general design will have been similar.

8.4 Evidence of Readiness for Transfer to the Design and Construction Phases

8.4 For less mature technologies, provide evidence (including identifying specific applications) that the technology to be employed for energy production is ready for transfer to the design and construction phases. Also, address how the status of the technology is being considered in the financial plan for the project.

To deliver a cost-effective low risk Project the Bidder will employ technology, equipment and methodologies that are mature (i.e. currently operational or in the construction phase for other large scale offshore wind farms). In other words, all critical components that the Bidder plans to use on the Project are based on established earlier versions that have been manufactured and operated successfully by the bidder on multiple large-scale offshore wind projects.

The only major component in the Project that could be said to be less mature is the battery storage system which the Bidder plans to deploy to maximize the benefits of the Project's energy delivery to the Commonwealth. However, under the Preferred Option, [redacted] is widely recognized as a pioneer and leader in the market for utility scale energy storage. [redacted] has extensive experience installing and commissioning commercial grid energy storage solutions with over [redacted] MW of energy storage installed, under construction or in late stages of development at numerous sites around the world. To put this impressive figure into context, [redacted] MW is equivalent to almost [redacted] percent of the U.S.'s entire commissioned battery storage fleet[16]. [redacted]

[16] Bloomberg New Energy Finance lists the U.S. as having 675-MW installed battery storage capacity as of 2017.

[redacted] have been providing effective and reliable energy storage services since [redacted] including peak shaving, ancillary services, renewable integration (ramp management), and grid reliability applications. [redacted] technical proposal for the Project is provided in Attachment 8-3, with additional details regarding the company's track record and global experience. Given this impressive track record the Bidder is confident in [redacted] skills to deliver a battery storage system ready for transfer to design and construction and successful commissioning in line with the overall Project schedule.

The status of the technology has no bearing on the financial plan of the Project.

8.5 Full and Complete List of Equipment Needed

8.5 Please indicate if the bidder has a full and complete list of equipment needed for all physical aspects of the bid, including generation facilities, turbine support structures, electrical platforms, transmission lead lines, and mandatory and voluntary transmission system upgrades. If not, identify the areas of uncertainty and when the full and complete list of equipment will be identified.

The list of equipment needed is shown in Attachment 8-4. The Bidder has interpreted "full and complete list of equipment needed" as including only components and major sub-components.

8.6 Equipment Procurement

8.6 Please indicate if the bidder has secured its equipment for all physical aspects of the bid, including generation facilities, transmission lead lines, and mandatory and voluntary transmission system upgrades. If not, identify the long-lead equipment and describe the timing for securing this equipment.

As described in Sections 8.2 and 8.5, equipment and suppliers are not yet firmly contracted although the Bidder has initiated detailed dialogues with many suppliers. A timeline for securing equipment components in provided in Section 9.

The Bidder's approach to securing such equipment is two-fold; for certain components of the onshore scopes that are considered standard items, framework agreements are already secured with suppliers. Contracts for such equipment would be directly awarded to the applicable supplier, which in many cases would have guaranteed lead times for delivery. The framework agreements for standard long lead equipment are typically valid for 3-5 years.

With regards to the non-standard, customized equipment items, competitive bids would be solicited prior to awarding. In this scenario, suppliers would be vetted and pre-qualified by the Project team prior to being included on the bid list to ensure that the Bidder has an established working relationship and prior experience with the suppliers providing proposals. In both cases, pricing would be fixed at the time of contract execution to minimize uncertainty around cost risks throughout the duration of the Project.

Another third procurement methodology used, especially for larger offshore CAPEX supply and services, is target-oriented collaboration contracting which is a procurement strategy Ørsted has used over the past 5 years. This strategy has reduced cost and increased safety and quality

All equipment will be contracted and procured once siting and permitting activities are underway, allowing ample time for the equipment to be delivered on-site or to a storage facility prior to construction. Many of the non-standard long lead equipment will warrant a factory acceptance test prior to shipping, which will ensure that the equipment is in proper working order prior to delivery on site. This process greatly reduces risk and eliminates uncertainty, which in turn ensures that construction goes smoothly and schedule delays are minimized.

The long lead equipment and services required for this Project include:

Foundations – [redacted] As documented in Attachment 8-2, the Bidder has entered into a [redacted], which outlines the intention – exclusive to the Bidder with regards to this RFP - to set up significant parts of the foundation manufacturing in [redacted] The contract [redacted] is estimated to be closed in [redacted]

WTGs – including the WTG towers, the nacelles, and the blades. The choice of technology depends on the supplier choses which will depend on the competitive tender taking place through first half of [redacted] It is expected that the technology will be selected in [redacted].

Array Cables – Ørsted has full supply security for the array cables [redacted] is contemplating manufacturing the array cables [redacted] and Ørsted is supporting this effort.

Offshore Export Cable – Ørsted has very close relations with the few global potential suppliers of export cables. Ørsted intends [redacted] in order to obtain the best possible cost. The contract is estimated to be closed in [redacted].

OSS – including the foundation and the platform – also referred to as the "topside", and all of the electrical components that are part of the transformer system. There are few capable suppliers in the U.S. for the OSS; therefore, in order to obtain the most optimal cost, it is very important to maintain competition in the purchase of these components. The contract is planned to be closed in [redacted]

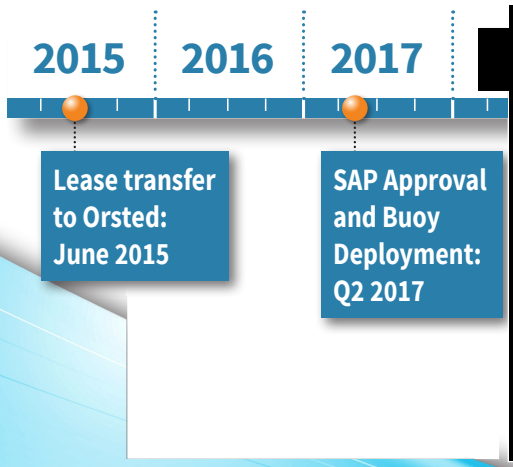
OnSS – including the electrical components. Eversource will make use of [redacted] The civil engineering and construction of the actual facility will be done by experienced [redacted]. The contract is estimated to be closed in [redacted]

Section 9

Project Schedule

The Bidder is confident that its Project can be developed, financed, and constructed by 2023.

- The proposed build-out is both aggressive and achievable, taking in Ørsted's lessons learned from planning and executing multiple large-scale offshore wind projects and Eversource's knowledge of the local regulatory and supply chain dynamics.
- The Bidder's ability to develop the Project is supported by Ørsted's history of **more than 20 offshore wind farms** developed in Europe, with an additional **seven wind farms currently under construction**.
- The Bidder gained a significant Project milestone with the **industry-first approval of a Site Assessment Plan** in June 2017 with subsequent deployment of two FLiDARs and a wave buoy in the Lease Area.
- Bay State Wind has secured Letters of Support [redacted] installation and transport vessels, enabling the greater use of Massachusetts ports and harbors.
- Geophysical and geotechnical surveys across the Lease Area and export cable routes were commissioned in early 2016 and will be completed by 2018.



[redacted]

Anholt Offshore Wind Farm

9. PROJECT SCHEDULE

A bidder must demonstrate that its proposal can be developed, financed, and constructed and be technically viable within a commercially reasonable timeframe. The bidder is required to provide sufficient information and documentation that shows that the bidder's resources, process and schedule are adequate for the acquisition of all rights, permits and approvals for the project and for the financing of the project consistent with the proposed project milestone dates.

Bidders are required to provide a complete critical path schedule for the project from the notice of selection of the project for contract consideration to the start of commercial operations. For each project element, list the start and end date.

In the Preferred Option, the Bidder will bring the Project to COD by [redacted]

The proposed schedule for the development and construction of the Project is achievable, supported by Ørsted's history with planning and executing multiple large scale offshore wind projects and Eversource's knowledge of the local regulatory framework and supply chain dynamics. Bay State Wind has planned for contingencies and unexpected events. The Bidder's ability to execute the Project as committed is supported by its history of 22 offshore wind farms already developed, constructed and in current operation in Europe, with an additional seven wind farms currently under construction (see Section 12). As detailed in Section 5, financing of the Project does not require any outside lending arrangements due to Ørsted's and Eversource's financial strength. Technical design and constructability is retained in-house and is based on almost three decades of experience with engineering, procuring, and constructing offshore wind farms and complex onshore transmission lines. This in-house experience and technical know-how is what sets the Project apart from all other offshore wind developers.

The Bidder seriously evaluated the feasibility of a [redacted] and determined that it would significantly increase cost and risk to the Commonwealth. To enable the earliest COD possible, [redacted] This enables us to put forward the most aggressive yet realistic timeline. Similarly, the Bidder's dialogue with vessel owners has revealed that the earliest possible delivery of Jones Act-compliant vessels is [redacted] such that offshore installation of TPs and WTGs cannot be initiated prior to [redacted]. Finally, the Preferred Option WTG, which will provide the greatest value to Massachusetts ratepayers, [redacted]

Below, Section 9 highlights our expertise in planning and demonstrates the Bidder's ability to execute the Project in a commercially reasonable timeframe.

[redacted]

[redacted]

9.1 Schedule and Critical Path

9.1 Identify the elements on the critical path. The schedule should include, at a minimum, preliminary engineering, financing, acquisition of real property rights, Federal, state and/or local permits, licenses, environmental assessments and/or environmental impact statements (including anticipated permit submittal and approval dates), completion of interconnection studies and approvals, procurement, facility contracts, start of construction, construction schedule, and any other requirements that could influence the project schedule and the commercial operation date.

9.1.1 Overview of the Critical Path

The overall critical path for the Project is provided in Figure 9.1, identifying a timeline for interconnection studies and application, site investigations and environmental surveys, and federal, state and local reviews and permitting, all of which has already been initiated. The primary construction critical path of any large scale offshore windfarm project includes the installation and energization of the OnSS and OSS, and installation of the first string of foundations and array cables, which enables WTG commissioning (Figure 9.1). A more detailed Project schedule is provided in Attachment 9-1; however, not all the items identified therein are considered critical path.

[redacted]

9.1.2 Critical Path

Site investigation activities were initiated in early 2016 and are ongoing. The purpose of these studies is to develop a robust understanding of ground conditions at the Project site which informs engineering, design and permitting.

As discussed in Section 7.2, a key factor defining the Project's critical path is BOEM's approval of the COP. The Bidder intends to submit the COP in [redacted] and has anticipated an [redacted]-month review based on [redacted], as well as discussions with BOEM regarding their review timeline. Therefore, the Bidder assumes receipt of COP approval by [redacted], as indicated in Figure 9.1.

The earliest construction activities are commencement of the modifications at the Brayton Point 345-kV Substation, and the start of construction for the OnSS. Both activities are expected to begin in [redacted].

The export cables will be installed (surface laid and post lay jetting) from [redacted], starting onshore and moving out to the OSS. Once pulled in and installed, the offshore jointing can commence followed by the offshore platform termination and onshore transition joint bay termination. After termination, hot commissioning and energization can proceed. The target for energization from the onshore grid [redacted]

Although the Bidder has estimated [redacted] lead-time for supply of the export cable, this activity is being scheduled as occurring prior to COP approval, in early [redacted], to allow offshore installation to begin in early [redacted] In order to mitigate risk, the commissioning timeline includes pre-COP signing of several contracts for the OnSS.

After approximately [redacted] months of fabrication, the OSS will be ready for load out and installation, at approximately the same time the export cable will be loaded out from facilities in Europe. The OSS topside and jacket will be installed within a [redacted] window from [redacted] This approach allows for pre-commissioning of electrical systems and components starting with the fire safety systems etc. before actual hot commissioning and energization can be commenced.

WTG installation will start in [redacted], followed by several weeks of commissioning and offshore testing. The first power from the Project will be ready for delivery after energization of the first string in [redacted] The WTG installation and commissioning phase will be completed by [redacted]

9.1.3 Planning and Management Tools to Predict and Track the Construction Campaign

While refining the construction campaign for the Project, the Bidder will utilize Ørsted's vast experience from previous planned and executed projects. Ørsted has developed several tools based on lessons learned from previous projects, one of which is an offshore reporting tool installed on each vessel during the construction campaign and managed by Ørsted's own client representatives onboard. This tool captures all installation statistics including construction status, installation activity durations, and weather downtime. This data is benchmarked against the anticipated durations for the campaign. The activities and

durations are saved within an accessible database system that enables future projects to easily and more precisely estimate the duration of future construction campaigns.

In addition to this tool, Ørsted has also developed measures to model offshore construction campaigns durations and weather downtime by inputting and evaluating known durations of the previous offshore activities in concert with a 37-year-record weather file. A Monte Carlo analysis provides a P20[17], P50 and P80 duration for the installation campaign.

These two tools, together with the experience of the project management team enables the Bidder to precisely estimate how long the installation campaign will take, the most optimal time to launch and not least what float is necessary between the construction scopes to ensure a smooth campaign without either too much float or unnecessary downtime on construction vessels.

9.1.4 Schedule Contingencies and Float Time

Of course, not all can be modeled. Offshore construction is a complex operation, with many factors at play. Conditions on the site might require that the primary scopes - foundation, inter-array cables, and WTGs – not necessarily follow the same "typical" sequence. As an example, ground conditions might present a higher risk of punch-through when jacking up for the WTG installation in certain places, thereby suggesting that WTGs follow another sequence than inter-array cables, which might be better suited sequencing installation by cable type (150 mm, 500 mm, 630 mm, etc.). As many of the studies that inform the final sequencing have not been completed yet, the Bidder has incorporated an approximately 1 month float between the start date of each main scope, to ensure that adequate flexibility remains in the schedule.

The WTG suppliers require lead time to accommodate U.S. design modifications into existing designs and to type-certify WTGs according to IEC standards prior to serial production. During serial production the WTG components will be transported to the U.S. to build up sufficient storage buffer at the load out port for the WTG installation to start. WTG installation start is anticipated for [redacted] to allow sufficient time to build up the needed storage buffer. As discussed in Section 9.2, the Preferred Option includes the use of two new Jones Act-compliant installation and transportation vessels for installation of the TPs and WTG. The timeline for securing two new-built Jones Act-compliant vessels supports earliest realistic WTG installation in [redacted].

9.2 Maritime Vessels and Laydown Facilities

9.2 Include a discussion on use of maritime vessels and access to them. Also include a description and discussion of the laydown facility/facilities to be used for construction, assembly, staging, storage, and deployment.

9.2.1 Maritime Vessels

A list of the vessels needed for the Project is provide in Section 10 (Table 10.1).

[17] *P20; P50; P80 refer to the confidence level of the probability of the modelled duration not being exceeded. Looking across the last 37 years of recorded weather for the site, load out harbors etc., the modelled installation campaign would in 20 percent, 50 percent or 80 percent of the time be executed within the modelled period.*

In the following sections, the Bidder details the use of maritime vessels with regards to geoscience investigations; WTG, foundation and cable installation; staging; and O&M.

Geoscience Investigations

As part of the Project the Bidder must contract vessels to perform substantial investigations of the seabed as well as the environment to gain an understanding of potential impacts that the Project may have and to complete necessary modeling and design. This work commenced in 2016 and to date the Project has made use of both U.S. and non-U.S. flagged vessels (Table 9.1). For future survey works the Bidder will endeavor to use U.S. flagged vessels whenever possible and cost effective, but expects to continue using a mix of U.S. and non-U.S. flagged vessels due to a limited number of suitable vessels in the U.S. It is worth noting that there are no Jones Act compliance issues related to the use of non-U.S. flagged vessels for the purposes of geophysical and geotechnical investigations.

Table 9.1 Ongoing and Completed work under the Geoscience and Permitting Work Streams

Scope	Description	Vessel	Status
Desktop studies of site	Included geological studies and initial UXO study	NA	Completed 2016
Geophysical 1a screening survey	900 m line separation grid reconnaissance for accurate bathymetry, supporting seabed mapping and structural modeling	RV Ocean Researcher	Completed 2016
Geotechnical 1a investigation	Initial seabed geological formation and geological classification	Fugro Synergy	Completed 2016
Geophysical 1b export cable route survey	Reconnaissance along the export cable route for accurate bathymetry, seabed mapping and structural modeling	RV Shearwater RV Ocean Researcher	Completed 2017
Geophysical 1b site	Ultra-high-resolution survey as per 1a but with greater resolution to better understand and evaluate seabed conditions (80 m line separation grid)	RV Ocean Researcher	Initiated 2017

Finally, as shown in Table 9.1 the Bidder has already completed a significant part of the site investigation and permitting work. This is important as supply and installation contracting time schedules are closely linked between scopes. The fact that the Bidder has performed this amount of work contributes significantly to the robustness of the construction time schedule.

Heavy Lift Vessel for TPs and WTGs:

The Bidder has investigated the market thoroughly for vessels and concluded that there are currently no Jones Act-compliant vessels capable of installing the TPs or WTGs. However, there are many players in the market who are willing to pursue the construction of such a

vessel. Ørsted has a strong track record of facilitating the investment in new offshore wind installation vessels. As an example, Ørsted, through its A2SEA ownership, invested in two purpose-built offshore WTG jack-up vessels in 2010 and 2012, each at the value of around $150M[18]. Around the same time, due to limited supply of vessels for foundation installation, Ørsted was a critical driver in bringing Swire Blue Ocean's purpose-built offshore wind installation vessels *Pacific Orca* and *Pacific Osprey* to the market, by committing a pipeline of offshore wind farm projects to Swire Blue Ocean.

Today, Ørsted maintains an ongoing dialogue with the major offshore wind installation players about development of new installation vessels, methods, tools and concepts. This is part of Ørsted's work to bring down the cost of offshore wind energy.

Ørsted brings this experience to the U.S. market, and in order to facilitate the construction of a Jones Act-compliant heavy lift installation and transportation vessel for the Project, Ørsted has:

- Thoroughly evaluated the market for parties interested in building a Jones Act-compliant offshore wind installation and transportation vessel;
- Talked to more than 25 different U.S. or international companies interested in building, owning or operating a Jones Act-compliant offshore wind installation and transportation vessel;
- Assessed the companies' interest, ability and credibility in bringing a Jones Act-compliant offshore wind installation and transportation vessel to the market; and
- Entered into detailed technical and commercial discussions with the most promising suppliers, to help them mature their concepts and their business cases up until investment decision. The discussions are ongoing.

The Letters of Support and Letters of Intent, provided in Attachment 9-2 from four potential contractors represent the most promising delivery of the necessary Jones Act-compliant offshore wind installation and transportation vessels. The Bidder is, as stated in the Letters of Support, in close technical collaboration with these suppliers regarding Jones Act-compliant heavy lift installation and transportation vessels for offshore wind installation. All of these companies are committed to collaborating with the Project in order to reach the best solution regarding the necessary vessel which, as the Preferred Option, will enable the Project to install WTGs from [redacted] and TPs from [redacted].

This also means that pre-assembly of the WTGs can take place locally in [redacted] creating local jobs and supporting economic growth.

Cable Installation

The Bidder has investigated the cable installation market in the U.S. thoroughly and concluded that there are available contractors and vessels for cable installation for limited parts of the scope. In order to mitigate risk and ensure high efficiency during installation, the majority of the installation scope will be performed with state-of-the art European vessels and equipment; however, the Project intends to utilize sustainable and efficient U.S.

[18] https://www.a2sea.com/a2sea-invests-in-a-new-jack-up-vessel/

equipment and vessels, as available, for smaller aspects of the scope. For example, the Bidder intends to install the inter-array cables out of [redacted].

Laydown Facilities

The Bidder has signed an option agreement to lease MassCEC's New Bedford Marine Commerce Terminal as the installation hub for [redacted], as the Preferred Option, and [redacted] freighters will deliver components from Europe or the U.S. to the laydown facility at the terminal. It is anticipated that construction management will operate in [redacted] at a sister location, which will transform into the O&M base post-construction.

The site facilities necessary for the Preferred Option are provided in Table 9.2; backup locations are also listed. Laydown facilities are also discussed in section 10.2.

[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]

Operation and Maintenance

The Bidder intends to set up an O&M base in [redacted], creating a substantial number of long-term jobs and supporting sustainable economic growth in the Commonwealth (see Section 11 and 14).

9.3 Status of all Critical Path Items

9.3 Detail the status of all critical path items, such as receipt of all necessary siting, environmental, and ISO-NE approvals.

Since 2015, the Bidder has been actively engaged in development of the Project and has initiated several critical path items necessary to maintain the current Project schedule. The status of important Project milestones, including several critical path items, is provided below.

Interconnection Request and Studies. In August 2016, the Bidder filed an application with ISO-NE for interconnection at Brayton Point. As discussed in Section 6.6, the ISO-NE Feasibility Study was completed in April 2017 and the ISO-NE System Impact Study is expected to be completed in Q1 2018. The ISO-NE I.3.9 process is not considered critical path for the Project.

Site Access for Interconnection. The Bidder has entered into an Option agreement to purchase a [redacted]. This site is the location of the Bidder's proposed OnSS. Additional easements are needed from Dynegy (or

subsequent property owner) and/or National Grid for installation of underground facilities needed for completion of the interconnection to National Grid's existing 345-kV substation at Brayton Point. National Grid is an active participant in the ISO-NE Interconnection Process for [redacted], and the Bidder expects to secure the necessary easements in 2018.

Site Assessment and Characterization. Physical surveys for the two-year environmental studies were commissioned in early 2016. To support the Project schedule, the Bidder has advanced the Phase 1B geophysical and geotechnical surveys and export cable survey into the summer and fall of 2017 to ensure the required seabed and environmental data are collected to support follow-up studies and engineering and design of the Project. Two LiDAR buoys were deployed in July 2017 within the Lease Area to collect pertinent data, such as weather, wind speed and direction, and significant wave height and direction. The Bidder will continue to perform site assessment and characterization surveys including field work and desktop assessment through Q3 2019.

Federal, State and Local Permitting. As discussed in Section 7.2, the Bidder received industry-first approval for its SAP in June 2017. In February 2017, the Bidder filed a revised COP Survey Plan and BOEM accepted the plan in November 2017. The Bidder continues to consult with BOEM and other federal and state agencies regarding necessary environmental and cultural impact assessments in support of the anticipated COP filing and other required permits. After Phase 1B geophysical and geotechnical surveys are completed, the Bidder will submit all the required federal, state and local permit applications including the COP. The Bidder anticipates submitting the COP in [redacted] Attachment 7-1 provides a list of federal, state, and local permits with date of expected application and expected receipt of permits, approvals and/or licenses.

Technology and Services Procurement. Procurement studies and confidential meetings have been initiated as part of the Bidder's technology access strategy (see Section 8.2). Additionally, the Bidder has signed an option agreement to lease MassCEC's New Bedford Marine Commerce Terminal as a construction port. Ørsted's internal Marine and Ports Department has made three (3) separate site visits to the New Bedford Marine Commerce Terminal to obtain required details to plan for construction. Eversource has great local experience in OnSS construction in Massachusetts and strong relationships with local suppliers.

Construction. Construction of the OnSS is anticipated to commence [redacted] Construction of offshore components of the Project, including the foundations, WTGs, OSSs, and export and inter-array cables, [redacted]

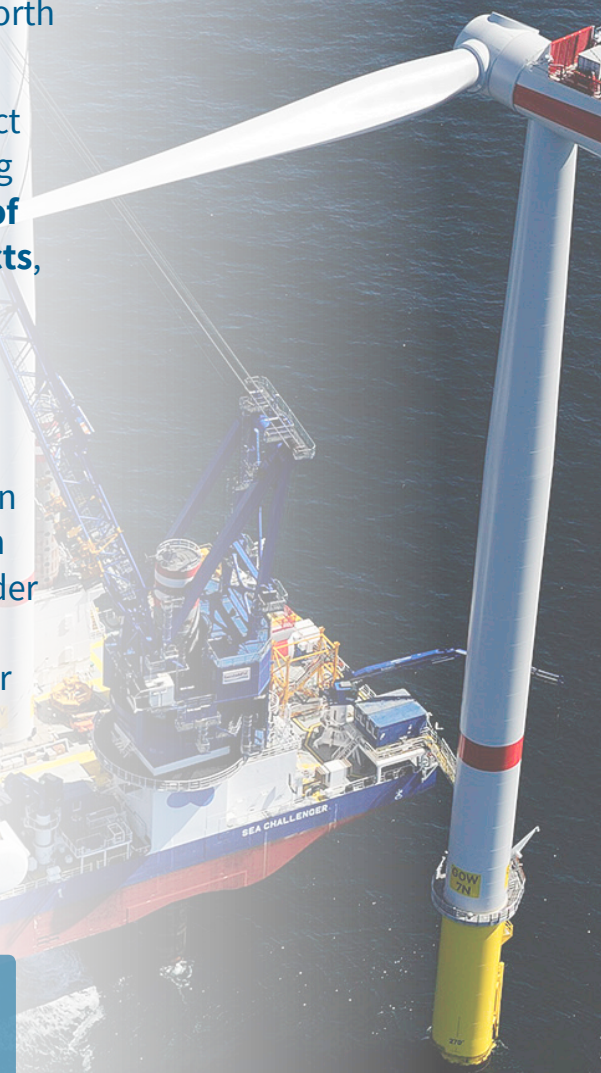
Section 10

Construction and Logistics

The Bidder leverages its **unrivaled industry experience** to navigate the thicket of engineering, logistical, and legal challenges to **deliver the United States' first large-scale offshore wind farm**, while **building Massachusetts' capacity** to serve as the North American hub for future offshore wind development.

- Developing a complex, large-scale infrastructure project in the harsh ocean environment is no small engineering feat. Sweating the details is crucial. Ørsted's **mastery of the staging and deployment of offshore wind projects**, and confidence in its ability to replicate this process to the benefit of Massachusetts ratepayers and local economy, is revealed in the detailed construction and logistics plans.
- The Bidder's **purpose-driven approach** to construction and logistics is manifest in the extensive and long-term commitment to Massachusetts' port facilities. The Bidder intends to use [redacted] for the Project, along with [redacted] for transition piece outfitting.
- The Bidder is working with various vessel owners to support construction of [redacted]

> *We are eager to collaborate with community partners in New Bedford and excited to show our new neighbors the many benefits from this offshore wind project.*
>
> **Ørsted President of North America**
> **Thomas Brostrøm**



Gode Wind Project

10. CONSTRUCTION AND LOGISTICS

This section of the proposal addresses necessary arrangements and processes for outfitting, assembly, storage and deployment of major project components such as turbine nacelles, blades, towers, foundations, and transmission support structures. Please provide a construction plan that captures the following objectives:

In this section, the Bidder outlines its construction plans for all major Project components, including related logistics, site control, and the roles and responsibilities of third parties. The Bidder again brings to bear its deep well of experience in executing large-scale, off-shore wind projects around the world; indeed, the Bidder's owners will furnish hundreds of employees dedicated to each of the major installation packages.

With its unique multi contracting approach that breaks major work packages into more discrete tasks, and the greater deployment of its own human resources the Bidder retains control over the outfitting, assembly, deployment and commissioning to a greater degree than any other developer in the business. This enhanced control covers not only the procurement phase and the division of work scopes into more narrow delivery packages, but also characterizes the construction phase. In the present context, it means that Bidder is better positioned to define where the different activities will take place, to assert greater control of local content.

The construction setup has evolved over years of collaboration with key suppliers and contractors. The Ørsted approach to collaboration is typically that of a long-standing relationship, where procedures, vessels and tools are optimized from project to project to achieve those significant cost reductions for which Ørsted is known.

Figure 10.1 shows the logistics activities for the Project and their geographical spread. As depicted, much of the logistical activity is concentrated in Massachusetts.

As described in Section 14, a significant number of jobs will be created in around the Commonwealth in consequence of the Bidder's more active control of activities and deliberate policy of locating these activities to support the development of a local supply chain.

This remainder of this section describes: 1) the major tasks associated with the deployment of the proposed Project, 2) the sites where these activities are slated to occur; 3) the wide array of specialized vessels to be used for the construction works – some of which will be new built, Jones' Act compliant vessels; and finally 4) the split of the overall Project scope into the various installation responsibilities.

10.1 Major Tasks Associated with Deployment of Proposed Project

10.1 Please list the major tasks or steps associated with deployment of the proposed project and the necessary specialized equipment (e.g. vessels, cranes).

The Bidder will take a multi contracting approach to equipment procurement and installation of the Project, the two major tasks associated with the deployment of the proposed project. Ørsted has successfully developed and followed this approach though its entire portfolio of offshore wind projects completed to date.

[redacted]

To acquire the necessary equipment and install the Project, Ørsted has an Engineering, Procurement and Construction (EPC) organization with over 900 employees, employing technical specialists and dedicated Managers to the installation of each of the package scopes in this project. For every project under installation, daily progress is recorded in corporate systems, which gives unique comparative data in helping to determine how much time each installation task should take and under all weather conditions. The major installation package's necessary equipment includes:

- foundations;
- WTGs;
- array cables;
- export cables;
- OSS;
- onshore cables; and
- OnSS including battery storage.

Each package will have its own installation contract with a specialized contractor, and each offshore package will require specialized vessels as described in Table 10.1. The WTG will be installed by the supplier, using the supplier's specialized lifting equipment and product specific procedures.

Table 10.1 Example of Preferred Vessel Types

Project Component	Type of Vessel (Number)	Size of Vessel	Illustrative Example of Vessel Type[1]	Purpose/Role of Vessel(s)
Monopiles (MPs)	Installation vessel capable of installing the foundations in dynamic position (DP2) mode[2]	*~37000 gross tonnage*		[redacted]
Transition Pieces (TPs)	Jack-up transportation and installation vessel specialized for offshore wind farms	~11000 gross tonnage		[redacted]
Wind Turbine Generators (WTGs)	Jack-up transportation and installation vessel specialized for WTG [redacted] (1, new U.S.-built)	~16000 gross tonnage		[redacted]

Table 10.1 Example of Preferred Vessel Types (continued)

Project Component	Type of Vessel (Number)	Size of Vessel	Illustrative Example of Vessel Type	Purpose/Role of Vessel(s)
Array and Export Cables	DP2 Cable Lay Vessel (U.S.-built transportation and installation vessel) (2)	4,500t cable capacity	Siem Aimery	A DP2-capable vessel purpose-built to facilitate array cable termination at WTG foundations.
		3,000t cable capacity	Edda Freya	A DP2-capable vessel, designed to lay array and export cables.
Array and Export Cables	DP2 Cable Lay Vessel (1)	7,000t cable capacity	Maersk Connector	A DP2 capable vessel designed to transport and install the export cable between the OSS and shore.

Table 10.1 Example of Preferred Vessel Types (continued)

Project Component	Type of Vessel (Number)	Size of Vessel	Illustrative Example of Vessel Type	Purpose/Role of Vessel(s)
Array and Export Cables	DP2 Cable Lay Barge (1)	3,400t cable capacity	Durocher Marine	A DP2 capable barge for Export Cable transportation and installation in shallow water.
Array and Export Cables	DP2 Multi-Purpose Service Vessel (1, U.S. Built)	5.700t cable capacity	Harvey Deep-Sea	A DP2 capable vessel designed for boulder removal and array and export cable burial, after being laid down.
Offshore Substation (OSS)	DP2 Heavy lift vessel (1)	29,722 gross tonnage	McDermott DB50	A DP2 capable vessel for lifting and installing the OSS.

Table 10.1 Example of Preferred Vessel Types (continued)

Project Component	Type of Vessel (Number)	Size of Vessel	Illustrative Example of Vessel Type	Purpose/Role of Vessel(s)
WTG, cable, and OSS Commissioning	Service operation vessel (1 to 3)	Tonnage 4874		A Jones Act-compliant vessel for crew housing and transfer; the service operation vessel houses up to 60 people with accommodations, helipad, daughter craft, and Walk to Work access to foundations.
	Crew transfer vessel (1 to 3)	Tonnage 215		Jones Act-compliant vessels for crew transfer; supporting personnel logistics with the transport of 12 to 24 people.

1 These are illustrative or otherwise model examples of a vessel class or type being considered for each role.

[redacted]

The overall coordination and management of the offshore construction work will be carried out under the Ørsted EPC Director, with dedicated construction site staffing. This approach gives the in-house EPC organization full control of the installation campaign, maintaining quality and schedule goals. The Bidder will house a permanent offshore presence at the site, with a dedicated Service Operating Vessel (SOV) or a jack-up platform having accommodation for workers. Sailing back and forth from land will leave too few effective working hours in a day to secure work progress. On-site coordination and HSE functions will be primarily carried out from this vessel.

10.2 Documentation of Site Control for Marine Terminals and Other Waterfront Facilities

10.2 Please provide documentation to demonstrate site control for all marine terminals and other waterfront facilities that will be used to stage, assemble, and deploy the project for each stage of construction.

i. If available, evidence that the bidder or the equipment/service provider have right(s) to use a marine terminal and/or waterfront facility for construction of the offshore wind energy project (e.g., by virtue of ownership or land development rights obtained from the owner).

The Bidder has signed an option agreement with MassCEC that would entitle it, if successful in the RFP Process, to lease the New Bedford Marine Commerce Terminal for the construction of the Project (Attachment 10-1). Pursuant to a September 2016 Letter of Intent, MassCEC entered into identical option agreements (conferring identical rights) with the Bidder, Vineyard Wind LLC, and Deepwater Wind LLC.

> ***"We are eager to collaborate with community partners in New Bedford and excited to show our new neighbors the many benefits from this offshore wind project."***
>
> **Ørsted President of North America Thomas Brostrøm**

On November 2, 2017, the Bidder opened its New Bedford office, expanding operations in the Commonwealth and furthering the commitment to the Southeast region.

ii. If not available, describe the status of acquisition of real property rights for necessary marine terminal and/or waterfront facilities, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project schedule.

As discussed above, the Bidder has secured an option to lease the New Bedford Marine Commerce Terminal for construction of the Project.

As discussed in Section 9.2, the Bidder has identified several waterfront facilities for purposes of installation and O&M. The status of acquisition of real property rights for these sites is provided in Table 10.2. Acquisition of these sites is not on the critical path; however, the overall project schedule accounts for the time necessary to secure the real property rights.

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

iii. Identify any joint use of existing or proposed real property rights for marine terminal or waterfront facilities.

As stated above, the Bidder, Vineyard Wind LLC, and Deepwater Wind LLC have signed identical option agreements with MassCEC entitling them to lease the New Bedford Marine Commerce Terminal in case of success in the RFP Process. In the event that the instant Section 83C solicitation results in multiple awards, with multiple winning bidders identifying the New Bedford Marine Commerce Terminal as their preferred staging area for elements of project construction, the option agreement contains mechanisms whereby priority use of the terminal can be agreed upon by the winning bidders or decided by a "tie-breaker." In the event that the Bidder is unable to use the New Bedford Marine Commerce Terminal, it has identified alternative facilities as described in Section 9.2 (Table 9.2).

10.3 Proposed Approach for Staging and Deployment of Major Project Components

10.3 Please describe the proposed approach for staging and deployment of major project components to the project site. Indicate the number, type and size of vessels that will be used, and their respective roles. Please include specific information on how the bidder's deployment strategy will conform to requirements of the Merchant Marine Act of 1920 (the Jones Act).

The proposed approach for staging and deployment of major Project components is provided below. A summary table identifying the number, type and size of vessels that will be used and their respective roles is provided in Table 10.1.

The Bidder has thoroughly reviewed and evaluated the requirements of the Jones Act to ensure that installation and operation of the Project is fully compliant with the Jones Act.

[redacted]

[redacted]

10.3.1 Foundations

The foundation construction and installation package consists of MP and TP fabrication, TP outfitting, and MP and TP installation on site. In the Preferred Option, the foundation package will contribute the most to new Massachusetts jobs.

MP and TP Tube Fabrication and Transit

The construction of MP and TP tubes are not very labor intensive, and it is anticipated that they will be fabricated in Europe. It is assumed that 3 sets of MP tubes can be transported to the feeder port site in one trip and approximately 15-18 TP tubes in one trip. [redacted]

Jones Act Applicability: No, because no transportation of merchandise between two points in the U.S. has occurred.

MP Installation

A non-U.S.-flagged DP2 vessel will transport the MPs from [redacted] to the site position and complete installation of the MP, using a pile gripper to keep the MP in position during the piling process. After piling is finished the hammer will be lifted off the MP and placed on the vessel deck prior to moving to the next position and repeating the process. The DP2 vessel will be capable of carrying 7-9 sets of MPs onboard depending of the size and weight of the MP.

Jones Act Applicability: No, because no transportation of merchandise between two points in the U.S. has occurred.

TP Outfitting in [redacted]

The TP tubes will be outfitted in [redacted].

Like the MP, the TP consists of a tube, but is much shorter, on the order of 25 m. In addition, the fully outfitted TP is significantly more complicated than the MP. In addition to the pipe, the TP consists of an external steel / concrete platform, internal steel platforms, and electrical items, such as lights, wires, switch gears, cable trays and various gauges, as well as rails for the elevator that runs up to the nacelle from the top of the TP. The steel platforms consist of standard steel profiles that are cut and welded manually, produced either at a central production location near the port or dispatched to local subcontractors in the area. All steel parts must be painted before assembly. Once the platforms are mounted in the TP, the assembly of all internal components can take place and the TPs loaded onto an installation vessel.

Jones Act Applicability: No, because no transportation of merchandise between two points in the U.S. has occurred.

TP Installation

In the Preferred Option, a Jones Act-compliant vessel will install the TPs. The installation vessel will transport the TPs from the outfitting port in [redacted] to the site position, dynamically maintain position on-site, and start the installation of the TP. First, an anode cage will be installed on the TP. Next, the TP is placed on top of the MP and bolted together. During the bolting process a remotely-operated vehicle will create and secure a connection between the

anode cage and the MP for cathodic protection. When foundation installation is finished a tent or similar cover will be put on top of the TP to protect the structure and electrical components inside.

Jones Act Applicability: Yes, in the Preferred Option, a Jones Act-compliant vessel will be used.

Figures 10.2 and 10.3 show the transportation and installation of a MP and TP.

Figure 10.2 Transportation and Installation of a MP (Westernmost Rough, 2014)

10.3.2 WTG

To allow for an effective WTG installation, installation out of a local harbor is preferable. To comply with Jones Act, under the Preferred Option, the Bidder is working with four vessel owners to support the construction of two Jones Act-compliant heavy lift installation and transportation vessels. This will support an effective and safe installation campaign on this Project, but it will also pave the way for future offshore wind farms in the U.S.

[redacted]

Figure 10.3 Installation of a TP (Westernmost Rough, 2014)

[redacted]

The WTG components will be fabricated at production facilities [redacted] and then transported to the envisaged load out port of [redacted] on board large cargo vessels.

WTG Pre Assembly in [redacted]

In the port of [redacted] the WTG components will be pre-assembled and prepared for load out. The load-out harbor also functions as the storage buffer for WTG components, ensuring a constant supply to the installation vessel transiting between the offshore installation site and the load out port. The pre-assembly and storage activities in the harbor requires skilled workers and heavy lifting equipment such as crawler cranes to move the components around.

The main and most resource demanding pre-assembly activity is tower assembly and outfitting. Incoming tower sections are inspected for overseas transport damage, and temporary stored by means of purpose built heavy-duty tower lift-trucks.

When assembling the complete tower structure, the bottom tower section is upended from horizontal to vertical and bolted into a temporary tower stacking foundation near the quayside (Figure 10.5). Thereafter, middle section(s) are stacked and bolted on top, the service-lift is installed inside the complete structure, and multiple electrical connections are run for HV cable, communication, DAVIT crane and nautical marking components. Certification work is carried out on certified structural elements and components. Pre-commissioning work prior to load out includes applying ID markings and a QC walk-down with the owner's representative (Figures 10.6 and 10.7).

Figure 10.5 Upending of Tower Section in Load Out Port (Gode Wind 2015)

Figure 10.6 Towers Assembled and Ready at the Load Out Port (Gode Wind 2015)

Figure 10.7 Towers Assembled and Ready for Loadout (Gode Wind 2015)

Nacelles are unloaded at the pre-assembly harbor by means of multi wheelers or a harbor crane. A thorough inspection for overseas transport damage is conducted, and pre-assembly consists mounting the Heli-hoist (basket), cooling unit with wind measurement instruments, and aviation marking components. If a nacelle is stored for a longer period, it needs to be conditioned by means of dehumidification and rotating of the entire drive train (e.g. generator). Prior to getting ready for load out, the nacelle assembly are pre-commissioned, ID-markings applied, and a QC walk-down with the owner's representative is conducted (Figure 10.8).

Figure 10.8 Nacelles Pre-assembled and Ready at the Load Out Port (Gode Wind 2015)

WTG blades are stored at the pre-assembly site as well, transported via harbor crane and trucks with special trailers. Little pre-assembly or inspection is required (Figure 10.9).

Figure 10.9 Blades Ready at the Load Out Port (Gode Wind 2015)

The Bidder intends for MassCEC's New Bedford Marine Commerce Terminal to be a critical part of this Project's success, and the highly skilled and appropriately licensed workforce supporting this task will include:

- Site management (e.g. Site Manager, Supervisor(s), Planner, HSE, Secretary);
- Crane drivers;
- Multi wheeler and heavy lifting truck drivers;
- Other logistics vehicle site drivers;
- High voltage electricians;
- Low voltage and communication electricians;

- Mechanical fitters; and
- Dock workers.

WTG Installation

After pre-assembly of the WTGs in [redacted] the WTG components (blades, nacelle and tower) are loaded onto the Jones Act-compliant heavy lift installation and transportation vessel, as the Preferred Option. WTG components are fastened onto the deck of the installation vessel using specially-designed seaworthy fastenings. Once fully loaded up to six WTGs sets can be stored on board for transport and installation offshore (Figure 10.10).

Figure 10.10 Loading Towers onto Installation Vessel (Gode Wind 2015)

Once positioned at the offshore site, the installation vessel jacks up and connects with a preinstalled foundation via gangway. Installation for each WTG is performed in five lifts; tower, nacelle, and three blades. This method of installing full towers and single blades from a dedicated installation vessel has proven to be an efficient and safe way to install WTGs offshore (Figure 10.11).

Figure 10.11 WTG Installation Vessel at Work - Installation of a WTG Blade (Borkum Riffgrund Wind Farm 1 2014)

WTG Commissioning

After installation, the WTG is connected to grid and commissioned. [redacted] will serve as the commissioning harbor and [redacted] however, commissioning would likely be completed by technicians hosted by either a crew transfer vessel (CTV) and/or DP2 vessel with a "walk to work" access system (Figure 10.12). The DP2 vessel uses a gangway system to transfer commissioning technicians to the WTGs and acts as a hotel vessel at the same time. CTVs push onto the boat landing on the foundations to allow technicians to ascend the WTG.

WTGs typically begin producing power 1 to 4 days after installation has been completed.

Figure 10.12 DP2 Vessel and CTV (Gode Wind 01+02 2015)

10.3.3 Electrical – Array Cable

A standard DP2 Installation vessel, and DP2 Post-lay burial vessel, with associated support craft, will be used to install the array cable. The cable will be transported to [redacted] by a freighter. The cable installation vessel will pick up lengths of cable from there to be laid.

Full site characterization has yet to be undertaken; however, it is expected that sand (loose, becoming very dense) is the predominant feature with some harder formations that may be evident, in addition to boulders. Although subject to change, the Preferred Option for cable installation is listed below: A DP2 vessel with turn tables or cable tanks will pick up and install the platform-connecting and inter-array cables, assisted by a pre dredging or mass flow excavation vessel for sand wave/excessive slope removal (route preparation). Another vessel will bury the cables by [redacted]

Cable crossings will require special measures such as rock placement; mattresses; and/or propriety separation devices;

Further, the operation will be assisted by survey vessels for pre cable lay surveys, post cable lay surveys, and Depth of Burial (DOB) surveys; and crew boats for tower teams, messenger wire installation, etc.; and a cable protection system during the cable installation period.

Both ends of the cable will be pulled into the TP or the OSS cable deck. After temporary hang-offs are installed a cable termination crew will commence final installation and commissioning.

10.3.4 Electrical – Export Cable

Installation of the export cable route can be defined by near-shore and far-shore sections. The near shore section routing is complex but the main difficulties are shallow water areas and a low, narrow bridge. Thus, installation of the full route cannot be completed with a standard installation vessel. To overcome this, a shallow water barge will be utilized. The cable installation vessel (DP2) will transport cable from the load out port to the barge within the near shore section. The barge will transit up river, laying and burying cable, finally transferring cable to the transition joint bay. The installation vessel will transit back down the river laying the cable towards the OSS, either by simultaneous lay and burial (Plough/Jetting/Cutting) or assisted by a DP2 vessel for cable burial works (Jetting/Cutting/ mass flow excavation). An offshore joint will be required as a complete single cable cannot be transported in one transit due to weight and volume restrictions. Associated support craft will be used as necessary: Dredging or Mass Flow Excavation vessels for sand wave/excessive slope removal (route preparation); DP2 vessels with turn table for cable transportation and installation, a jointing vessel or barge, a Boulder Clearance vessel equipped with a boulder clearance plough; and/or orange peel grab, Survey vessel(s) for pre cable lay surveys, post cable lay surveys and DOB surveys; and crew boats for platform access etc. Cable crossings will require special measures such as rock placement; mattresses; and/or propriety separation devices. A cable protection system will be implemented during cable installation.

The ends of the cable will be pulled into the transition joint bay and the OSS cable deck. A temporary hang-off will be installed and then the cable termination crew can commence their works.

10.3.5 OSS

OSS Fabrication and Installation

The OSS components - jackets, piles and topside - will be fabricated in selected fabrication yards, transported to the site and installed. The topside and jacket will be loaded onto separate U.S. flagged barges at the fabrication yard and towed to the offshore site (Figure 10.13). The transit time could be up to 14 days, depending on yard location. A heavy lift vessel will sail directly to the site, to meet the towed barges. The jacket will be lifted from the barge and placed on the seabed, and secured by use of 4 to 8 piles or suction buckets.

Figure 10.13 Typical Jacket Transported Horizontally

The topside will then be lifted in position on the jacket by the heavy lift vessel, and secured by welding to the jacket. The lifting operation, described in detail in Attachment 10-3, will not contravene the requirements of the Jones Act because no transportation of merchandise between two points in the U.S. has occurred.

It is anticipated that a [redacted] will lift and install the jacket and topside of the OSS. A detailed description of the installation of the jacket, piles and topside is provided in Attachment 10-3.

OSS Commissioning

All electrical equipment on the OSS needs to be commissioned to ensure quality, safety and functionality of each individual system and well as the integrated substation. Three phases of commissioning will to take place to ensure this.

Factory Acceptance Tests

Factory acceptance tests are carried out to confirm that the equipment under test has been manufactured in accordance with the approved design. These tests provide the employer with the opportunity to identify any design or build quality issues in advance of the equipment being delivered to site. All issues identified, should where possible, be rectified by the supplier prior to shipment.

Site Acceptance Test

During the site acceptance test, the equipment suppliers commissioning engineer conducts testing of the components supplied (as stand-alone systems) under the project scope, and tests the conformance of the delivered solution to the approved design and functional specifications. This process also confirms the integrity of the installation and the absence of any transit damage.

Site Integration Test

The site integration test involves the overall testing of the complete OSS. The system(s) under test may be composed of hardware, software, or hardware with embedded software. The site integration test is a process of verifying that the substation meets its requirements and performs in accordance with the design and client expectations.

First Energization of HV equipment and On Load Tests

Following the completion of factory acceptance, site acceptance, and site integration tests, and providing all the associated documentation has been completed and a Pre-Energization Inspection carried out, the equipment can be considered ready for energization. At this stage, the system is handed over to the Senior Authorized Person who will carry out the actual energization of the HV system.

10.3.6 OnSS

The Bidder's Owner Eversource will be responsible for detailed design, procurement, construction and commissioning of the OnSS. All the major equipment will be installed upon completion of concrete foundations and cable duct banks. The equipment manufacturers are responsible for transportation, rigging, and placing the equipment on the concrete foundations. The rigging company who acts as a sub- contractor to the equipment manufacturer is responsible for all logistical services, e.g. engineered rigging and hauling plans, routing, permitting, clearance checking, escort, police escort, load analysis of transport, as well as dimensional restrictions. When required, the rigging company is also responsible for temporary local warehouse storage of equipment and components. Upon installation of the equipment on the foundations, the rigging company is responsible for checking alignment, anchoring, and proper temporary protection from weather. Upon placing the equipment the manufacturers are required to complete attachments of all components associated with each equipment piece. When required, as part of final deployment the equipment will be filled with an insulating fluid and/or insulating gas.

OnSS Commissioning

All equipment, aside from the STATCOM, will be tested as soon as it is installed and control and protection equipment is available. Testing will be performed by competent and licensed contractors working in accordance with the test methodologies and plan reviewed and verified by qualified engineers. All tests will be documented by prescribed test reports and accepted by the Bidder. The commissioning will be performed in strict adherence to ISO's protocol on receiving permits and clearances.

345kV and medium voltage breakers: Upon the installation of all breakers and control panels, each breaker will be acceptance tested. The acceptance testing will include operability of the breakers, functional testing of control and protection schemes, alarms and indications, as well as remote control (SCADA) operability.

Control Center: The control center will be acceptance tested at the manufacturer's facility. Upon the installation at the site, each control and protection scheme will be tested and commissioned along with other equipment.

STATCOM: The STATCOM will be installed and commissioned by the manufacturer. Upon successful commissioning of the STATCOM, the Bidder will commission the output of the STATCOM power feeders to the system. The commission of the STATCOM will be performed after successful interconnection with National Grid's substation.

Step-Up Transformers: Upon the installation of the step-up transformers, they will be acceptance tested and commissioned.

Commissioning of the Onshore Station: Upon the acceptance testing of the substation control center and once the modifications to National Grid's Brayton Point substation are completed and in service, the commissioning of the substation will commence. The duration of the final commissioning will be approximately four weeks.

10.3.7 Battery Storage

The battery system supplier will deliver a turnkey system with all components up to the medium voltage switchgear. Eversource will be responsible for the connection of the battery system to the OnSS via the main autotransformers. The battery system will be installed in a dedicated building which houses the battery cells, power inverters and switchgear. The battery system step up transformers will be housed outside the building on concrete pads.

10.4 Party Responsible for Each Deployment Activity

10.4 List the party (e.g. the bidder, or equipment/service providers under contract to the bidder) responsible for each deployment activity and describe the role of each party. Describe the status of bidder's contractual agreements with third-party equipment/service providers.

Ørsted's approach to the sourcing and supply of the components and skills required for construction and operation of the Generation Asset and Offshore Transmission Asset of the Project is expected to be managed through a multi-contracting approach with the main packages and contractors described in Table 10.3. This is in contrast to a turnkey approach with only one contract for both supply and installation of the major scopes. The multi-contracting approach combined with Ørsted's in-house engineering capabilities allows for full EPC control, with the benefits of an optimized and transparent allocation of risk and full control over interfaces between main packages.

The procurement team in Ørsted works dedicated with broadening the supply chain by identifying, pre-qualifying and developing new suppliers, and manage the supply chain as a portfolio across the current and future portfolio of wind farms when procuring components for new wind farms.

Ørsted believes that using multiple suppliers will encourage competition in the supply chain, driving both price down and performance up and thereby reducing the cost of electricity.

Within the offshore wind industry, several of the suppliers have a portfolio of different products combined with a production capacity that enables them to both supply a range of different components used in the wind farm, such as cables and HV components, and supply to multiple wind farms.

Although competition is maintained by making sure alternative suppliers are available - Ørsted primarily works with selected, strategic suppliers in order to develop more cost-efficient concepts and products that can be used in tomorrow's wind farms. The close interaction with the service-suppliers and manufacturers and the sharing of knowledge between the experts are key success factor in developing more efficient manufacturing, installation methods, and technology.

An explanation of the responsibility split between contracts and the status of contracting the major scopes is provided in Table 10.3. Additional information about the procurement process is provided in Section 8.2. See also Section 9.2 for a description of negotiations and discussions regarding installation vessels for foundation, WTG, and cable deployment.

Table 10.3 Deployment Activity Responsible Parties

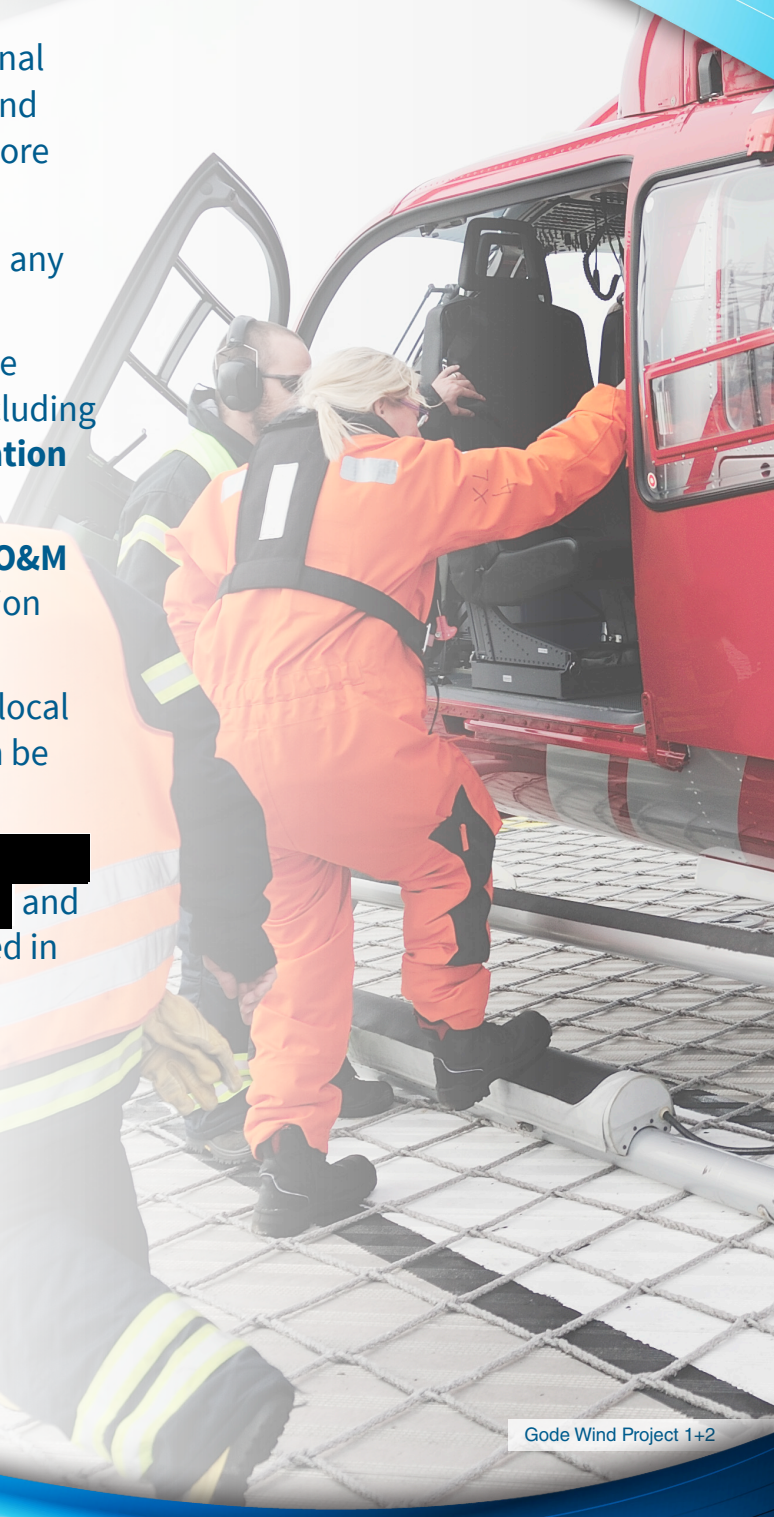
Deployment Activity	Responsible Party	Status of Procurement
Foundations	The **foundations supplier** will deliver the finalized MPs and the TPs at a quayside in order for the **installation contractor** to be able to transport them to the site.	[redacted]
WTG	The **WTG supplier** will transport, pre-assemble, install, and commission WTG components. The Bidder will contract the installation vessel and free issue this vessel to the WTG supplier for the installation	[redacted]
Array cables	The **array cable supplier** will manufacture and deliver the array cables at the designated harbor and the array cable **installation contractor** will take over the cables there, then transport, install and connect the cables from there	[redacted]
Export cable	The **export cable manufacturer** will deliver the export cable to the designated site which can be a harbor or the offshore project site where the **installation contractor** will take over the cable and install it and terminate it at shore	[redacted]
OSS	The **OSS fabrication contractor** will load the jacket and piles onto a Jones Act-compliant transportation barge and then load the topside onto a separate Jones Act-compliant transportation barge. The **OSS installation contractor** will tow the transportation barges to the field using Jones Act-compliant tow tugs. The **OSS installation contractor**'s installation vessel will meet the transportation barges in the field to lift off and install the structures.	[redacted]
OnSS	Commonly the **rigging companies** hired by the manufacturers are primarily responsible for staging and deployment activities. When required, the manufacturers hire local experienced contractors for specialized services.	[redacted]
Battery Storage	The **battery storage supplier** will transport and install storage components. An **electrical contractor** will connect the battery component to the OnSS.	[redacted]

Section 11

Operation and Maintenance

The Bidder has an **unparalleled track record in constructing and operating offshore wind farms** with more than two decades of operational experience and 3.8 GW constructed offshore wind capacity across more than 20 operational offshore wind farms.

- Ørsted **operates more wind turbines** than any other offshore wind operator in the world.
- The Bidder uses proprietary tools to achieve higher-than-average production factors including **optimized site layout** and **in-house operation and maintenance capabilities**.
- The Bidder expects that approximately [redacted] **O&M jobs** will be created for the ongoing operation and maintenance of the Project.
- Bay State Wind has initiated dialogue with local training providers to ensure these roles can be **sourced locally** to the extent possible.
- **New Bedford, Massachusetts** [redacted] and a Bay State Wind office has been established in the city.



Gode Wind Project 1+2

11. Operation and Maintenance

Projects that can demonstrate that the operation and maintenance ("O&M") plan, level of funding, and mechanism for funding will ensure reliable operations during the term of the contract or the tariff are preferred.

In this section, the Bidder addresses the complex task of operating and maintaining a commercial offshore wind energy facility, involving both on- and off-shore facilities and equipment critical to the successful generation of clean wind power. With more than two decades of operational experience and 3.8 GW constructed offshore wind capacity across 22 offshore wind farms in operation, the Bidder has an unparalleled track-record in constructing and operating offshore wind farms. It is this experience that allows us to frequently secure above industry-average production figures on our assets (see Figure 11.1). Having assets with greater availability not only supports cost reductions, it also increases the reliability benefits of our wind farms. Specifically, the Bidder achieves these higher production figures through two sophisticated tools it has developed to ensure the reliable operation of projects:

Optimized site layout: Proprietary tools that integrate skills and knowledge from a broad variety of disciplines allow us to design an optimized layout design compared to what our competitors can deliver. The design tool allows us to optimize our site layout for aerodynamics, reducing wake loss and increasing overall generation, and it also supports cost reductions by helping to minimize foundation and cable costs.

In-house O&M capabilities: As the operators of the largest offshore wind fleet in the world, Ørsted has built a highly skilled in-house O&M team. Through these in-house capabilities and continuous learning from our generation fleet, the Bidder is able to secure higher availability than the industry average. This allows our wind farms to be producing power for more hours per year. [redacted]

[redacted]

11.1 O&M Plan for the Project

11.1 Provide an O&M plan for the project that demonstrates the long term operational viability of the proposed project. The plan should include the location of the O&M base, a discussion of the staffing levels proposed for the project, the expected role of the project sponsor or turbine manufacturer/outside contractor, scheduling of major maintenance activity, and the plan for testing equipment.

Modeled on the successful track record of Ørsted and Eversource in operating complex commercial offshore wind energy and transmission facilities, the O&M Plan for the Project will tap into an organization articulated in three elements. [redacted] lthough the O&M Plan will be finalized as a component of the Facility Design Report (FDR)/Facility Installation Report review process (see Section 7.2), a preliminary O&M Plan is provided below.

11.1.1 Operating and Maintaining an Offshore Wind Farm

It can take around [redacted] people to operate and maintain and offshore wind farm. An indicative outline of the team structure of the staff working on one of Ørsted's operational wind farms is provided in Figure 11.2.

[redacted]

11.1.2 Location of the O&M Base

Under the Preferred Option, the O&M base is expected to be located in [redacted] Massachusetts.

11.1.3 Local Content and Job Creation

The Bidder estimates that around [redacted] long-term jobs (including subcontractors and others) will be required to perform the O&M activities for the Project. These jobs will be based in Massachusetts. Additional details on local content and job creation are provided in Section 14.

To further provide benefits to the Commonwealth, the Bidder has initiated discussions with local training providers to ensure skills and competencies can be sourced locally to the extent possible for the following roles:

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

11.1.4 Role of Project Sponsor

The Bidder will be accountable for performing all scheduled and unscheduled maintenance as well as all inspections related to the foundations, WTGs, array cables, OSS, export cables, OnSS, and onshore O&M facilities. Some of the specialized O&M activities will be contracted to third-party service companies. The following is an initial list of maintenance contractors available in the New England area:

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

The Bidder is in the process of evaluating additional maintenance contractors throughout New England. Service agreements, where required, are expected to be entered as described in Section 11.5.

11.1.5 Scheduling of Maintenance and Equipment Testing

An overall maintenance schedule will be developed in the early execution phase, considering the specific equipment and features of the offshore wind farm, detailing the activities and frequency of the surveys, inspections, and regular maintenance to be performed per industry best practices and with Ørsted's and Eversource's experience. A high-level overview of how frequent scheduled inspections and maintenance are performed is provided in Table 3.1; however, this will be adjusted prior to construction based on site-specific conditions. Additionally, the Bidder intends to utilize its extensive experience to minimize costs and maintenance in order to guarantee the success of the Project for all parties and beneficiaries.

Maintenance of the Project includes both scheduled and unscheduled maintenance; all necessary condition monitoring, inspections and diagnostics, Asset Integrity Assessments, and major overhauls to ensure the integrity and operational status of the assets are accounted for in the O&M plan.

To support O&M, the Project will be remotely controlled 24/7 via the SCADA systems for wind turbines and the balance of plant equipment. Condition monitoring is accomplished via monitoring systems implemented on key components and via the alarms in the SCADA systems. Diagnostic evaluations are completed by inspecting logs in the SCADA systems and by diagnostic on-site investigations.

Preventive maintenance will be performed to ensure that the operation of the substation and line equipment will provide high reliable performance. Maintenance of equipment will be performed in accordance with the interconnection agreements. In addition, all protective system maintenance will be performed in accordance with NPCC PRC 005-2 standard. Substation equipment will be maintained by qualified personnel in accordance with applicable industry standards and good utility practice to provide maximum operating performance and reliability.

11.2 Site Control Documentation

11.2 Please provide documentation to demonstrate site control for all marine terminals and other waterfront facilities that will be used to for the O&M.

i. If available, evidence that the bidder or the equipment/service provider have right(s) to use a marine terminal and/or waterfront facility for O&M of the offshore wind energy project (e.g., by virtue of ownership or land development rights obtained from the owner).

ii. If not available, describe the status of acquisition of real property rights for necessary marine terminal and/or waterfront facilities, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project schedule.

iii. Identify any joint use of existing or proposed real property rights for marine terminal or waterfront facilities.

Under the Preferred Option, the Bidder will use a site [redacted] to support O&M activities.

On November 21, 2017 the Bidder signed an agreement with [redacted] in [redacted] (see Section 10.2). Due diligence is currently being undertaken to assess its suitability as a location to base long-term O&M facilities for the Project, in addition to use as a Construction Management Base. The Bidder has the right to benefit from this agreement. The detail of the relationship is confidential and subject to a Non-Disclosure Agreement but is available upon request.

[redacted]

[redacted]

[redacted]

11.3 Proposed O&M Funding Mechanism

11.3 Describe in detail the proposed O&M funding mechanism and funding levels to support planned and unplanned O&M requirements.

O&M will be funded by internally generated cash flows from the revenues the Project receives from PPA payments, in addition to revenues from the capacity and ancillary services markets. If the Bidder requires working capital during the operating period, it will use internally generated cash flows, equity contributions from the Project Owners, and loans from either the Owners. The Bidder can provide additional information regarding funding of O&M upon request by the EDCs.

11.4 Major Equipment Terms of Warranties/Guarantees

11.4 Describe the terms (or expected terms) of the warranties and/or guarantees on major equipment that the bidder is utilizing or proposing to utilize.

11.4.1 WTGs

[redacted] limited to software updates, engineering support and remote diagnostics services. During the SWA period, it is assumed that the Bidder will provide a proportion of the technicians to ensure know-how ramp up and a smooth transition after the SWA expires. During this initial [redacted]-year period, the OEM is expected to provide a warranty covering the cost for potential component replacements as well as a PBA warranty at [redacted].

[redacted] the Bidder will be responsible for all maintenance and inspections of the WTGs. During this period, warranties from third parties, such as the WTG OEM, are expected to apply to any components and services acquired from such third party. These warranties have a duration of [redacted]

If the Bidder determines that the warranty is breached within the defect notification period after final acceptance of the equipment and materials, the contractor shall either repair or replace the affected equipment and materials at its sole cost and expense.

11.4.2 Transmission and Other Assets (OSS, OnSS, SCADA, HV components and cables)

The Bidder expects that the equipment and materials associated with the OnSS and transmission infrastructure will be covered by a [redacted]-year warranty. The supplier will warrant that all equipment and materials it supplies will conform to specifications provided by the Bidder, will be new when delivered and free from defects in title, design, material and workmanship for up to [redacted] years after final acceptance of work. If the Bidder determines that the warranty is breached, the contractor shall either repair or replace the affected equipment and materials at its sole cost and expense.

11.4.3 Battery Storage System

The battery storage system will be covered by a [redacted]-year standard warranty inclusive of Capacity Augmentation. Capacity Augmentation guarantees the rating of the battery and ensures that it will not degrade over the [redacted]-year warranty period.

11.5 O&M Agreement Contract Status

11.5 Describe the status of the project sponsor in securing any O&M agreements or contracts. Include a discussion of the sponsor's plan for securing a medium-term or long-term O&M contract, including the expected provider of O&M services.

To ensure that the Project provides the most cost-effective offshore wind energy to the Commonwealth, it is expected that the Bidder will enter into long-term O&M agreements with both Ørsted and Eversource. [redacted]

Where relevant, [redacted] might tender Service Contracts among approved suppliers with vetted qualifications, capabilities, and proper scalability to handle the long-term arrangement and scope of maintenance. The most prominent of these is the WTG SWA as described in Section 11.4.

The intention would be to enter into an agreement approximately [redacted] prior to commercial operation to ensure that the supplier is familiarized with the site and capable of taking over maintenance operations immediately.

The Bidder and its Operators – [redacted] - are actively engaging with several well-established international and local service providers for the provision of O&M services. In most cases, these agreements will be jointly negotiated with the equipment supply agreements to ensure compliance of the warranty obligations and operational efficiency when transitioning from the construction phase to the operational phase.

Besides informally exploring market opportunities and suppliers' capabilities, the Bidder has entered into a more formal dialogue with some service providers in the form of Requests for Information, RFPs, and Bidders Conference per PMI best practices, depending on the scope of service and market maturity.

It is expected that service agreements and contracts will be conditional on the Bidder being awarded a long-term contract in this RFP process.

11.6 O&M Services Experience

11.6 Provide examples of the bidder's experience with O&M services for other similar projects

The Bidder's Owners, Ørsted and Eversource, have developed, constructed, and operated many large energy projects over the past 25 years. Specifically, Ørsted operates more offshore WTGs than any other operator in the world, and is currently the operator of 22 commercial-scale offshore wind power facilities (Figure 11.3, Table 11.1). Similarly, Eversource regularly maintains over 300 substations of various capacity and configurations. Both companies employ highly trained professional engineers and experienced personnel to install, maintain, and repair equipment and the Project would greatly benefit from this combined experience to support O&M. See Section 12.4 for a complete list of similar Ørsted and Eversource projects.

[redacted]

Table 11.1 Ørsted's Operated Sites as of 2017

Project	Size (MW)	Wind Turbine (#, WTG capacity)	Country	Scope of Operations[1,2]	Ørsted Operational Period
Nysted	165.6	72 X 2.3 MW	DK	[redacted]	2004 - ongoing
Barrow	90	30 X 3 MW	UK	[redacted]	2006 - ongoing
Burbo Bank	90	25 X 3.6 MW	UK	[redacted]	2007 - ongoing
Horns Reef 2	209	91 X 2.3 MW	DK	[redacted]	2009 - ongoing
Walney	367	102 X 3.6 MW	UK	[redacted]	2011 - ongoing
Gunfleet Sands	172.8	48 X 3.6 MW	UK	[redacted]	2012 - ongoing
Anholt	400	111 X 3.6 MW	DK	[redacted]	2013 - ongoing
London Array	630	175 x 3.6 MW	UK	[redacted]	2013-2017
Westermost Rough	210	35 X 6 MW	UK	[redacted]	2014 - ongoing
Gunfleet Sands demo	12	2 X 6 MW	UK	[redacted]	2014 - ongoing
Borkum Riffgrund I	312	78 X 4 MW	DE	[redacted]	2015 - ongoing
Gode Wind 01-02	582	97 X 6 MW	DE	[redacted]	2016 - ongoing
Burbo Bank ext.	254	32 X 8 MW	UK	[redacted]	2017 - ongoing
Lincs	270	75 X 3.6 MW	UK	[redacted]	2017 - ongoing

1 The scope of operations is dependent on the country specific conditions and specifically whether and to which the extent the transmission assets are operated by the TSO.

2 Generating Assets (GA), Generating Assets and Offshore Substation (GA+OSS).

Section 12

Project Management/Experience

Fielding some of the most experienced and capable hands in the global offshore wind and New England transmission industries, the Bidder is the **best guarantee of delivering a successful offshore wind project** to the Commonwealth.

- Over the past 25+ years, Ørsted has constructed **3.8 GW of offshore wind capacity**, accounting for **around a quarter of the world's installed offshore wind capacity**.
- Over the past decade, Eversource has successfully completed hundreds of traditional and major capital projects.
- Eversource has a **proven track record in successful single- and multi-state project siting and permitting**, working closely with other companies to develop major projects, and safely and efficiently constructing transmission projects.
- Eversource has been a member of ISO-NE, NEPOOL, and NPCC since inception.

3X the capacity under management as our nearest competitor

3.8 GW of constructed offshore wind capacity

2,000+ Ørsted employees supporting Bay State Wind Project

Gode Wind Project

12. PROJECT MANAGEMENT/EXPERIENCE

Bidders are required to demonstrate project experience and management capability to successfully develop and operate the project proposed. The Distribution Companies are particularly interested in project teams that have demonstrated success in projects of similar type, size and technology and can demonstrate an ability to work together effectively to bring the project to commercial operation in a timely fashion.

In 2016, Ørsted and Eversource joined forces to create a single, cohesive team solely dedicated to the development of the Project. This team combines top talent from the world's leading offshore wind developer and New England's pre-eminent energy company with deep experience in successfully developing complex energy projects over the past 20+ years. The Owners' depth of experience, proven track record and unparalleled commitment to excellence will ensure seamless project execution, unrivaled by any competitor.

Consisting of two leading energy companies, the Bidder brings a winning combination of experience and skills to the development of Massachusetts' first offshore windfarm and the U.S.'s first utility-scale offshore windfarm. These strengths are encapsulated in the following core competencies:

Technical Acumen

With 23 offshore wind projects constructed and a dedicated offshore wind business unit consisting of over 2,000 dedicated experts spanning engineering, permitting, supply chain engagement and O&M, Ørsted is the industry leader within offshore wind. Similarly, Eversource brings deep experience in interconnecting renewable resources into New England's electrical system reliably and cost-effectively. Eversource has served as New England's leading electricity and natural gas distribution company for over a hundred years. With over 8,000 employees based across New England, its deep knowledge of the region's electrical system is without parallel.

Financial Capacity

The Bidder brings an unrivaled financial strength reflected in the joint venture partners' solid credit rating scores, total assets worth more than $50 billion and a cash flow from operating activities of about $4 billion.

Supply Chain Relationships

The Bidder's market-leading global position within offshore wind, and sizeable U.S. project pipeline, gives it the unique ability to provide suppliers greater certainty when making long-term decisions to invest in the Commonwealth, resulting in a major boost to the local economy. This is not a new strategy but a reprise of Ørsted's phenomenal success in building a robust UK offshore wind industry. Ørsted's 2,000-MW build-out on the East Coast of the UK has been accompanied by a multi-billion dollar investment by our supply chain partners, in large part due to Ørsted's active engagement with both potential local suppliers and large multi-national ones to entice them to invest in the region.

Knowledge of New England's Electrical System

The Bidder brings an unrivaled sophisticated understanding of New England's electrical system through the joint-venture partner, Eversource. The Bidder has parlayed this understanding to provide Massachusetts ratepayers with the lowest cost, highest value offshore wind project.

Environmental Stewardship

The Bidder recognizes the importance of being an environmental steward and ensuring that the construction and operation of the Project is compatible with existing social, economic and environmental uses within and around the Project area. Its' industry-leading team of wildlife and marine specialists have been working proactively since being awarded the Lease in June 2015 to engage with interested and affected stakeholders and to conduct sound site assessment activities to support development of appropriate mitigation and minimization measures.

12.1 Project Organizational Chart

12.1 Provide an organizational chart for the project that lists the project participants and identifies the corporate structure, including general and limited partners.

An organizational chart of the Bidder structure is provided in Figure 12.1.

12.2 Bidder and Project Participant Experience

12.2 Provide statements that list the specific experience of the bidder and each of the project participants (including, when applicable, the bidder, partners, and proposed contractors), in developing, financing, owning, and operating generating and transmission facilities, other projects of similar type, size and technology, and any evidence that the project participants have worked jointly on other projects.

12.2.1 Bay State Wind LLC

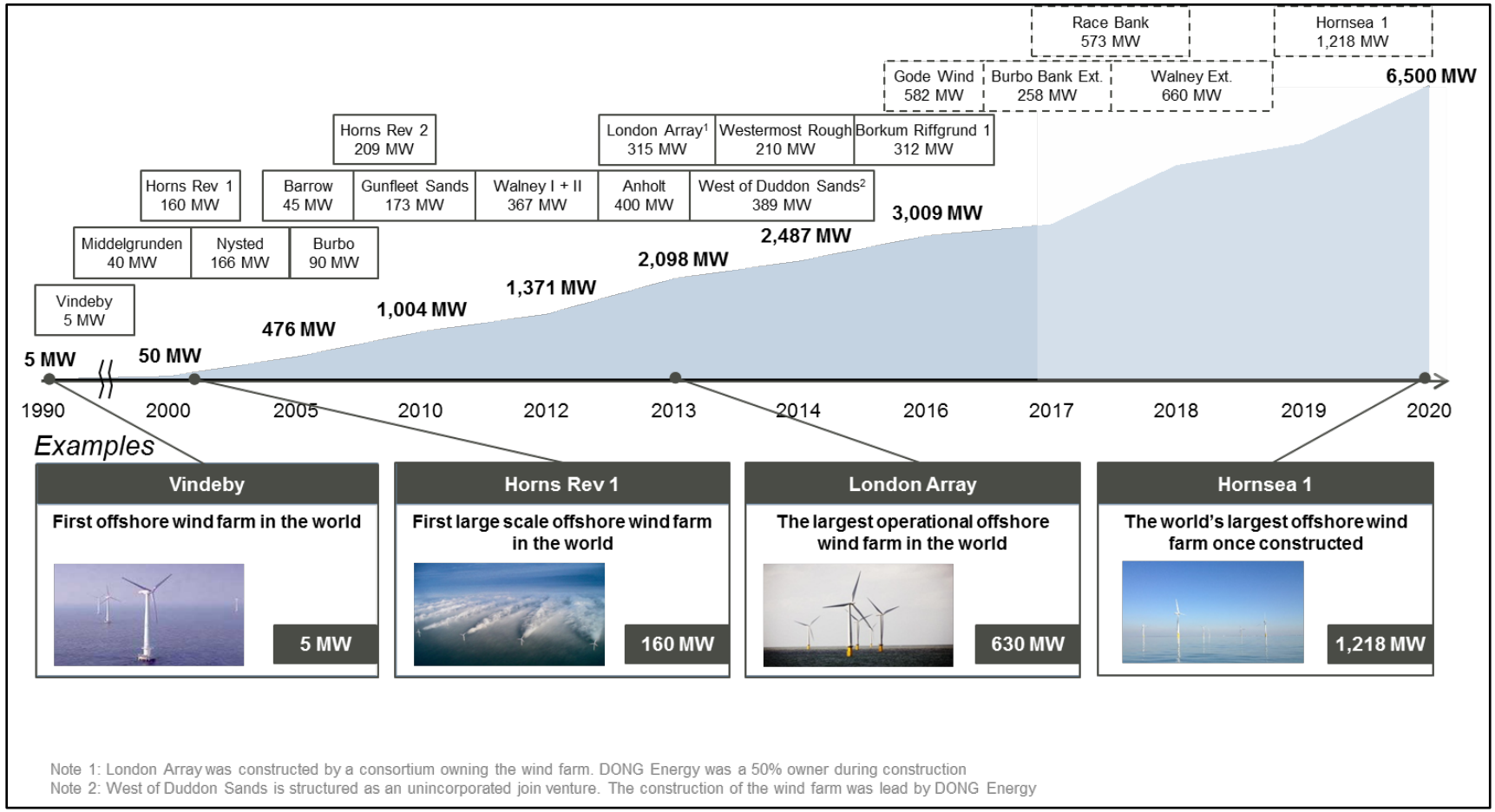
As a 50/50 joint venture between Ørsted and Eversource, the Bidder will benefit from the extensive experience that these partners have gained over the past two decades in developing, constructing, and operating complex energy projects. The complementary partnership between these two parent companies brings world-leading offshore wind expertise and expert knowledge of transmission, including offshore transmission, and deep roots in Massachusetts together.

12.2.2 Ørsted

Ørsted is the industry leader in offshore wind with significant experience with the rigors and challenges of the offshore wind business. Over the past 25 years, Ørsted has constructed 3.8 GW of offshore wind capacity (see Figure 12.2), which is approximately 30 percent of globally installed offshore wind capacity. Ørsted's existing activities span a number of markets which include Denmark, the United Kingdom, Germany, the Netherlands, the United States, and Taiwan. As a result, Ørsted is well practiced in adapting to, and thriving within, new regulatory, permitting, and political landscapes. It is the current Ørsted leadership team that, within the short span of the past three to four years, has driven dramatic cost reductions and paved the way for exponential market growth.

[redacted]

Figure 12.2 Total Constructed Capacity by Ørsted (MW)



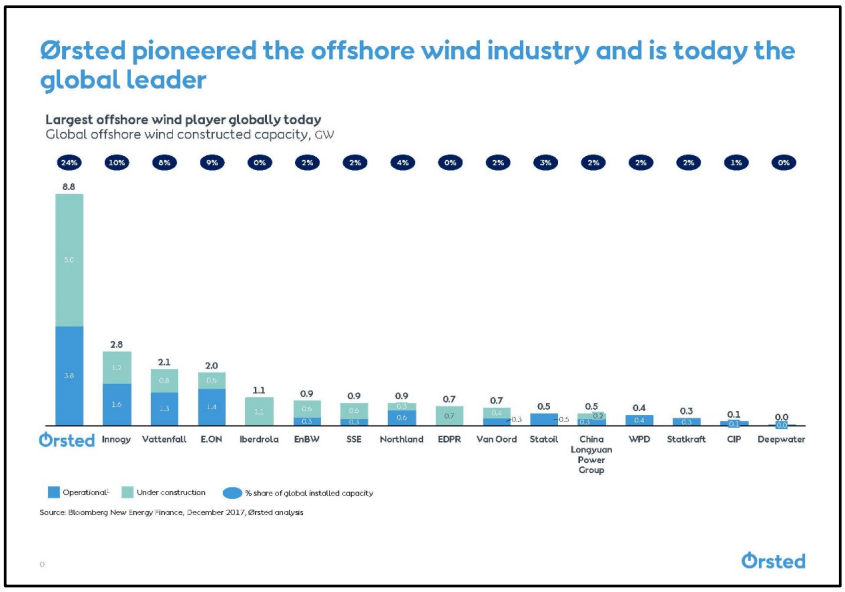
Note 1: London Array was constructed by a consortium owning the wind farm. DONG Energy was a 50% owner during construction
Note 2: West of Duddon Sands is structured as an unincorporated join venture. The construction of the wind farm was lead by DONG Energy

All of Ørsted's experience in offshore wind in development, construction, operation, and decommissioning is relevant to the Project. Specific examples of Ørsted's expertise in development and operations of offshore wind energy projects include:

- Participating in over 20 competitive offshore wind tenders and executing on project development post-award;
- First-ever win with a zero-subsidy bid (Germany 2017);
- Permitting of complex projects with input and consent required from numerous stakeholders including regulatory agencies, non-governmental organizations, and the fishing industry;
- Design and planning of high-voltage transmission solutions capable of delivering power from offshore wind projects to the identified onshore grid connection point, from as far away as 50 miles (80 km) (Walney Extension, Race Bank and Hornsea 1);
- Construction of offshore wind farms in challenging marine environments, including far from shore projects, high wave heights, high wind speeds and rough sea conditions;
- Planning and execution of O&M strategy for offshore wind farms; and
- First-ever decommissioning of an offshore wind project, the Vindeby Offshore Wind Farm near Lolland in March 2017[20].

Through combining the lessons learned and experience gained from the development, construction and operation of a number of offshore projects in Europe, Ørsted is capable of designing and implementing technical solutions that are appropriate and proven. To demonstrate Ørsted's breadth and depth of industry knowledge, a partial list of previous projects is provided in Section 12.4. Key personnel are discussed in Section 12.3 provides additional detail on key personnel dedicated to this Project.

Ørsted is an industry leader, with 3x the installed offshore wind-energy capacity than its nearest competitor.



Furthermore, Ørsted is also currently involved in two additional projects in the United States beyond this Project: Ocean Wind (New Jersey) and Coastal Virginia Offshore Wind, a partnership with Dominion Energy. Not only does this reinforce Ørsted's

[20] Hyperlink to youtube video: https://www.youtube.com/watch?v=QEJHB8V4hEE.

commitment to the U.S. offshore wind industry, but it also offers an opportunity to share lessons learned across the region. The Bidder will leverage Ørsted's experience, particularly with regards to the BOEM permitting process and supply chain development, to secure on-time and on-budget development of this Project to the greatest benefit of the Commonwealth.

12.2.3 Eversource

Eversource is an industry leader in timely and efficiently siting, permitting, constructing and maintaining large complex transmission and distribution projects including high-voltage and extra HV overhead, underground and hybrid transmission lines, and associated terminal equipment. Throughout New England, Eversource has successfully completed hundreds of capital projects over the past decade with a proven track record in:

- Successful single state and multi-state project siting and permitting;
- Working closely with other companies to develop major projects; and
- Safely and efficiently constructing transmission and distribution projects.

As described in Section 5, Eversource, a Fortune 500 energy company, has significant financial resources and invests substantially in transmission facilities. Eversource financed those investments with its strong cash flows and ready access to the capital markets.

Eversource has successfully completed hundreds of traditional and major capital projects over the past decade. Eversource's innovative solutions to technical and environmental challenges include:

- The first and most extensive 345-kV applications of solid core cross linked polyethylene (XLPE) underground cables in the United States;
- Laying marine cable from a purpose-built ship; and
- Constructing overhead transmission support structures from the air, using helicopters.

Eversource has recent and significant experience with large, complex energy projects. Over the past 10-15 years, Eversource has planned, designed, permitted and constructed over $2.8B of major transmission upgrades in southern New England.

For the purposes of developing the Project, Eversource has replicated its successful formula by assembling a core team of seasoned professionals who have been involved in the development and construction of numerous large transmission facilities, supplemented by internal and external resources that provide the expertise to support project execution. A partial list of previous projects is provided in Section 12.4 to further illustrate Eversource's experience. Section 12.3 provides additional detail on key personnel dedicated to this Project.

12.3 Key Staff Experience

12.3 Provide a management chart that lists the key personnel dedicated to this project and provide resumes of the key personnel. Key personnel of the bidder's development team having substantial project management responsibilities must have:

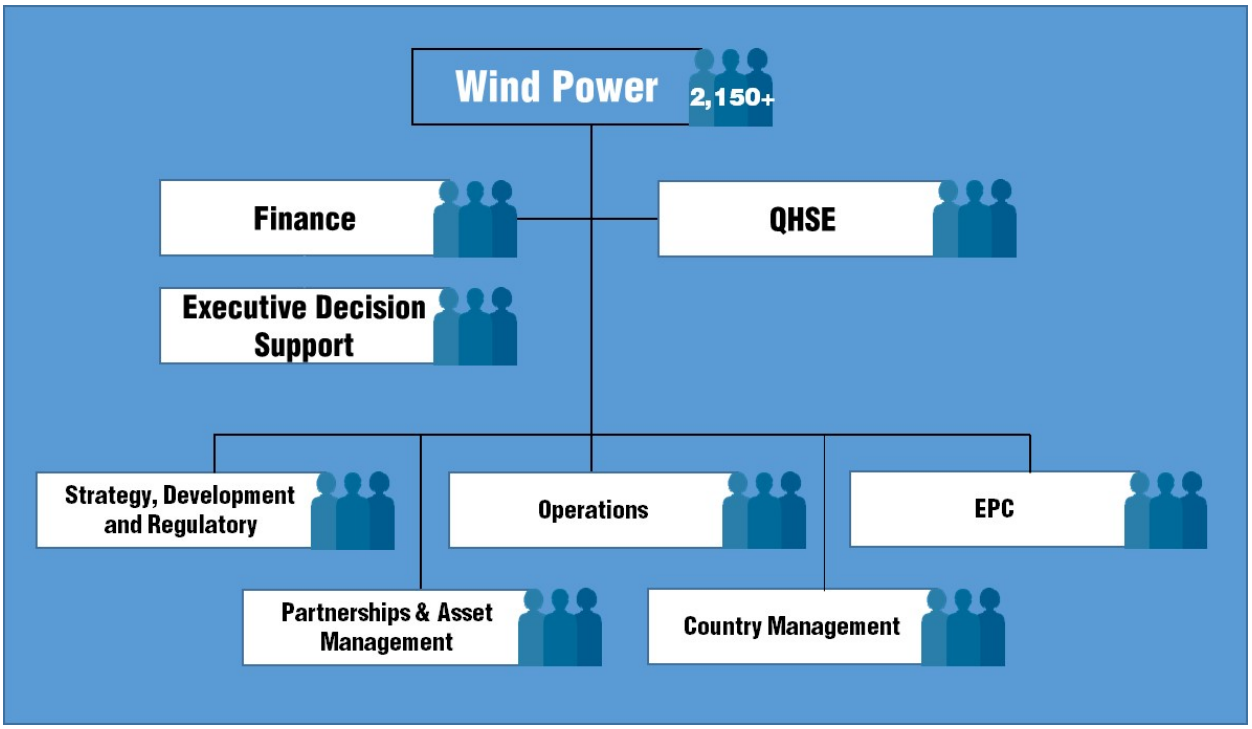
i. Successfully developed and/or operated one or more projects of similar size or complexity or requiring similar skill sets; and

ii. Experience in financing power generation projects (or have the financial means to finance the project on the bidder's balance sheet).

Ørsted has over 2,000 employees dedicated to the development, construction and operation of utility scale offshore wind projects similar in nature to this Project (see Figure 12.3). Eversource has approximately 8,000 employees dedicated to the development, construction and operation of utility scale transmission and distribution projects across New England. It is therefore undoubtedly one of the Bidder's primary assets to be able to draw upon this extensive talent and resource pool for the development, construction and operation of the Project.

The Project development organization is provided in Figure 12.1. Once final permits are received and construction begins, some roles will be exchanged with people specialized in project execution: The project development manager is replaced by a program director from the Ørsted EPC Division; the technical project manager is replaced by an EPC director and similarly for other roles.

Figure 12.3 Ørsted Organization with Number of FTE Employees in Each Unit (as per Dec. 2016)



12.3.1 Key Personnel Directly Involved in the Management of the Project

The key personnel directly involved in the management of this Project are identified below and resumes for those personnel are provided in Attachment 12-1. All the members of the Project team have substantial experience within different areas of the development project: consents and permitting, market development, project development and progress, partnerships, along with broader business and investment experience.

Ørsted Key Staff

Ørsted relies on an experienced team to lead and manage the successful implementation of the Project throughout all development aspects in accordance with management models that have been implanted on dozens of previous projects (Table 12.1).

[redacted]

[redacted]

[redacted]

[redacted]

Eversource Key Staff

In its role as co-owner of Bay State Wind and service provider for development, construction and operation of the onshore facilities, Eversource proposes an experienced team to lead and manage the successful implementation of the facility throughout all development aspects (Table 12.2).

[redacted]

[redacted]

[redacted]

12.4 Relevant Current Projects

12.4 Provide a listing of all projects the project sponsor has successfully developed or that are currently under construction. Provide the following information as part of the response:

i. Name of the project

ii. Location of the project

iii. Project type, size and technology

iv. Commercial operation date

v. Estimated and actual capacity factor of the project for the past three years

vi. Availability factor of the project for the past three years

vii. References, including the names and current addresses and telephone numbers of individuals to contact for each reference.

12.4.1 Ørsted

To date, Ørsted has constructed 3.8 GW of offshore wind capacity, which is approximately 30 percent of globally installed offshore wind capacity. Ørsted's existing activities span a number of markets, which include Denmark, the United Kingdom, Germany, the Netherlands, the United States, and Taiwan. Detailed information regarding Ørsted's offshore wind portfolio is provided in Table 12.3.

Ørsted's Unparalleled Offshore Wind Experience

- 25+ years' experience
- 22 operational projects
- 3.8 GW constructed capacity
- 2,000+ dedicated employees
- 7 projects under construction
- 8.8 GW of capacity by 2022

For further information regarding the offshore wind projects referenced in Table 12.3, please contact:

[redacted]	[redacted]

12.4.2 Eversource

Eversource has successfully developed several recent large projects with an initial capital cost of more than $70 million. Descriptions of the projects are provided in Table 12.4. Since the projects listed are not generation projects, there are no capacity and availability factors.

All of the projects listed in Table 12.4 are owned by Eversource affiliates, and the President of Eversource's transmission department may be contacted for further information with respect to any of these projects at:

[redacted]

Table 12.3 Ørsted Project Experience

Project/Program	Location	Description	Size and Project Technology	In-Service Date	Status	Capacity Factor (Estimated)[1]			Capacity Factor (Actual)[2]			Availability Factor (Actual)[3]		
						2014	2015	2016	2014	2015	2016	2014	2015	2016
Denmark[4]														
Anholt	Kattegat (DK)	Offshore wind	400 MW; Siemens Gamesa SWT-3.6-120	2013	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Avedøre Holme	Øresund (DK)	Nearshore wind	10.8 MW; Siemens Gamesa SWT-3.6-107/120	2009 / 2011	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Horns Rev 2	North Sea (DK)	Offshore wind	209.3 MW; Siemens Gamesa SWT-2.3-93	2010	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Horns Rev 1	North Sea (DK)	Offshore wind	160 MW; Vestas V80-2 MW	2003	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Nysted	Fehmarnbelt (DK)	Offshore wind	165.6 MW; Bonus SWT 2.3-82	2003	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Middelgrunden	Øresund (DK)	Nearshore wind	20 MW; Bonus B76/2000	2001	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Vindeby	Smålandsfarvandet (DK)	Offshore wind	4.95 MW; Bonus B35/450	1991	Decommissioned	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]														
OWP West	North Sea (DE)	Offshore wind	240 MW; Technology TBD	2024	Under Development	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Borkum Riffgrund West 2	North Sea (DE)	Offshore wind	240 MW; Technology TBD	2024	Under Development	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gode Wind 3	North Sea (DE)	Offshore wind	110 MW; Technology TBD	2023	Under Development	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Borkum Riffgrund 2	North Sea (DE)	Offshore wind	450 MW; MVOW 8.3 MW-164	2018	Under Development	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gode Wind 1	North Sea (DE)	Offshore wind	380 MW; Siemens SWT 6.0-154	2016	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gode Wind 2	North Sea (DE)	Offshore wind	252 MW; Siemens SWT 6.0-154	2016	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Borkum Riffgrund 1	North Sea (DE)	Offshore wind	312 MW; Siemens SWT 4.0-120	2015	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Netherlands														
Borssele 1 & 2	North Sea (NL)	Offshore wind	752 MW; Siemens Gamesa 8 MW	2020	Under Construction	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 12.3 Ørsted Project Experience (continued)

Project/Program	Location	Description	Size and Project Technology	In-Service Date[2]	Status	Capacity Factor (Estimated)[1]			Capacity Factor (Actual)[2]			Availability Factor (Actual)[3]		
						2014	2015	2016	2014	2015	2016	2014	2015	2016
[redacted]														
Hornsea 2	North Sea (UK)	Offshore wind	1,386 MW; Technology TBD	2022	Under Development	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Hornsea 1	North Sea (UK)	Offshore wind	1,200 MW; Technology TBD	2020	Under Construction	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Walney Extension	Irish Sea (UK)	Offshore wind	660 MW; MHI-Vestas V164-8.0 MW & Siemens SWT-7.0-154	2018	Under Construction	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Race Bank	North Sea (UK)	Offshore wind	573 MW; SWT-6.0-154	2018	Under Construction	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Burbo Bank Extension	Irish Sea (UK)	Offshore wind	258 MW; V164-8.0 MW (MHI Vestas Offshore Wind)	2017	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Westermost Rough	North Sea (UK)	Offshore wind	210 MW; SWT-6.0-154	2015	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
West of Duddon Sands	Irish Sea (UK)	Offshore wind	388.8 MW; SWT-3.6-120	2014	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gunfleet Sands Demo	Thames Estuary (UK)	Offshore wind	12 MW; SWT-6.0-120	2013	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Lincs	North Sea (UK)	Offshore wind	270 MW; SWT-3.6-120	2013	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
London Array 1	Thames Estuary (UK)	Offshore wind	630 MW; SWT-3.6-120	2013	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Walney 1	Irish Sea (UK)	Offshore wind	183.6 MW; SWT-3.6-107	2011	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Walney 2	Irish Sea (UK)	Offshore wind	183.6 MW; SWT-3.6-120	2011	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gunfleet Sands 1	Thames Estuary (UK)	Offshore wind	108 MW; SWT-3.6-107	2010	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gunfleet Sands 2	Thames Estuary (UK)	Offshore wind	64.8 MW; SWT-3.6-107	2010	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Burbo Bank	Irish Sea (UK)	Offshore wind	90 MW; SWT-3.6-107	2007	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Barrow	Irish Sea (UK)	Offshore wind	90 MW; V90-3 MW Offshore (Vestas)	2006	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Taiwan														
Formosa 1 - Phase 1	Taiwan Strait	Offshore wind	8 MW; 4.0 MW SWT-120	2017	In Operation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

Sources: Danish Energy Agency, Fraunhofer ISE & EEX, National Grid, and Ørsted.

Table 12.4 Eversource Project Experience

Project/Program	Description	Location	In-Service Date	Cost (US $M)
Bethel/Norwalk	Construction of a new 21-mile (34 km) 345-kV line consisting of 2.1 miles (3.4 km) of XLPE cable, 9.7 miles (15.6 km) of high pressure fluid filled cables and 8.6 miles (13.8 km) of overhead construction	CT	2006	$337
Glenbrook Cables	Construction of two sets of parallel 115-kV XLPE cables installed along an 8.7-mile (14-km) route underneath roadways in a highly congested area of Fairfield County, close to New York City; and significant substation upgrades	CT	2008	$239
Stoughton Cables	Construction in phases of two parallel 345-kV high pressure fluid filled cables installed along a 17-mile (27 km) route, and a third cable installed along an 11-mile (17 km) route, all underneath roadways in and near Boston; a new 345-kV switching station, and associated substation improvements.	MA	2007 2009	$317
Long Island Replacement Cable	Joint project with Long Island Power Authority: replacement of seven fluid-filled transmission cables between Norwalk, CT and Northport, NY by 3 138-kV XLPE marine cables, buried 6 ft (2 m) below the sea bottom.	CT	2008	$79*
Middletown/Norwalk	Joint project with United Illuminating: Construction of new 345-kV circuits consisting of 45 miles (72 km) of overhead line and 24 miles (39 km) of underground cables; reconstruction of 57 miles (92 km) of 115-kV line; construction of new substations and expansion of existing substations.	CT	2009	$955*
Greater Springfield Reliability (NEEWS)	Construction of 39 linear miles (63 linear km) of new 345-kV transmission lines and reconstruction of existing 115-kV lines between Ludlow, Massachusetts, and Bloomfield, Connecticut with 13 new or rebuilt substations and switching stations (110 circuit m [177 circuit km])	MA/CT	2013	$676
Long-Term Lower SEMA Upgrades	Construction of new 18 miles (29 km) 345-kV line between Carver, MA, across Cape Cod canal to Bourne, MA and new 345-kV substation; reconstruction of pre-existing 345-kV line on separate towers, and related 115-kV modifications.	MA	2014	$106
Interstate Reliability (NEEWS)	Joint project with National Grid: Connecticut portion: 37 miles (59 km) of new 345-kV line with associated substation improvements, now in construction.	CT	2015	$218*

* = Eversource Cost Only

12.5 Project Team

12.5 With regard to the bidder's project team, identify and describe the entity responsible for the following, as applicable:

i. Construction Period lender

ii. Operating Period Lender and/or Tax Equity Provider

iii. Financial Advisor

iv. Environmental Consultant

v. Facility Operator & Manager

vi. Owner's Engineer

vii. Transmission Consultant

viii. Legal Counsel

The shared expertise of Owners Ørsted and Eversource in developing, financing, and operating energy projects will be supplemented by third party firms as outlined below.

12.5.1 Construction Period Lender

As outlined in Section 5, the Project will be indirectly financed by its two owners, Ørsted and Eversource.

12.5.2 Operating Period Lender and/or Tax Equity Provider

As outlined in Section 5, the Project will be indirectly financed by its two owners, Ørsted and Eversource.

In contrast to a majority of renewable developments, the Project is not dependent upon tax equity financing under current federal tax law, which is particularly important in this political climate. The volatility of appetite and pricing of tax equity investments will not affect this Project, which significantly reduces the overall financing execution risk.

12.5.3 Financial Advisor

[redacted] have been retained to provide financial advising for this Project. [redacted], is one of the four largest public accounting firms in the world, while [redacted] is one of the largest accounting, tax, and business advisory firms in the [redacted] with over 2,400 professionals worldwide.

12.5.4 Environmental Consultant

[redacted] is contracted to provide environmental consulting services for the Project. [redacted] is responsible for drafting and coordinating the completion of a full and compliant COP for submission to BOEM. In addition to the COP, [redacted] is responsible for the delivery of a COP Survey Plan, including execution of site characterization surveys or sub-contracting surveys and providing project management for sub-consultants. [redacted] will also support receipt of other federal, state, and local approvals required for construction and operation of the Project. [redacted] is a leading provider of consulting and engineering services, with over 16,000 associates supporting government and commercial clients

worldwide with innovative solutions focused on water, environment, infrastructure, resource management, energy, and international development.

12.5.5 Facility Operator and Manager

Bay State Wind will be the lead Facility Operator and Manager.

12.5.6 Owner's Engineer

Supplementing Ørsted and Eversource's robust internal resources, [redacted] has been retained as the Owner's Engineer of record for this Project. [redacted] is headquartered in [redacted] and is one of the largest and most experienced engineering firms in the country, specializing in construction/commissioning support for power generation, transmission and distribution, buildings, and central heating/chiller plants; as well as mechanical, electrical, plumbing, and technology services engineering.

12.5.7 Transmission Consultant

[redacted] has been retained to provide consulting services. [redacted] is a leading industry provider of Power System Studies in the Northeast, with over 50 professionals providing system planning, engineering studies, and engineering and design services.

12.5.8 Legal Counsel

The primary in-house legal counsel advising Ørsted and Eversource in connection with this proposal are, respectively, [redacted] External legal counsel is being provided by [redacted].

12.6 Bidder's ISO-NE Market Experience

Provide details of bidder's experience in ISO-NE Markets. With regard to bidder's experience with ISO-NE markets, please indicate the entity that will assume the duties of Lead Market Participant for your Project. Please provide a summary of the proposed Lead Market Participant's experience with each of the ISO-NE markets.

The Owners will designate a Lead Market Participant for Bay State Wind in accordance with the ISO-NE asset registration requirements. The Lead Market Participant will be able to draw on Eversource's history of comprehensive involvement in ISO-NE.

Eversource has been a member of ISO-NE and its predecessor since inception. Relevant staff experience includes:

- Extensive participation in the ISO-NE market, technical and planning committees, tasked with establishing and overseeing the development and maintenance of market rules.
- Experience operating renewable and conventional generation including participation in the day ahead and real time markets for energy, in addition to the markets for capacity, regulation, forward reserve, voltage support and financial transmission rights.
- Provision of last resort wholesale power service in New Hampshire, Connecticut and Massachusetts, including daily coordination with ISO-NE on load forecasting,

generation bidding and scheduling and oversight of power supply agreements in the states.

- Significant experience in the fuel supply markets and an intimate understanding of the reliability impacts to the power market.

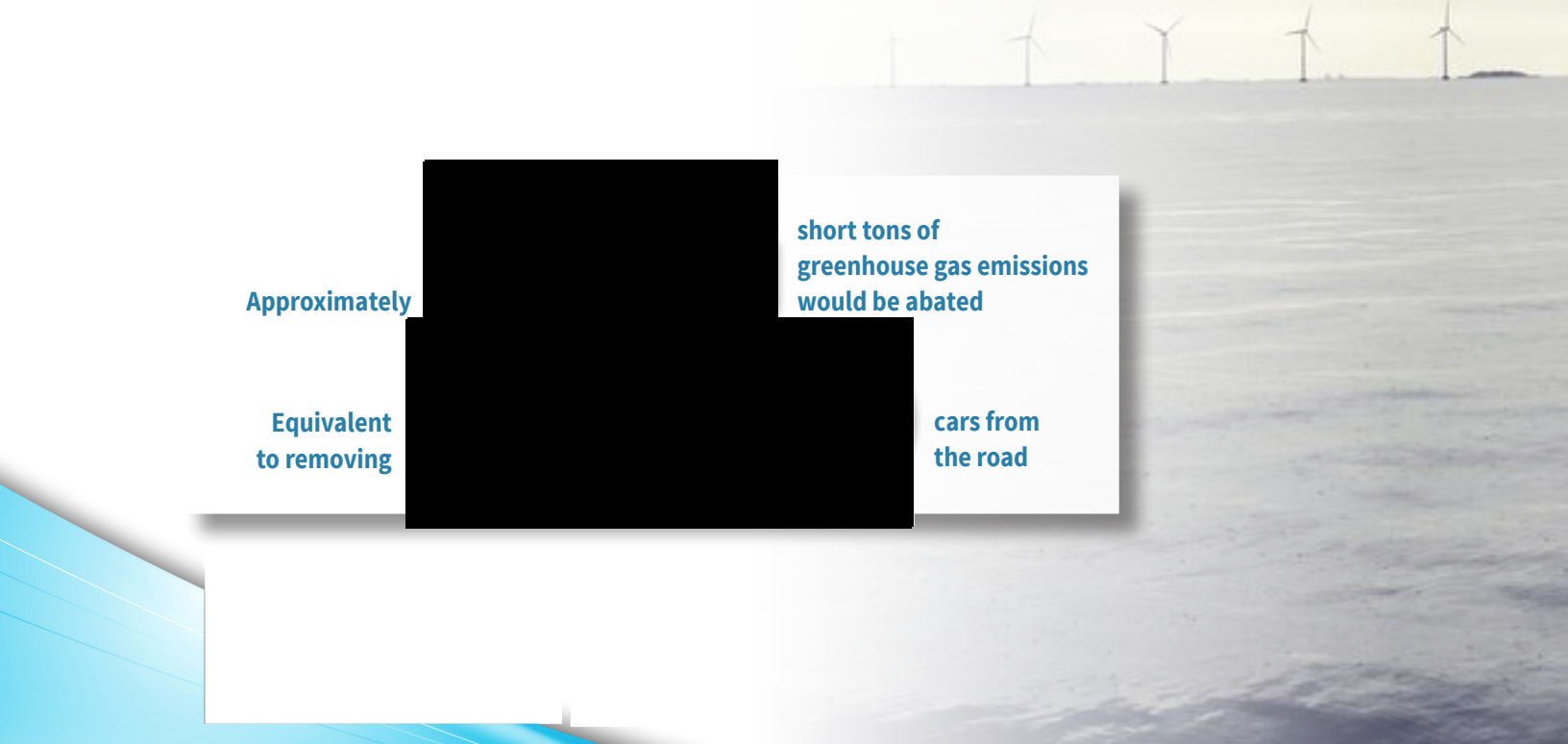
Eversource has been a member of NEPOOL and NPCC since inception and participates in these organizations on a regular basis. Eversource maintains policies and procedures and executes activities in a manner that ensures all market activities comply with ISO-NE, FERC and NERC/NPCC requirements.

Section 13
Emissions

- Offshore wind is a renewable energy source that will deliver large quantities of **reliable clean energy** to the Commonwealth helping it **achieve its ambitious Global Warming Solutions Act goals**.
- The Project would **generate enough energy to meet the annual electricity demands of [redacted] Massachusetts residences**.
- The Project would **abate approximately [redacted] of emissions**, which is equivalent to a **contribution of about [redacted]% of the Commonwealth's required Global Warming Solutions Act emissions reductions.**

Approximately [redacted] **short tons of greenhouse gas emissions would be abated**

Equivalent to removing [redacted] **cars from the road**



Rødsand 1+2 Offshore Wind Farm

13. EMISSIONS

In this section, the Bidder highlights our unprecedented clean energy leadership as well as the emissions impact of the Project.

Ørsted has made a commitment to going 100 percent renewable, and already today 85 percent of our capital is deployed towards green energy solutions in wind, biofuels, storage and customer solutions. Ørsted recently changed its name from DONG Energy (Danish Oil and Natural Gas) because this legacy name no longer reflects the Company since it has reduced our carbon footprint by more than 50 percent in the span of a decade.

Similarly, Eversource is focused on being a catalyst for clean energy development in New England. It allocates 7 percent of its annual revenues—or more than $500 million annually—to energy efficiency programs for its nearly 4 million customers. Its energy efficiency programs have been consistently ranked #1 in the country. It is well under way in building 70 megawatts of solar energy in Massachusetts and divesting its remaining fossil fueled generation. Eversource has spent approximately $6 billion over the past 12 years to strengthen New England's high voltage electric grid to improve reliability and resiliency and to better allow new efficient and less emitting power to reach the region's customers.

The Bay State Wind Project is consistent with the Owners' commitment to transitioning to a clean energy future and will make a significant contribution towards the Commonwealth's ambitious greenhouse gas reduction goals.

13.1 Emissions Estimates

13.1 Provide emissions estimates based on available data from the unit manufacturer. Alternatively, provide actual emissions data determined in accordance with the paragraph above for a similar facility built within the past 3 years. Include copies of supporting documentation for all emissions estimates.

The operation of WTGs does not generate greenhouse gas emissions; therefore, emissions data is not applicable (Table 13.1).

Table 13.1 Project Anticipated Emissions, expressed in pounds/megawatt-hour (lbs/MWh)

Source of Information	Date of Test (if applicable)	Greenhouse Gases (all except methane) Expressed as Carbon Dioxide equivalent (CO_2e)	Nitrogen Oxide (NO_x)	Sulfur Oxide (So_x)	Carbon Monoxide (CO)	Particulate Matter (PM 2.5)	Methane (CH_4)
N/A	N/A	0	0	0	0	0	0

Note:
Assumed to relate solely to the operation of WTGs. Additional information available upon request if necessary.

13.2 Improvements to the Emissions Profile

13.2 Describe any past investments that will, or have been made to your facility to improve its emissions profile or any planned future investments made to your facility in order to improve its emissions profile.

Not applicable.

13.3 Contribution to Massachusetts 2008 Global Warming Solutions Act and the 2010 Clean Energy and Climate Plan for 2020

13.3 Describe how your project will contribute to the Massachusetts 2008 Global Warming Solutions Act (GWSA) and the 2010 Clean Energy and Climate Plan for 2020, updated in 2015. Describe how your project will contribute to the Commonwealth's 2030, 2040 and 2050 GHG emission targets and any benefits associated with an earlier operational date.

The Massachusetts 2008 GWSA requires that reductions from all sectors of the Massachusetts economy should achieve a 25 percent reduction in greenhouse gas emissions by 2020 and an 80 percent reduction by 2050 as compared to 1990 levels.

Benefits of Displacing Fossil Generation in New England

[redacted] million short tons per year is the equivalent of removing [redacted] cars from the roads[21]

The Project would represent the addition of a significant new large-scale, clean energy resource to meet regional power demands, and enough generation to meet the needs of [redacted] Massachusetts residences[22]. As detailed in the 2015 *Update of the Clean Energy and Climate Plan for 2020*[23], additional clean electricity is one of the two most significant drivers for continued reduction of greenhouse gas emissions and achievement of Massachusetts' GWSA goals.

An 800-MW injection of clean energy at Brayton Point will displace significant fossil generation in the ISO-NE system. Using monthly marginal emissions rates provided by ISO-NE,[24] LAI estimated that the Project would abate [redacted] million short tons of greenhouse gas emissions over the course of the 20-year study period. This is equivalent to [redacted] percent of the Commonwealth's required GWSA emission reductions for 2020 to 2030, 2030 to 2040, and 2040 to 2050.[25]

The estimate of carbon reductions is calculated using the marginal emissions rates found in the 2015 *ISO New England Generator Air Emissions Report*[26]. ISO-NE calculates a weighted marginal emissions rate which includes all Locational Marginal Units over the course of the year. LAI multiplied the monthly marginal emissions rates by output in order to estimate avoided emissions.

[21] Based on EPA figures for typical passenger vehicle emissions of carbon dioxide per year.
[22] Based on Project production forecast and 2016 EIA data for Massachusetts' residential energy use.
[23] http://www.mass.gov/eea/docs/eea/energy/cecp-for-2020.pdf
[24] https://www.iso-ne.com/static-assets/documents/2017/01/2015_emissions_report.pdf, Table 9 in the Appendix.
[25] To arrive at reduction targets for 2030 and 2040, the Bidder has made a linear reduction from the 2020 (25 percent) target and 2050 (80 percent) target. This yield a reduction target for 2030 of 43 percent and 62 percent for 2040.
[26] https://www.iso-ne.com/static-assets/documents/2017/01/2015_emissions_report.pdf

Given the cumulative effects of carbon emissions, the Bidder understands and supports the Commonwealth's desire to achieve the earliest possible reductions as a down-payment towards the Commonwealth's commendable long-term targets under the GWSA. As noted in Section 9, the Bidder believes it has put forth the most realistic and defensible operational date for the Project given critical path items, including but not limited to securing approval of the COP from BOEM. This factor, taken together with the Bidder's collective experience and financial and technical capability, should inspire confidence that these promised carbon reductions will be realized at the earliest opportunity.

Section 14

Contribution to Employment and Economic Development and Other Direct and Indirect Benefits

The Project will result in over **$970 million** in total net economic benefits to the Commonwealth.

- The Project will **generate more than 1,250 jobs during construction**.
- The Bidder will **drive significant economic growth** across Massachusetts through its extensive supply chain network.
- The Bidder has entered into a major agreement with four of Massachusetts' leading Community Action Agencies to **lessen the overall energy burden to low income customers**. The Bidder will contribute a total of $8.7 million to support two of the Commonwealth's cornerstone programs – the Low Income Heating Assistance Program and the Weatherization Assistance Program.
- Through a partnership with the Massachusetts Maritime Academy, the Bidder will offer Global Wind Organization **training and development to the next generation of offshore wind technicians**.
- The Project opened an **office in New Bedford, Massachusetts**, and Ørsted established its North American headquarters in Boston, Massachusetts.
- Eversource is a Boston based Fortune 500 Company strongly supportive of the clean energy and community goals of the Commonwealth.

JOB CREATION

10,853 Indirect jobs

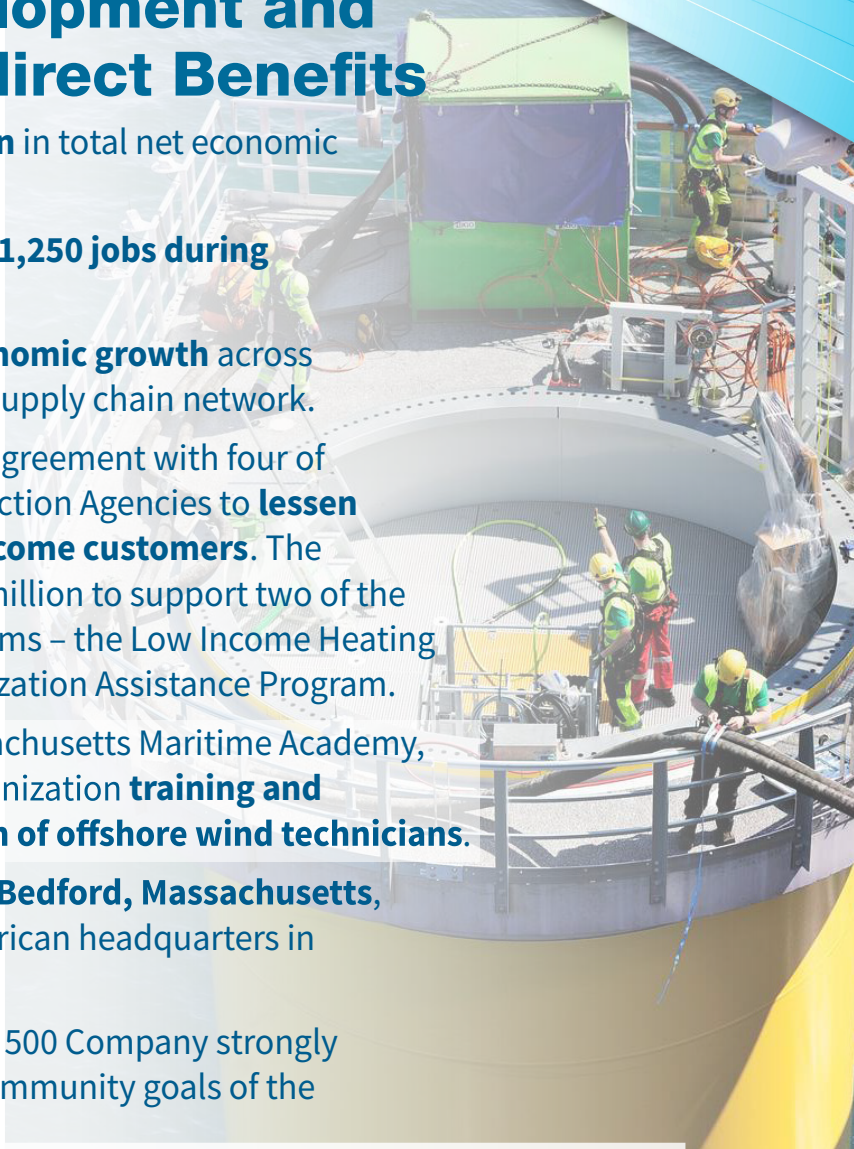
Development and Construction Phase (Annual): **1,250**

Operational Phase: [redacted]

FINANCIAL INVESTMENT / CONTRIBUTION

$500M+ Total investment

$1.54B Contribution to gross state product



Gode Wind Project

14. Contribution to Employment and Economic Development and Other Direct and Indirect Benefits

In this section, the Bidder discusses the anticipated economic development and other direct and indirect benefits for the Commonwealth of Massachusetts broadly and for the communities within close proximity to the Project specifically. Given Ørsted's significant history of wind development in Europe, the Bidder anticipates positive impacts that would mirror what has been achieved in countries like the UK, Netherlands, and Germany. The Bidder's aim is to replicate in New Bedford and the South Coast region more generally the economic revitalization that has been seen in several regions of the UK following the development of large-scale windfarms.

For the Bidder, the task at hand is not simply to build a project – it is no less an ambition than building a U.S.-based offshore wind industry, with the first significant supply chain investments made in Massachusetts. Bay State Wind aims to deliver on the promise of high skilled, high paying jobs that is part and parcel of building this new U.S.-based industry with a multitude of local suppliers. And the Bidder is uniquely positioned to do just that. Our strong vendor relationships, built in some cases on a book of business going back 20 or more years, gives us the credibility to get our suppliers to buy into our vision of a vibrant and sustainable U.S. market - and to make concrete investment decisions on that basis. As shown in Figure 2.3, while much of this activity is naturally concentrated along Massachusetts' coastal communities, the opportunity to tap into the Commonwealth's solid base of advanced manufacturing and high-tech service industries enables us to also involve inland communities statewide in this green industry.

The following sections highlight the tangible and quantifiable benefits realized through implementation of the major elements of our economic development strategy. This strategy encompasses the following major elements:

- Construction jobs. Bay State Wind will maximize the use of local labor and integration into the overall construction phase. Recognizing that some offshore tasks are highly specialized, there are nevertheless many work elements that can be supported by the local labor pool. (Section 14.1)
- Operation and maintenance jobs. These roles are more permanent and necessary to support the safe and efficient operation of the asset over its useful life. (Section 14.1)
- Indirect benefit creation. Bay State Wind's significant expenditure within the local Massachusetts economy to build and operate this significant new infrastructure project will have major "ripple effects" in terms of additional jobs, local tax revenue, and gross state product. (Section 14.2)
- Ports/harbors strategy. Bay State Wind intends to use the New Bedford Marine Commerce Terminal as its construction base, to use another facility in [redacted] as its construction-management and eventual O&M base, and to use [redacted] for foundation manufacturing activity. (Section 10)
- Made in Massachusetts. The Bidder has actively pursued opportunities to recruit Massachusetts-based advanced manufacturing and service providers in service of the U.S.'s first large-scale offshore wind farm. Moreover, the Bay State Wind team

has leveraged our unrivaled buying power to secure commitments from global industry leaders to establish significant new manufacturing facilities in Massachusetts. Our success in identifying suitable vendors – and commitment to build on this foundation going forward - is documented in this Bid. (Section 8)

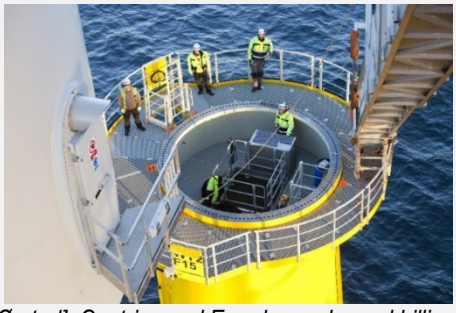
- **Vessels strategy**. The Bidder has obtained letters of support from several vessel owners for construction of Jones Act-compliant heavy lift installation and transportation vessels. Furthermore, the Bidder has made finding a solution to the Jones Act a top priority, as it will unlock significant cost savings and the greater utilization of local harbor facilities. (Section 9)
- **Re-use of onshore properties.** The Bidder has secured site control for the construction and operation of Project components, contributing to the local tax base. (Section 6)
- **Workforce development.** The Bidder is making a substantial commitment to Massachusetts' institutions of higher learning to support training programs for offshore activities. (Section 14.3)

As demonstrated by Ørsted's 25+ years of development experience in Europe, the Bidder will implement a strategy to ensure that Massachusetts realizes the full range of economic benefits, similar to that which has been achieved in countries like the UK, Netherlands, and Germany (see UK Humber Region Case Study).

Ørsted's Offshore Wind Development Brings Economic Revitalization

In recent decades the UK's Humber region has faced significant challenges due to the loss of manufacturing and the decline of its once burgeoning fisheries industry. This economic decline has led to persistently high unemployment rates, low skill levels and limited population growth. However, in the past years the offshore wind industry has become a strong growth engine for the Humber region's economy, with the region's local business council, the Humber LEP, describing it as the number one economic opportunity for the area. Ørsted has played a key role in this economic rejuvenation providing an average of 1,600 direct jobs per year in the Humber region between 2015-2020 (with up to 2,700 jobs in some years), hundreds of long-term O&M jobs, and has catalyzed the development and growth of a local supply chain, helping to reestablish manufacturing companies in the region.

"The region […] looks at growing the local economy by £216m annually and creating over 5,000 jobs, whilst also building upon the great maritime tradition of the area. Despite many false dawns [Grimsby's] new vision is built on its increasing attractiveness to companies looking to research, develop and deliver clean sources of energy such as DONG Energy [Ørsted]."



Full story here at Lincolnshire Today

When offshore wind developers are committed to the communities where they operate, like Ørsted is, they can have a strong revitalizing impact on a region's economy.

"Generating electricity for thousands of people, companies like Dong Energy [Ørsted], Centrica and E-on have plunged billions of pounds into building the North Sea wind farms […] to reshape Grimsby's industrial landscape. The huge shift for Grimsby to now being a base for huge international firms […] was not necessarily a smooth one, with the town's decline following the collapse of the fishing industry well documented."

Full story here at the Grimsby Telegraph

[redacted]

14.1 Direct Job Creation

14.1 Please provide an estimate of the number of jobs to be created directly during project development and construction, and during operations, and a general description of the types of jobs created, estimated annual compensation, the employer(s) for such jobs, and the location. Please treat the development, construction, and operation and maintenance periods separately in your response.

In the Preferred Option[27], a number of activities will be placed in Massachusetts in order to deliver the highest number of Massachusetts jobs possible, without compromising on the electricity price offered to the ratepayers. The total number of full time employees, expressed in full time job-years is approximately 1,250 direct jobs during development and construction. These figures should be considered as extremely conservative, in that they represent the local content potential identified as of the date of bid submission. The Bidder will continue to explore additional opportunities for local supply chain development as it moves forward with the Project.

[redacted]

14.1.1 Development

Development of the Project will create approximately 240 full time job-years, such as engineers, environmental, financial, and other professional roles, each with annual Total Employer Compensation of $123,000 according to Mercer (2016)[28] (Category PC 52, Professionals).

14.1.2 Construction

During project construction, an estimated 1,025 full time job-years will be created, filling roles such as steel workers, welders, electrical workers and wind technicians[29]. Below are

[27] As defined in Section 8, the Preferred Option represents our current view of the most advantageous solution for this project, based upon the Bidder's deep understanding of the state of the supply market and technical experience.
[28] Source: Mercer report, Total Employment Costs Around the World, 2016.
[29] Massachusetts Bureau of Labor Statistics, as cited in Attachment 14-1.

listed locations and estimated Total Employer Compensations, taken as an average across various job categories and levels of experience:

- [redacted] OnSS, onshore export cable, battery storage. $80,000/year
- [redacted] TP outfitting, $90,000/year
- [redacted] WTG pre-assembly, WTG installation, foundation installation, $70,000/year

An additional 75 professional jobs such as engineers, business specialists and EHS specialists will be employed in the construction management functions, each with annual Total Employment Cost of $123,000 according to Mercer (2016)[22] (Category PC 52, Professionals). These activities will take place in [redacted] and other locations across the Commonwealth.

[redacted]

14.1.3 Operations

Project O&M will create around [redacted] long-term jobs, taking into account internal employees and subcontractors.

These jobs will be located in Massachusetts.

14.2 Indirect Job Creation

14.2 Please provide the same information as provided in response to question 14.1 above but with respect to jobs that would be indirectly created as a result of the proposed project.

Bay State Wind contracted with Boston-based energy economic consultant Levitan and Associates, Inc. (or LAI) to perform a comprehensive analysis of economic benefits to the Commonwealth (Attachment 14-1). Based on the analysis in the LAI report in Attachment 14-1, "indirect" jobs creation is broadly interpreted to include both supply-chain jobs and other new jobs created from multiple rounds of business, household, and government spending as a result of the Project's investment in the Commonwealth. The LAI report provides the breakout of both drivers of indirect job creation, inter-industry spending effects and additional household spending.

The Project is expected to create a total of 10,853 full-time-equivalent (FTE) job-years in Massachusetts of indirect employment[30] over the study period beginning in 2018 with

[30] The following figures include both *indirect* and *induced* job effects. *Indirect effects* reflect the changes in inter-industry purchases in response to the new demands of the directly affected industry (industries). *Induced effects* reflect the

further development activities and extending through construction and the initial 25-year operating period. Indirect job creation results associated with the development, construction, and operations phases are shown below in Table 14.1. The complete details of the analysis and results are provided in the LAI report.

Table 14.1 Jobs Created by Indirect Employment Effects

(FTE-years)	Development	Construction	Operations	Total
Indirect II Effect	52	3,395	7,406	10,853
Indirect Effect	28	1,699	4,545	6,273
Induced Effect	24	1,696	2,861	4,581

Unlike with direct job creation, it is not possible to identify the names of employers and locations for the much more diffuse supply-chain and multiplier effects of indirect job creation, as discussed in the LAI report. The LAI analysis expects that much of the locational impacts will occur in and around New Bedford, which will be the hub of activities during both the construction and operations phases. A second center of indirect job creation will be in the Boston metro area, the hub of development activities and where TP outfitting, and manufacture of TP, OSS, and battery storage components will be done. This job creation will then promote economic development across an array of other industries in the Commonwealth.

The average annual compensation of workers that benefit from indirect job creation is shown in Table 14.2 below in comparison to Massachusetts average compensation. This information is also from the LAI report, which provides details of the data sources.

Table 14.2. Average Labor Income of Indirect Employment Effects

(2017 $000 / FTE-year)	Development	Construction	Operations	Total
Indirect II Effect	48.5	80.1	66.8	70.9
Indirect Effect	40.2	102.0	72.1	80.1
Induced Effect	58.3	58.2	58.3	58.3

14.3 Economic Development Impacts

14.3 Please describe any other economic development impacts (either positive or negative) that could result from the proposed project, such as creating property tax revenues, creating lease revenues to public and private parties, or purchasing capital equipment, materials or services for local businesses. Please provide the location(s) where these economic development benefits are expected to occur.

The Project will inject significant new direct investment into the Massachusetts economy. By our estimate, the total local (MA) capital (CAPEX) and 25-year operational (OPEX) Project expenditures will exceed [redacted] There are numerous local economic touchpoints where the Project will create significant positive impacts, amplified throughout the entire Massachusetts economy. In addition to the direct and indirect jobs identified in Sections

changes in household purchases of goods and services out of the additional income of employees and proprietors that is created by the changes in direct and indirect expenditures. *Indirect II* is simply the sum of the indirect and induced effects.

14.1 and 14.2, the Project will provide multiple other benefit streams. These include, but are not limited to:

- Use of [redacted] as the staging area for construction, and the O&M base over the life of the asset. This will require the Bidder to make lease payments and fees totaling over $20 million, excluding expected annual property tax payments to the City of [redacted] The Preferred Option includes WTG pre-assembly and long-term O&M based in [redacted], though the exact use of this site is to be determined.
- Entering into an exclusive arrangement with [redacted], one of Europe's top steel manufacturers and suppliers of [redacted] to set up operations in Massachusetts (Attachment 8-2). As of this Bid, the Bidder, and its supplier [redacted], are actively pursuing the leasing of a [redacted] site for the [redacted], resulting in 240 construction job-years. In addition, WTG tower manufacturer [redacted] which is expected to add 150-200 jobs when the plant is operating at full capacity. This comes in addition to the direct and indirect jobs assessed in this section, since the commitment was made after calculations were completed.
- Working [redacted] to support the construction of two Jones Act-compliant installation and transportation vessels in the U.S. This will have profound consequences for Massachusetts' ambitions to establish its preeminent position in the offshore wind supply chain and for the U.S. market more generally. As evidenced by this Bid, the deployment of a U.S.-built, flagged and operated vessel will enable the greater use of Massachusetts' ports and harbors. It will also facilitate cost savings in project development by avoiding the "workarounds" heretofore required to meet the strictures of the Jones Act.
- Cable landing and OnSS development at [redacted], Massachusetts. This site will serve multiple purposes - it will enable the Bidder to make landfall of the export cable, facilitate development of the OnSS, and support deployment of the battery storage solution. In addition, it will repurpose the existing transmission infrastructure. Use of the site will create local construction jobs while contributing to the local property tax base as an offset resulting from the [redacted]
- Shortlisting several advanced manufacturing firms with significant operations within Massachusetts, including:
  - [redacted] for the manufacture of components to be used in the OSS and the TPs;
  - [redacted] for the construction and deployment of the Project's battery storage system; and
  - [redacted] manufacture of [redacted] Other Massachusetts suppliers also under consideration for this scope.
- Entering into a MOU with the Massachusetts Maritime Academy to provide long-term financial support for this state university focused on careers in the worldwide maritime economy. Initial funding will support the offering academic scholarships from students from under-represented Gateway Cities across the state. Subject to bid award, future funding will support such initiatives as the development and offering of

GWO certified training, which is mandatory for all workers going offshore or working at heights. In this way, the Bidder hopes to empower the next generation of students to be a part of the emerging offshore wind industry.

- Memorandum of Understanding with Bristol Community College (BCC) to begin in December 2017. The purpose of this MOU is for the Bidder and BCC to work collaboratively together in the development of a wind energy educational component at the college. The MOU includes:
  - Participating in the BCC "Women in STEM" series
  - Serving on the BCC STEM advisory board
  - Participating in BCC's K-12 initiative to train middle school and high school science teachers on developing an offshore wind energy curriculum
  - Hosting BCC student interns
  - Serving as a guest lecturer in BCC's offshore wind courses

> ***"I am enthusiastic about the opportunities presented by the Bay State Wind project to spur new economic activity in and around New Bedford."***
>
> **Bruce Morell, Executive Director, People Acting in Community Endeavors, Inc.**

- Exploring a collaboration with BCC and other industry stakeholders to develop an offshore wind training center in New Bedford, Massachusetts. In addition, the MOU contains a pledge of $1 million contingent upon a PPA to use for various initiatives such as; scholarships, classroom needs, training programs, infrastructure projects as they relate to a new campus location.
- [redacted]

The local economic impacts analysis conducted by LAI, described in Section 14.2 for indirect employment effects, also provides estimates of additional state and local income tax revenue and gross state product impacts, the later measured as economic value-added within Massachusetts. Total additional state and local income tax revenue contribution effects of the economic growth stimulated by the Project are shown by phase and total in Table 14.3. That table also projects the Massachusetts state government 27 percent share of BOEM site lease payments, based on expected COD, energy output and MA Hub energy prices. Total additional gross state product impacts of the Project by phase and total are shown in Table 14.4.

Table 14.3. State and Local Tax Revenue Direct, Indirect, and Total Effects

(2017 $ million)	Development	Construction	Operations	Total
State and Local Tax Receipts	0.4	37.6	60.4	98.5
BOEM Lease Revenue	0.3	0.4	22.9	23.6
Total Revenue	0.7	38.0	83.3	122.1

Table 14.4. Gross State Product Direct, Indirect, and Total Effects

(2017 $ million)	Development	Construction	Operations	Total
Direct Effect	3.3	166.1	344.6	514.0
Indirect II Effect	4.7	429.3	598.3	1,032.2
Indirect Effect	2.5	271.0	331.2	604.7
Induced Effect	2.2	158.2	267.1	427.5
Total Effects	8.0	595.3	942.9	1,546.2

14.4 Tracking or Reporting Mechanisms Contributing to Employment and Economic Development

14.4 Please describe any tracking or reporting mechanisms, such as an annual report(s) of milestones achieved and jobs created, to verify the contributions to employment and economic development identified in 14.1, 14.2 and 14.3.

In order to measure success in relation to the economic development estimates made in Sections 14.1, 14.2, and 14.3 above, the Bidder proposes to implement a set of tracking and reporting mechanisms that are administratively simple, transparent, and objective.

The Bidder will commit to tracking its Massachusetts direct employment and its Massachusetts-sourced subcontractor and materials/services expenses as the basis for updates of other direct, indirect, and induced employment creation benefits through the second year of operation at full capacity. Because subcontractors and suppliers of goods and services typically will not or cannot readily provide information on the employment effects of their sales, the Bidder will apply the direct, indirect, and induced employment parameters used in the IMPLAN model developed by LAI to actual local expenditures to derive estimated non-Project local employment impacts. The cutoff of ending tracking after the second year of operation at full capacity is because a steady-state will be achieved by that milestone. The second, rather than the first year, is selected in case there are unusual expenses during the first year or modification of the O&M plan based on initial experience.

Due to the different degrees of certainty for different job creation drivers, the Bidder will provide a breakdown of the calculated FTE job impacts by category. In order from most to least certain, they are:

- Direct Project employees;
- Project allocation of a portion of Massachusetts back-office and Boston-based management employees;
- Estimates of other direct on-site employment during development, construction, and operations;
- Estimates of indirect (supply chain) Massachusetts job creation; and
- Estimates of induced (income re-spending) Massachusetts job creation.

The Bidder will also maintain a list of local supplier establishments and the types of goods or services they provide to the Project.

The Bidder will commit to providing annual reports to DOER and/or MassCEC with narratives on milestones achieved, jobs created, supply-chain procurement from Massachusetts

business establishments, and other economic development efforts and expenditures. Other economic development efforts and expenditures will be reported in two categories, commitments, and possible future efforts.

Other economic development commitments that will be reported on annually include:

- Property tax payments to [redacted] for the OnSS and battery energy storage facility;
- Lease payments to MassCEC for the New Bedford Marine Commerce Terminal, [redacted] and any local property taxes to the City of New Bedford;
- Lease payments and property tax payments to the [redacted] for [redacted] activity at [redacted];
- Contributions to local non-profit organizations via a Bay State Wind Community Benefit Fund, once established and total ad hoc contributions and recipients until the fund is established;
- Total annual contributions to Massachusetts Maritime Academy and how funds are utilized (e.g., scholarships, GWO technician training);
- Total annual contributions to the New Bedford Wind Energy Center; and
- Total annual payments under the Low Income Ratepayer Fund established by the Bidder and their allocation between LIHEAP and WAP.

As the Bidder gains traction in the Massachusetts economy and develops additional offshore wind farms in Massachusetts, Rhode Island, or elsewhere along the Atlantic seaboard, other economic development activities, some of which may be in partnership with the MassCEC or other organizations, will undoubtedly arise. The annual reports will also describe those sole and joint efforts and participation by the Bidder.

Beyond reporting directly to the DOER, subject to appropriate protection of proprietary and confidential information, the Bidder will commit to cooperate with the MassCEC by providing short and/or long census form information for its annual MassCEC Industry Report, or for any special offshore wind reports it sponsors.

Finally, the Bidder will post progress towards major milestones on the Bay State Wind website as news becomes available, in the form of press releases and articles.

14.5 Benefits or Impacts Associated with the Proposed Project

14.5 To the extent not already specified elsewhere in your response, please address the factors listed in Section 2.2.2.7 and describe any benefits or impacts associated with the proposed project.

Given the context of this question, the Bidder assumes the reference to 2.2.2.7, above, was intended to read 2.2.2.8 and the Evaluation Team is seeking to elicit any additional information regarding potential local job and economic development benefits of the project not previously covered in this section.

In addition to what is included in Sections 14.1, 14.2, and 14.3, the Bidder has documented in this section and elsewhere in this bid the breadth and depth of our local supply chain development plan. The map depicted in Section 2.4.8 presents a snapshot of the many

areas of the Commonwealth directly touched by the Project – either as active port staging areas during the construction or O&M phases of the Project; sites where the Bidder will contribute to the local tax base given our project footprint; or those local communities and businesses from which Bay State Wind will source the equipment and skills that will be needed to build and service this utility-scale power plant over its useful life.

An additional point to underscore here is that the Bidder has deliberately taken a conservative approach in ascribing jobs and local economic development activity to the project. That is, the Bidder has only "counted" those local content commitments where there is a high degree of confidence based on the current status of vendor negotiations. However, this is not a static process and throughout the development phase Bay State Wind will make a concerted ongoing effort to procure from those local vendors identified in Attachment 8-1 who are capable of meeting our rigorous standards for quality and cost-effectiveness. As noted in Section 8.2.1, our "multi-contract" approach facilitates local suppliers getting involved in scopes of gradually greater complexity and dollar value as their capacity for doing this work increases.

The same should be said of local labor. Post-award, our intention is to continue to engage with the many trade organizations with whom Bay State Wind has established relationships to identify areas where the members of these organizations can play a constructive role in the emerging offshore wind industry and, where appropriate, pursue PLAs to formalize these understandings. The Bidder will consult with the trades to identify skill gaps and consider approaches for closing those gaps, for example by expanding our support for training offered by the Massachusetts Maritime Academy and the New Bedford Wind Energy Center. Lastly, the Bidder will give preference to local suppliers who are in good standing with the local trades in our sourcing and will encourage our major equipment vendors who require specialized workers to support local training efforts.

Please see Appendix B of the LAI report (Attachment 14-1) for a description of expenditures by phases (development, construction, operation) and by industry.

14.6 Benefits to Low-Income Ratepayers in the Commonwealth and Impacts on the Cost to the Project

14.6 Please demonstrate any benefits to low-income ratepayers in the Commonwealth, and the impact, if any, those benefits will have on the cost to the project.

Beginning in January 2017, the Bidder met with representatives of the NCLC, one the nation's preeminent low-income consumer advocacy organizations, and representatives of the Massachusetts LEAN, an association of nonprofit agencies that coordinate the delivery of government and utility-funded energy efficiency services to low-income customers throughout Massachusetts. The purpose of this dialogue was to explore ways in which the Bidder, as a wholesale generator without a direct relationship with retail customers, could achieve the Energy Diversity Act's goal of providing benefits to Massachusetts' low income ratepayers in the most cost-effective and impactful way possible. These discussions culminated in a MOU with ABCD and Action, two of the leading Community Action Agencies (Attachment 14-2). Separate agreements were reached with New Bedford-based People Acting in Community Endeavors, Inc. and Plymouth-based South Shore Community Action Council (SSCAC) (Attachment 14-2). Under these agreements, the Bidder has pledged up to

$17.55M[31] in financial support for two of the Commonwealth's bedrock programs in addressing energy affordability - the WAP and the LIHEAP. Upon award of a PPA to the Bidder, these outlays will be made annually over the period of project development and construction and ensuing a 20-year PPA term.

In summary, the key elements of the framework agreement comprise the following:

Program support. The Bidder support will work synergistically to help meet the energy affordability need in the Commonwealth. Support for WAP will promote energy affordability over the *long-term* through measures that provide long-term energy savings; while LIHEAP will provide *short-term* assistance to those attempting to manage arrearages in their energy bills.

> ***"Over the course of the twenty year agreement, the amount pledged by BSW would help serve the home energy needs of tens of thousands of households."***
>
> **John Wells, ABCD and Elliott Jacobson, Action Inc.**

- *WAP.* This federally- and utility-funded program supports the delivery of a range of improvements to the energy performance of dwellings of low-income families. Local, certified and insured weatherization contractors are hired to complete the work. Scope of services can include: air sealing, attic and/or sidewall insulation, weather stripping and minor repairs. Pursuing these investments enables low-income families to permanently reduce their energy bills by making their homes more energy efficient, comfortable, healthier and safer. Further, these investments have proven societal benefits, including reduction in GHG and boosting job growth in Massachusetts' emerging "green energy" sector. Despite its great success, WAP has only reached approximately 20 percent of low income households, and is perennially at risk of budget cuts. The Bidder's contribution is intended to help augment, diversify and stabilize the delivery of this important program.
- *LIHEAP.* Created in 1981, this is a federal program that assists eligible low-income households in partial payment of their winter heating bills. The program is overseen by the United States Department of Health and Human Services, and funded by grants appropriated from the federal government. LIHEAP has provided significant financial assistance to thousands of low-income households throughout the Commonwealth. According to Charles Harak of the National Consumer Law Center, LIHEAP serves about 160,000 households annually, much less than the total eligible population. In 2016, LIHEAP received $148 million from the federal government, but the expectation is significantly less for 2017, *i.e.*, $130 million. Therefore, as with WAP, the leveraging of the Bidder's funding would represent a small but integral component of the Massachusetts' LIHEAP program's current concern value – simply put, every dollar counts.

Funding. Payments will be made on an annual basis. Actual funding will be based on the MW capacity award by the EDCs. Two funding tiers are contemplated – one covering the period between PPA award and Commercial Operation; and the second tier consisting of the 20-year PPA period.

Fund Scope and Management. One of the key features of the framework agreement is that it leverages the highly successful low income program delivery infrastructure in the

[31] Payments are scaled on a $/MW basis, with an 800-MW project representing the high end of the range.

Commonwealth and ensures that low income customers within all communities statewide can participate. Funding will be made to each of the state's lead vendors, who in turn will distribute monies received to local Energy Assistance Agencies and vendors in accordance with a formula-rate set by the Massachusetts Department of Housing and Community Development.

Fund Impact. The low-income fund is expected to significantly extend the reach of programs intended to lessen the energy burden on low income households.

- Assuming 100 percent of funding was allocated to fuel assistance payments, it would fully serve the needs of approximately **1,000 households**;
- If the funds were instead used to increase payments to households already determined to be LIHEAP eligible, this funding would provide $100 in additional assistance to **5,000 households** in the first year of the program and **10,000 households in the 20th year;**
- Alternatively, the fund will cover whole building insulation and related energy efficiency measures for **2,000 to 4,000 households** statewide.

Ratepayer impact. The Bidder is holding ratepayers harmless for the cost of the program. The amount contributed to the low-income fund is a lump sum annual amount independent of the PPA price, facility production, or revenues received. Additionally, the Bidder has lowered its return expectations to account for the cost of the program.

Section 15

Additional Information Required for Transmission Projects

The Bidder explored [redacted] alternatives to develop the optimal Expandable Transmission Network solution to interconnect up to 1,600 MW of nameplate offshore wind energy generation capacity and determined that the best option for the Commonwealth is the [redacted] Solution.

- The **Expandable Transmission Network solution** will [redacted] to ensure facilities are constructed and paid for only when and where needed.
- Design features [redacted] offer prudent redundancy and reliability benefits.
- The expected operating life for the Phase I transmission system is [redacted]
- The Bidder will use **state-of-the-art** [redacted] **transmission technology** to minimize line losses to the maximum extent possible.
- Bay State Wind has secured [redacted] for its onshore substation site.
- Interconnection requests submitted to ISO-New England for full 1,600 MW of nameplate capacity.
- [redacted]

Gode Wind Project

15. Additional Information Required for Transmission Projects (and All System Upgrades Associated with Proposed Transmission Projects)

In this section, the Bidder presents additional information with respect to the proposed transmission components of the Project, as required in Section 2.2.1.3 of the RFP.

[redacted]

Bids that include Transmission Projects (and all System Upgrades) must also provide the following information:

15.1 Transmission Project Information (Generator Lead Line)

15.1 Transmission Project Information:

i. Overall project description

The Preferred Option can be divided into two major parts:

1. Generating Components, including:
   - WTGs;
   - MPs and TPs;
   - Inter-array cables (operating at 66-kV); and,
   - OSS, including all equipment up to the high side of the transformer(s) (including the transformer itself);
2. Transmission Components, including:
   - OSS equipment supporting the offshore termination of the export cable(s) and interconnection to the high side of the transformer(s) (with the exception of these terminations, the OSS is considered part of the Generation Component);
   - Export cable(s);
   - OnSS at which the export cables will be terminated at 275-kV and stepped up to 345-kV;
   - Interconnection facilities between the OnSS and the existing 345-kV Brayton Point Substation. These facilities are expected to include underground conduit/cable installation between substation facilities; and,
   - Expansion of the 345-kV Brayton Point Substation to support termination of the interconnection facilities.

The transmission system is the part of the Project transmits power from the OSS and interconnect to the electrical grid at the onshore Point of Interconnection for the benefit of

consumers. The following sections discuss the transmission components in further detail, in the order presented above.

OSS

The OSS's primary purpose is to raise the voltage level on the export cables to reduce the losses in the electrical system. The substation consists of a three-deck topside (box) housing electrical component (i.e., transformers, switchgear, and shunt reactors); installed on top of a jacket which is secured to the seabed.

The 800-MW OSS will be located within the Lease Area and will serve to convert and package energy for transfer from the WTGs to the OnSS.

The OSS will carry equipment for high-voltage transmission and distribution, along with other equipment such as a backup diesel generator, batteries, and panels for WTG control.

The cable and cellar decks will be open and the remaining rooms will in general be closed climate-controlled rooms with the exception of the transformer and shunt rooms, which will be naturally ventilated via openings in the walls.

Export Cables

The export cables connect the offshore with the OnSS. [redacted] cables will be used to transmit all the power generated by the WTGs and collected on the OSS to the electrical network on land. Each cable will be capable of transmitting [redacted] MW of power to the OnSS, at an operating voltage of [redacted]-kV. The Bidder has concluded that, at this operating voltage, and through the use of shunt reactors, losses over the export cables can be minimized and deliverability, therefore, optimized.

The [redacted] export cables, each approximately [redacted] long with an approximate diameter of [redacted] mm, will be buried in the seabed, and will make landfall close to the OnSS. Installation methods will be carefully assessed to ensure minimal seabed disturbance, but it is likely at this time that jetting/plowing techniques will be used. Cable burial depths will be determined based on the installation methods assessed, and based on siting/permit approvals received, but an initial depth target of [redacted]) below the seabed is expected to ensure adequate protection, public safety, and continuation of other recreational or commercial uses in the vicinity of the cables. Where target depths cannot be achieved due to seabed conditions or other impediments, other forms of cable protection will be considered (i.e., armoring).

OnSS

The OnSS's primary purpose is to adapt the voltage level from the level used on the export cables to the 345kV grid level and making sure other grid requirements are fulfilled. The OnSS will be located next to the National Grid interconnection point at the Brayton Point Substation that will be available to receive Bay State Wind generation after retirement of the coal-fired power plant, no system upgrades are required on the transmission system other than expanding the Brayton Point 345-kV substation. The area of the OnSS is approximately [redacted]

A new OnSS would be constructed at [redacted], and will be sized to receive 800 MW of offshore generation. Power delivered via the offshore export cables would be stepped up from [redacted] kV to 345-kV. Examples of equipment and structures to be located at the new OnSS include transformers, switchgear, shunt reactors (fixed and variable), static synchronous compensator(s) (STATCOM(s)), harmonic filters, protection and control systems, and a control house. The Bidder also proposes installation of 55 MW of battery storage, integral to the OnSS and capable of delivering 110 MWhr into the transmission system during peak demand (see Sections 3.3.8 and 3.4 for additional detail on the battery storage solution).

Interconnection to 345-kV Brayton Point Substation

[redacted] 345-kV circuits would be installed between the new OnSS and the existing Brayton Point substation located on the site of the former Brayton Point Generating Station. These circuits would be located underground within easements to be acquired from Dynegy (or subsequent owners as may be applicable) and National Grid. The underground interconnection facilities will be installed in an excavated trench, and will include multiple single-phase XLPE cables installed within cable conduit, fiber-optics and related conduits to support communication and controls systems, and will be backfilled using materials offering appropriate thermal properties.

Expansion to 345-kV Brayton Point Substation

The existing 345-kV Brayton Point Substation is of gas-insulated construction and is owned and operated by National Grid. Upgrades to the Brayton Point substation would be required in order to terminate the underground circuit(s) coming from the new OnSS. Upgrades would include substation expansion, and installation of gas-insulated equipment required to receive the new circuits. Once terminated, offshore wind generation would enter the ISO-NE system via existing 345 kV and 115 kV overhead circuits that exit Brayton Point to the north.

ii. The operating voltage of the proposed project

The operating voltage of the windfarm array cables will be [redacted] Array cables will be collected at the OSS where power will be stepped up to [redacted] kV. Export cables will then transmit power at [redacted] kV to the new proposed OnSS, where power will be further stepped up to 345 kV. From the OnSS, power will be interconnected to the existing 345-kV Brayton Point Substation where electricity will enter the transmission system at 345-kV.

iii. The type of structures (such as steel towers, poles or jackets) that would be used for the proposed project

OSS

The 800-MW OSS is designed to be installed using a four-legged jacket structure secured the seabed. Indicative dimensions for the OSS are provided in Table 15.1.

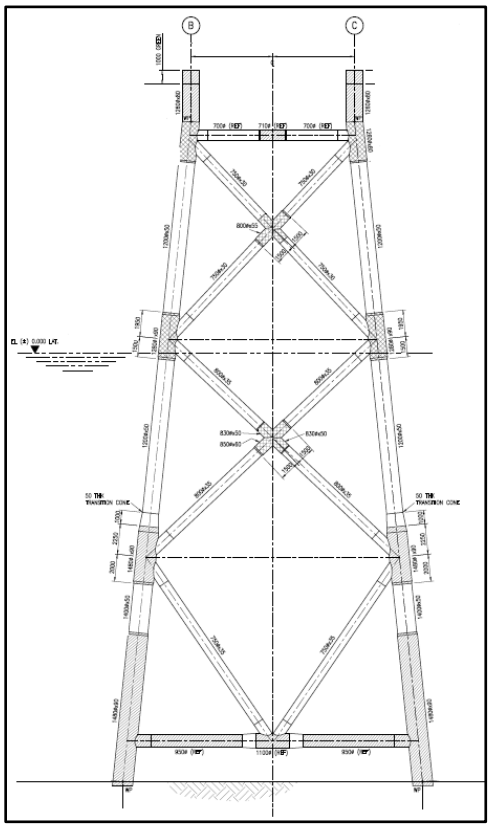
Structural Systems

Figure 15.1 provides an illustrative representation of the OSS foundation system under consideration by the Bidder.

Table 15.1 OSS Specifications

Specification	
Topside steel weight [t]	[redacted]
Topside weight Total [t]	[redacted]
Jacket weight [t]	[redacted]
Water depth [m]	[redacted]
LxBxH [m]	[redacted]
Distance to ONS (export cable length) [km]	[redacted]

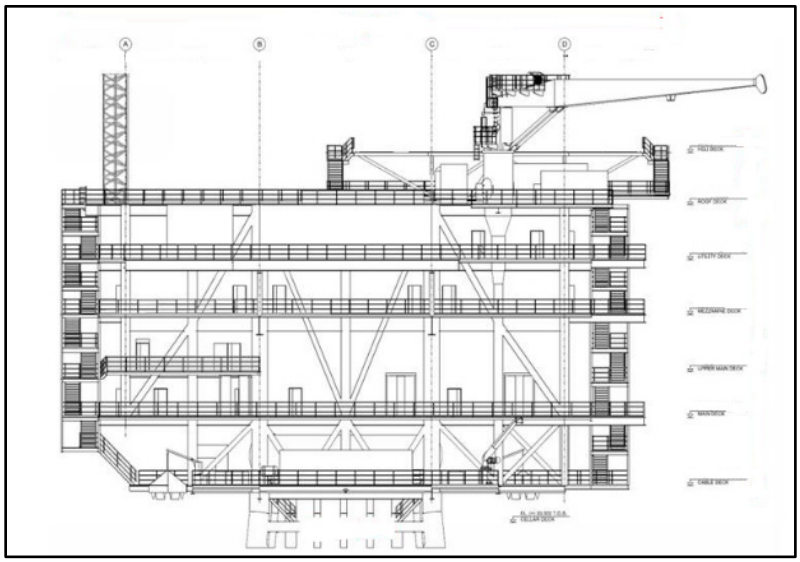
Figure 15.1 Typical OSS Foundation



The Bidder is considering the use of pin piles or suction buckets to fix the jacket to the seabed, but final design will be determined based on completion of geotechnical investigations to be completed in 2018.

Figure 15.2 provide illustrative representations of the topside (where all OSS equipment is housed) structural system under consideration by the Bidder. This structural system would be a steel brace column system with architectural walls (climate shield) that are not load carrying except for the local wind load. The main braces and columns are tubulars (circular members) whereas members in the decks are wide flange H profiles. This type of structural system has been used on all previous OSSs with the only deviation that the walls in some cases also have been load carrying. This method has also been used at the majority of oil and gas installation in the Gulf of Mexico and elsewhere.

Figure 15.2 Typical OSS Topside with Deck Configuration



The reasons for choosing the system are:

- Many fabricators from which to choose, ensuring selection of a proven structural solution (as well as competitive pricing);
- Allows for parallel fabrication as each deck can be fabricated separately; and,
- Robust system offering the flexibility needed to incorporate changes as design proceeds and/or if required by permit/siting agencies.

The two lower decks of the top side (cable and cellar deck) will be open decks and the remaining rooms will in general be closed, climate-controlled rooms with the exception of the transformer and shunt rooms, which will be natural ventilated via openings in the walls.

The OSS would be equipped with boat landing, heli deck and service crane.

An example of a typical Ørsted designed topside with a 4-leg jacket substructure, the Westermost Rough Windfarm located in the UK waters, is provided in Figure 15.3.

OnSS

The Bidder proposes to construct the OnSS using a gas-insulated substation design. An illustrative layout of the OnSS is provided in Figure 15.4. Equipment and steel foundations are expected to be of reinforced concreate, and will be of a design suitable for existing soil condition and coastal storm/flood events. Certain foundations may require pile support, depending on the outcome of ongoing geotechnical investigations. Actual layout may vary as well as environmental assessments are completed and based on siting/permit agency reviews.

Figure 15.3 Typical Ørsted-designed Topside with a 4-leg Jacket (Westermost Rough Windfarm, United Kingdom)

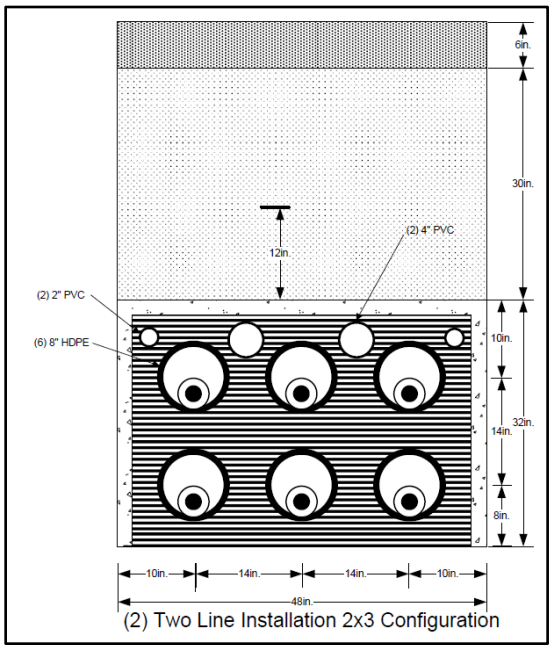
[redacted]

[redacted]

Underground Interconnections to the Brayton Point Substation

Underground 345-kV transmission facilities will be construction from the new OnSS to the Brayton Point Substation approximately [redacted] to the south on the Brayton Point property. Underground circuits will consist of single-phase XLPE cables within conduits that will be installed in an excavated trench. Conduits will also be installed for including of fiber optic/communications cables that will support protection and control system. Once installed, the trench will be backfilled using natural material or thermal backfill if required. Figure 15.5 provides a typical trench/conduit configuration that could be used to construct the interconnection facilities.

Figure 15.5 Typical Trench/Conduit Configuration



Expansion of Brayton Point Substation

The existing Brayton Point 345-kV substation facility will need to be modified and expanded to accept the new underground circuit(s) from the OnSS to the north. National Grid representatives are engaged with the Bidder and ISO-NE as the current Interconnection Request process proceeds [redacted]. The existing substation is of gas-insulated substation construction, and the Bidder expects the substation will need to be expanded to construct an additional bay in which the interconnections can be completed. Equipment expected to be installed to support this expansion include 345-kV breakers, capacitor voltage transformers, arrestors, disconnect switched, cable terminations and other ancillary facilities. As for the OnSS, foundation requirements for the necessary equipment will be designed in consideration of existing soil conditions, but are presently expected to be of reinforced concrete.

iv. The length of the proposed transmission line and the type(s) of terrain and land ownership of the proposed ROW

The [redacted] export cables, each approximately [redacted] long, with an approximate diameter of [redacted] buried in the sea bed, and will make landfall close to the OnSS.

The route proposed between the proposed OnSS and the Brayton Point Substation (the point of system interconnection) is roughly [redacted] in length. Onshore terrain between these locations is a combination of uplands, previously disturbed lands (associated with the former Brayton Point Generation Station), and some wetlands. Portions of this area are undeveloped (vegetated) or within existing easements held by National Grid for the use and maintenance of existing overhead transmission facilities. Any areas of wetlands that cannot be avoided during the installation of transmission facilities will be either fully restored following construction, or appropriate compensatory mitigation will be implemented.

Onshore land and easement acquisition needs are described in detail in Section 6.

v. The substation facilities (number of breakers, transformers, etc.) required at each terminal of the proposed project and information as to how the new facilities would interconnect to any existing facilities.

The primary components for the OSS and their usage are provided in Table 15.2.

Table 15.2 OSS Components

Description	Purpose	Number of units	Type of units
Medium Voltage (MV) Switchgear	Mainly to connect strings of WTGs to the MV busbar and further to the MV side on the MV/HV transformer	[redacted]	[redacted]
Grounding Auxiliary Transformer	Providing auxiliary LV power supply	[redacted]	[redacted]
Neutral Grounding Resistor	Making a solid grounded MV network	[redacted]	[redacted]
Transformer	Changing the voltage level from WTG level (MV) to the transmission system voltage level (HV)	[redacted]	[redacted]
High Voltage (HV) Shunt Reactor	Reactive compensation of the export cable to optimize the active power transfer of the export cable and the losses	[redacted]	[redacted]
HV Switchgear	Connecting export cable to the transformer and the HV SR to the export cable	[redacted]	[redacted]

The primary components for the OnSS and their usage are provided in Table 15.3.

As described in Table 15.3 the OnSS is equipped with harmonic filtering and reactive compensation equipment. The harmonic filters are present to mitigate any impact of harmonics on the onshore grid from the WTGs, or dampen any amplification of existing harmonics present in the 345-kV grid due to amplification by the export system cable circuits. Variable and fixed shunt reactors compensate for the export cable charging and harmonic filters. The variable shunt reactor in connection with the STATCOM will serve to control the Brayton Point 345-kV bus to a target voltage determined by ISO-NE.

Table 15.3 Onshore Components

Description	Purpose	Number of units	Type of units
High Voltage Shunt Reactor (fixed)	Reactive compensation of the Export cable to optimize the active power transfer of the export cable	[redacted]	[redacted]
High Voltage Variable Shunt Reactor	Adaptive reactive compensation due to load changes, to maintain neutral reactive power flow to onshore grid and to compensate HV Harmonic Filter	[redacted]	[redacted]
High Voltage Harmonic Filter	Filtering the harmonics in the system	[redacted]	[redacted]
Dynamic Reactive Compensation	Maintaining the grid voltage at the set point level	[redacted]	[redacted]
High Voltage Switch Gear	Connecting various equipment to the HV busbar	[redacted]	[redacted]
Grid Transformer	Changing the voltage level from transmission system voltage level (HV) to 345-kV	[redacted]	[redacted]
Grid Switchgear	Connecting the 345-kV cables to Brayton Point	[redacted]	[redacted]
Battery Energy Storage	Load-shifting the generation to peak hours Connecting within the OnSS	[redacted]	[redacted]

The **Underground Interconnections to the Brayton Point Substation** and **Expansion of Brayton Point Substation** sections in Section 15.1 describes how the new facilities would interconnect to any existing facilities.

vi. The estimated costs of the proposed project broken out into separate categories as described below for transmission facilities and substation facilities in nominal year dollars.

a. For cost of service or modified cost of service proposals:

1. Provide the capital cost estimate presented as a buildup of costs by category, such as environmental, engineering, civil works, materials, equipment, construction, construction management, physical and price contingencies, allowance for funds used during construction (AFUDC), and all other categories for which recovery under FERC would be sought. These categories are illustrative; aggregate costs into the categories most relevant to the development of the proposed project. All costs should be provided in nominal dollars.

[redacted] Please refer to Section 16 for additional information on the proposed PPA.

2. For projects with transmission and substation components, separate the costs into two rows (e.g. use one row for substation construction and a second for transmission construction). Describe the detailed financial plan on a monthly basis during the construction period, e.g., for 3 years or as long as necessary. The plan should present the costs and financial outlays in each month of the construction period, and the corresponding sources of financing (equity contribution and debt drawdown), as in the following illustrative table. Data should include an estimate of the cost of both physical and price contingencies during the construction period. The financing plan should indicate the ability to finance the construction of the proposed project under base case and contingency scenarios.

[redacted] Please refer to Section 16 for additional information on the proposed PPA.

3. Describe the proposed financing sources and instruments.

[redacted]
Please refer to Section 16 for additional information on the proposed PPA.

4. Sources of funds for construction and working capital – include name of entity providing debt financing, loan amounts, interest rates, repayment period, grace period during construction; and equity provided by project sponsor.

[redacted]
Please refer to Section 16 for additional information on the proposed PPA. Furthermore, as stated in Section 5.3, the Owners plan to finance the development, construction and operation of the proposed Project with equity contributions. Therefore, no applicable names of entities providing debt financing, loan amounts, interest rates, repayment periods or grace periods during construction provided herein.

5. Sources of funds for unexpected repairs or replacement construction during the operating period, e.g., replacement of tower. Note: the operating period is the applicant's estimate of the useful life or accounting life of the transmission project element(s).

Not applicable. [redacted]. Please refer to Section 16 for additional information on the proposed PPA.

b. If the bidder is proposing fixed-rate pricing rather than cost-of-service or modified cost-of-service pricing, provide sufficient information and assessment to show that the proposed project, including any necessary transmission network upgrades, is financially viable. In this regard, provide capital cost estimates and operation and maintenance cost estimates and the basis for your estimates, including the extent to which estimates are based on vendor contracts or vendor quotes, your experience in the development, construction and/or operation of similar projects, your approach regarding contingency and risk management, and your proposed financing plan. All costs should be provided in nominal dollars, although inflation and cost escalation estimates should be provided. Please describe in detail the due diligence you have conducted in developing your pricing and tariff proposal.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
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[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]	[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]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted] [redacted] [redacted]
[redacted]	[redacted]
[redacted]	[redacted] [redacted] [redacted] [redacted]
[redacted]	[redacted] [redacted] [redacted] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

vii. Provide a proposed schedule for project development through release for operation that includes key critical path items, such as:

a. Completion of studies and receipt of approvals needed for the interconnection;

b. Material and equipment procurement, including identification of long lead time equipment;

A schedule for the Project is provided in Attachment 9-1 and elaborated upon in Section 9.

As described in Section 6.6, ISO-NE has completed the feasibility study for the Project and is currently performing the System Impact Study [redacted]). The Feasibility Study shows that the Bidder can connect 800 MW at the Brayton Point POI with no system upgrades required.

The expected timeline for receipt of approvals needed for the interconnection is provided in Attachment 7-1.

As discussed in Section 9.1, the build time for the OSS and HV and MV electrical equipment is approximately [redacted] months with installation completed within a [redacted]-month window. The lead time of the export cable is approximately [redacted] months.

Construction of all onshore facilities (OnSS and interconnections) is estimated to require approximately [redacted] months for completion. Procurement of all onshore materials and equipment, from the release of initial solicitations (i.e., RFPs) to delivery of all materials/equipment, will occur over a [redacted]-month period, likely commencing in [redacted] The longest single lead time item is expected to be the STATCOM(s), which will require an estimated [redacted] months for fabrication.

viii. Bidder must indicate whether it proposes to recover abandonment costs for its transmission project from the Distribution Companies, as described in Section 2.2.2.5.2 of this RFP. If so, Bidder must acknowledge that recovery of any such abandonment costs shall be in accordance with FERC rules and policies, and also acknowledge that in no event will a Bidder seek to recover abandonment costs if the abandonment was caused directly or indirectly by some act or failure to act of the Bidder. Bidder must further affirmatively commit not to seek from FERC or any other agency or authority any treatment of abandonment costs inconsistent with the provisions of Section 2.2.2.5.2 of the RFP. To the extent the Bidder proposes to recover abandonment costs, such proposal should be further described as set forth in Appendix C-3 of this RFP.

The Bidder assumes the reference to Section 2.2.2.5.2 of the RFP is meant to refer to Section 2.2.2.6.2 of the RFP.

[redacted]

15.2 Proposed Payment Required for the Project and all System Upgrades (Generator Lead Line)

15.2 The proposed payment required for the transmission project and all system upgrades.

i. All proposals must include significant cost containment as stated in the RFP.

[redacted]

ii. List all situations which may change the proposed payments by consumers during the contract term.

The proposed PPA represents [redacted] Please refer to the proposed PPA provided in Section 16.

iii. Identify any limits placed upon the bidder's post-contract term rates according to current FERC rules.

[redacted]

iv. Identify all other project revenues which may be received by the bidder during the contract term which would not reduce rates paid by consumers.

[redacted]

v. If the proposed payments may change during the contract term or the proposal is based on cost of service, the bidder must provide the method that transmission owner shall use to determine the payment for the Transmission Project under the transmission Rate Schedule or Tariff and Service Agreement to be filed with FERC. If the proposed payment is a formula rate, the Eligible Bidder must also provide the formula and its proposed inputs that the transmission owner will file with FERC.

[redacted] Please refer to the proposed PPA provided in Section 16.

vi. If the proposed payment is based on the Transmission Project's cost of service and may change during the contract term based on changes in the cost of service, a full revenue requirements model must be included and submitted as a working Excel spreadsheet with the formulas intact. Provide the annual revenue requirement forecasts for the project – including assumptions. Provide a draft version of the revenue requirement calculation in a format that is similar to what would be included in the Rate Schedule or Tariff and Service Agreement application to FERC, indicating the forecast revenue requirement amounts and all assumptions used in the calculations. This should include but not be limited to the assumptions regarding rate of return, depreciation life, split between debt and capital, AFUDC and weighted cost of capital, and a detailed estimate of the anticipated average annual operating and maintenance cost. Provide the information requested in Section 14.1.a of the Bidder Response Package.

[redacted] lease refer to the proposed PPA provided in Section 16.

vii. If the pricing proposed is based on cost of service, detail all cost containment commitments. Examples of such commitments include fixed price components, cost overrun restrictions, or other cost bandwidth provisions that are proposed to limit ratepayer risk must be clearly defined.

[redacted]. Please refer to the proposed PPA provided in Section 16.

[redacted]

viii. Please include full and complete descriptions of all cost containment measures that you propose to be included in your pricing. Additionally provide any supporting documentation for any savings or methods of savings including cost caps on any portion of your project. Please include working excel spreadsheets to more fully explain how your cost containment measures should work. Please provide details and notes that describe the nexus between the cost

containment provisions in your proposal and those supporting documents and spreadsheets. Please provide examples about how any cost containment measures you are proposing would work.

[redacted] Please refer to the proposed PPA provided in Section 16.

[redacted]

ix. To the extent that you are proposing different interconnection scenarios that affect cost please include full and complete cost information on each scenario. Please describe all interconnection and transmission upgrade costs required to interconnect at the Capacity Capability Interconnection Standard and to ensure full delivery of the proposed Offshore Wind Energy Generation profile, including transmission upgrades that may need to occur beyond the point of interconnection.

Not applicable; the Bidder is not proposing different interconnection scenarios in this proposal.

As discussed in Section 6.7, there are no anticipated transmission upgrades beyond the proposed POI (Brayton Point).

x. Please describe the coordination of the availability of the Offshore Wind Energy Generation and any associated transmission or distribution facilities. All proposals must include a project schedule, and proposals including a combination of transmission and Offshore Wind Energy Generation should propose complete critical path schedules, for both elements of the project, from the notice of selection for contract consideration to the start of commercial operations (the "Baseline Schedule"). Please describe all aspects of your proposal that protect ratepayers from risks associated with payments for transmission costs when any associated expected Offshore Wind Energy Generation, as proposed by the bidder, is absent, reduced, or curtailed as compared to the Baseline Schedule.

The transmission facilities in this Bid will be constructed by the Bidder in connection with the Project. A detailed Project schedule is provided in Attachment 9-1 and elaborated upon in Section 9.

[redacted]

xi. Please describe your approach to avoid line losses.

The Bidder's approach is to use state-of-the-art [redacted]-kV transmission technology to minimize line losses to the maximum extent possible. For three-phase submarine cables, this is the highest transmission voltage available at the distance required, and reduces losses compared to lower voltage systems. The OSS steps-up the voltage from [redacted] kV, which is the state-of-the-art and highest voltage available for array systems. [redacted] Load tap changing capacity of the offshore and onshore transformers together with voltage control from the WTGs and the

STATCOM(s) will regulate voltage at the substations and on the export cables which will also help to minimize losses.

15.3 Schedule of Payments (Generator Lead Line)

15.3 The schedule of the payments defined in 14.2 above including when the payments will commence, how often payments will be required and the length of time over which payments will be required. In no event may payments commence before the Transmission Project is placed in service.

The Bidder assumes the reference to Section 14.2 is meant to refer to Section 15.2.

Payments to the Project will commence once the Project declares Commercial Operation. Payments will be made monthly over a period of [redacted] years in accordance with the PPA provided in Section 16.

15.4 Design Life of the Project (Generator Lead Line)

15.4 The design life of the project.

The expected operating life for the Project is [redacted]

15.5 Description of the Reliability Benefits of the Proposed Project and Impacts on Existing Transmission Constraints (Generator Lead Line)

15.5 A description of the reliability benefits of the proposed Transmission Project and its impact on existing transmission constraints.

In addition to the reliability benefits described in Sections 3.3 and 3.4, both the OSS and OnSS have [redacted] transformers which provide redundancy in the event of an unexpected transformer outage. This means the Project can operate up to [redacted] percent power output during an onshore or offshore transformer outage, this results in an energy capture of up to [redacted] percent, based on a yearly wind distribution profile. Further, the Project will utilize [redacted] export cables such that during an export cable outage the Project can operate up to [redacted] percent power output; this results in an energy capture of up to [redacted] percent during the export cable outage.

Additionally, the OnSS is equipped with [redacted] STATCOM devices and variable shunt reactors which are configured to control the voltage at the POI to a predefined target determined by ISO-NE. This ensures the voltage at the POI is maintained at a steady level while the Project is operational. In addition, the Project is able to produce additional reactive power during onshore grid faults to contribute to the ISO-NE grid stability.

Finally, the battery storage contributes towards the reliability and security of the ISO-NE grid as described in Sections 3.3 and 3.4.

16. EXCEPTIONS TO FORM PPAS

Please attach an explanation of any exceptions to the Form PPA set forth in Appendix C-1. Comments to the proposed Form PPA must include any specific alternative provisions in a redline format to the Form PPA.

The Bidder has attached a mark-up of each form of the PPA provided at Appendices C-1 and C-2 of the RFP (Attachment 16-1). In line with paragraph 2.2.1.9 of the RFP, Bidder has kept its proposed changes to the bare minimum and our proposed changes fall into the following categories:

- non-substantive corrections and edits;
- [redacted]
- revisions intended to allow us to offer the lowest possible prices and increase economic benefits without shifting any material risk onto the EDCs or ratepayers.

Our mark-ups include "notes to draft" explaining our proposed changes (other than the non-substantive corrects and edits), however the key revisions are as follows:

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

[redacted]

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

[redacted]

17. RESPONSE TO TRANSMISSION TARIFF/CONTRACT REQUIREMENTS

Transmission bids must contain a proposed tariff, rate schedule or transmission service agreement ("Transmission Agreement") that the Bidder proposes as the vehicle for recovery of its transmission costs from the Distribution Companies and/or interconnecting generation suppliers. In addition, all transmission bids must separately contain a detailed summary of the material provisions of the proposed Transmission Agreement. Such a summary should include, but not be limited to, a discussion of the key provisions set forth in Appendix C-3, as well as a cross-reference to the corresponding sections of the proposed Transmission Agreement where such provisions may be found.

Bidders are discouraged from proposing changes to the Form PPA and or variations from the Proposed Tariff requirements.

Not applicable.