Leading Light Wind

New York State Energy Research and Development Authority (NYSERDA)

Purchase of Offshore Wind Renewable Energy Certificates (ORECs)

RFP No. ORECRFP22-1 • January 26, 2023

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[redacted]

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Acronyms and abbreviations

Acronym/ abbreviation	Meaning
AC	Alternating current
ACP	American Clean Power Association
AIS	Automatic identification system
AMAPPS	Atlantic Marine Assessment Program for Protected Species
ARI	Airstreams Renewables, Inc.
[redacted]	[redacted]
BACT	Best available control technologies
BESS	Battery Energy Storage System
[redacted]	
BOEM	Bureau of Ocean Energy Management
BRI	Biodiversity Research Institute
CAISO	California Independent System Operator
CAPEX	Capital expenditure
CATL	Contemporary Amperex Technology Co., Limited
CCO	Chief Communications Officer
CEO	Chief Executive Officer
CES	Clean Energy Standard
CFR	Code of Federal Regulations

Acronym/ abbreviation	Meaning
CJWG	Climate Justice Working Group
CLV	Cable-lay vessel
CO_2	Carbon dioxide
COD	Commercial operation date
ConEd	Con Edison
COP	Construction and Operations Plan
CPP	Coordinated Project Plan
CPS	Cable protection systems
[redacted]	
DAC	Disadvantaged Communities
DBE	Disadvantaged Business Enterprise
DC	Direct current
DD	Direct drive
DEC	Department of Environmental Conservation
DEI	Diversity, Equity, and Inclusion
DIS	Deliverability Interconnection Standard
DMR	Dedicated metallic return
[redacted]	
DOD	Department of Defense

Acronym/ abbreviation	Meaning
DOS	Department of State
DOT	Department of Transportation
EBS	Emergency breathing system
EC	Export cable
EDP	Energía del Pacífico, Ltda. de C.V.
EEIO	Environmentally Extended Input-Output Model
EIS	Environmental Impact Statement
EMF	Electromagnetic field
EMP	Environmental Mitigation Plan
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineering, procurement, and construction
EPCI	Engineering, procurement, construction, and installation
ERCOT	Electric Reliability Council of Texas
ERIS	Energy Resource Interconnection Service
ESA	Endangered Species Act
E-TWG	Environmental Technical Working Group
EVP	Executive Vice President
FAA	Federal Aviation Administration
FDNY	Fire Department of the City of New York
FEIS	Final Environmental Impacts Statement
FID	Final investment decision
FIR	Fabrication and Installation Report
FLO	Fisheries Liaison Officer
FLS	Floating LiDAR system
FMP	Fisheries Mitigation Plan
FORWRD	Fish & Fisheries Offshore Wind Research Database
F-TWG	Fisheries Technical Working Group
GAAP	Generally Accepted Accounting Principles
[redacted]	

Acronym/ abbreviation	Meaning
GHG	Greenhouse gas
GIS	Geographic information system
GW	Gigawatts
GWh	Gigawatt-hour
HDD	Horizontal directional drilling
HLV	Heavy lifting vessel
HSE	Health, safety, and environment
HSSE	Health, safety, security, and environmental
HTV	Heavy transport vessel
HV	High-voltage
HVAC	High-voltage alternating current
HVDC	High-voltage direct current
IFC	International Fire Code
[redacted]	[redacted]
IO	Input-output
ISO	International Organization for Standardization
IRS	Internal Revenue Service
JSC-TWG	Jobs and Supply Chain Technical Working Group
KPE	Key Procurement Elements
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt-hour
LEED	Leadership in Energy and Environmental Design
LGBT	Lesbian, gay, bisexual, and transgender
LiDAR	Light detection and ranging
LLCA	Limited liability company agreement
LNG	Liquefied natural gas
LNTP	Limited Notice to Proceed
LT	Long-term
LV	Low-voltage

Acronym/ abbreviation	Meaning
m	Meters
M&A	Mergers and acquisitions
MIS	Minimum Interconnection Standard
MISO	Midcontinent Independent System Operator
mm	Millimeters
MM	Million
MOU	Memorandum of Understanding
[redacted]	
MTA	Metropolitan Transportation Authority
M-TWG	Maritime Technical Working Group
MVA	Megavolt amperes
MW	Megawatts
MWBE	Minority/Women-owned Business Enterprise
MWh	Megawatt-hour
NABTU	North America's Building Trades Unions
NEC	National Electric Code
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
[redacted]	[redacted]
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrous oxide
NPS	National Park Service
NREL	National Renewable Energy Laboratory
NTP	Notice to Proceed
NWI	National Wetlands Inventory
NYISO	New York Independent System Operator
NYPA	New York Power Authority
NYSDPS	New York State Department of Public Service
NYSEG	New York State Electric & Gas

Acronym/ abbreviation	Meaning
NYSERDA	New York State Energy Research and Development Authority
O&M	Operations and maintenance
OCA	Offshore Construction Associates
OCS	Outer Continental Shelf
OFCS	Offshore converter station
OFD	One Federal Decision
OEM	Original equipment manufacturer
OGS	Office of General Services
OIV	Offshore installation vehicle
ONCS	Onshore converter station
OPEX	Operational expenditure
OREC	Offshore Wind Renewable Energy Certificate
OTS	Ocean Tech Services
OWA	Carbon Trust Offshore Wind Accelerator
OWTI	Offshore Wind Training Institute
PAMS	Passive acoustic monitoring systems
PAR	Phase Angle Regulator
PEIS	Programmatic Environmental Impact Statement
PJM	Pennsylvania, New Jersey, and Maryland
POC	Point of contact
POI	Point of interconnection
PPA	Power Purchase Agreement
PSC	New York State Publlic Services Commission
PSP	Public Sector Pension
PTC	Production tax credits
QA/QC	Quality assurance/quality control
QP	Queue position
RCNY	Rules of the City of New York
RFP	Request for proposal

Acronym/ abbreviation	Meaning
RIB	Rigid inflatable boat
ROD	Record of Decision
ROSA	Responsible Offshore Science Alliance
ROV	Remotely operated vehicle
ROW	Right-of-way
RTE	Round trip efficiency
RWSC	Regional Wildlife Science Collaborative
SCADA	Supervisory control and data acquisition
SCIP	Supply Chain Investment Plan
[redacted]	
SDVOB	Service Disabled Veteran Owned Business
SERC	State Electricity Regulatory Commission
[redacted]	
[redacted]	
SLD	Single line diagram
SO_2	Sulfur dioxide
SOC	State of charge
SPMT	Self-propelled modular transporter
SPP	Southwest Power Pool
SRIS	System reliability impact study
SRIV	Subsea rock installation vessel
SSSI	Site of Special Scientific Interest
SVP	Senior Vice President
SWECO	Suzlon Wind Energy Corporation

Acronym/ abbreviation	Meaning
T&E	Threatened and Endangered
TI	Turbulence intensity
[redacted]	
TSS	Traffic separation scheme
TVA	Tennessee Valley Authority
TWh	Terawatt-hour
UBC	United Brotherhood of Carpenters
ULS	Ultimate limit state
UPS	Uninterruptible power supply
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEEIO	United States Environmentally-Extended Input-Output
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VP	Vice President
VSC	Voltage-sourced converter
WD	Water depth
WEA	Water Environment Association
WECC	Western Electricity Coordinating Council
WHOI	Woods Hole Oceanographic Institution
WRG	Wind resource grid
WTG	Wind turbine generator
WTIV	Wind turbine installation vessel
XLPE	Cross-linked polyethylene

01
Executive summary

01 Executive summary

1.1 Introduction

In 2018, New York adopted an Offshore Wind Standard that provides a robust framework for a nation-leading offshore wind industry—one that creates local, family-sustaining jobs; revitalizes ports, harbors, and manufacturing hubs; fosters environmentally responsible development; and positions New York State as a global leader in the clean energy transition.

New York solidified this promise in 2019, with the signing of the nation-leading Climate Leadership and Community Protection Act, the “Climate Act”, a law that provides a comprehensive roadmap for the most ambitious and just energy transition in the country. This historic legislation mandated a monumental transformation of the New York power sector, calling for 100% of the state’s electricity to come from renewable sources by 2040, and calling for at least 9,000 megawatts (MW) of offshore wind by 2035.

New York’s clean energy goals set the standard for the nation and are among the boldest in the world.

They provide meaningful leadership on the moral imperative to address the climate crisis, while creating healthier economies and communities for the people of New York. We thank our governmental leaders and the advocates who have set this vision and established these goals—now we must do the hard work of effective implementation.

In response to NYSERDA's 2022 Offshore Wind Renewable Energy Credit Request for Proposals (ORECRFP22-1), Leading Light Wind is proud to submit this proposal, a bold vision—Charting the Clean Energy Future in New York.

Leading Light Wind will build on our team's track record of innovation. As tried and tested partners to New York State, we have proven our ability to effectively develop sustainable American energy and transmission infrastructure and engage with communities to advance public health, create good-paying jobs, and catalyze a reliable, clean energy transition that empowers more people than ever before.

Leading Light Wind will deliver enough clean energy to power the equivalent of 800,000 New York homes every year. The project and its associated supply chain investments will provide direct economic benefits to New York by investing in critical infrastructure, building new onshore and offshore clean energy capacity, and revitalizing historic ports. The project includes options with over $1.5 billion in visionary supply chain investments and includes funding up to $300 million in stakeholder-directed community priorities. Our community-focused investments will ensure that benefits are spread across the entire state, with a particular focus on frontline communities.

As the only American-led project in the New York Bight, Leading Light Wind is uniquely positioned and motivated to secure The Empire State's position as an undisputed leader in the global clean energy transition.

Leading Light Wind by the numbers

Project capacity of up to **2,100 MW** delivered to the point of interconnection (POI)

Up to **$13.3 billion** in economic benefits for New York State ($8.2 billion from the Leading Light Wind project, and $5.1 billion from the Supply Chain Investment Plans or SCIPs)

Up to **25,000 job-years** associated with the project and SCIP investments over the contract period

[redacted]

Up to **$300 million** offered via Community Benefits Program for stakeholder-directed priorities

Spending of up to **$299 million** in disadvantaged communities and up to **$359 million** with New York State MWBEs and SDVOBs

Enough clean energy to power the equivalent of up to **800,000 New York homes** every year

Year 1 carbon emissions reductions of up to **1.96 million tons**, the equivalent of taking about **384,000 gas-powered vehicles** off the road annually

1.2 An American-Led, New York-based team that is proven and ready

Global clean energy expertise meets deep New York roots: Invenergy as lead developer and energyRe as co-developer, bring a proven team who are already solving New York's clean energy infrastructure challenges.

In the New York offshore wind landscape, Leading Light Wind stands alone as the only project led solely by American-owned organizations. A truly American offshore wind industry requires sustained American reinvestment over multiple projects and project cycles to develop a skilled workforce, engineering and design expertise, innovation hubs, and durable supply chains in construction, manufacturing, logistics, and professional services.

Investing in infrastructure through domestic organizations ensures domestic reinvestment and builds civic pride. Every project supports jobs, but domestic ownership is a jobs multiplier, today and into the future.

Around the world, Invenergy has **more than 80 gigawatts** (GW) of sustainable energy projects under development and **more than 30 GW** that are in operation, under construction, or contracted. This portfolio includes transformative clean energy projects that solve some of the world's toughest energy challenges.

Over nearly two decades of investment and operations in New York, Invenergy has successfully developed major wind, solar, and energy storage projects. These projects contribute millions of dollars to New York State economies, create hundreds of good-paying local jobs, and have the capacity to generate enough **American-made, clean energy to power over 260,000 New York homes.**

Leading Light Wind's co-developer energyRe is an independent New York company focused on solving complex challenges and providing clean energy solutions, with expertise in infrastructure, engineering, and development. The founding partners of energyRe include the principals of New York-based Related Companies. Related is one of the largest private owners and preservationists of affordable housing in New York and the United States, reflecting its commitment to empowering local communities.

Related's developments in New York include the 28-acre Hudson Yards neighborhood on Manhattan's West Side and the transformative Willets Point community in Queens with 2,500 100% affordable housing units. Across 17 states, energyRe currently has 10.5 GW of renewable generation, more than 500 miles of transmission, and 155 MW of distributed generation assets under development.

Leading Light Wind builds upon Invenergy and energyRe's robust partnership in New York, including the development of the Tier 4 contracted Clean Path New York HVDC transmission project. **Together, we are proud to serve the communities where we live and work by successfully advancing the next generation of secure, reliable, clean energy infrastructure.**

In the short time since our lease in May 2022, Leading Light Wind has completed crucial risk-mitigating development activities and surveys that allow us to offer NYSERDA project scenarios that ensure evaluations of risk and cost are data driven instead of assumption based. This includes geophysical surveys of the cable route (inshore), metocean data buoy measurements via LiDAR and other sensor arrays, and a targeted geotechnical campaign inclusive of multiple location. Our early engagement with federal stakeholders, coupled with risk mitigation activities across the project scenario matrix, is not only evidence of the team's effectiveness, but also offers NYSERDA additional project certainty.

Figure 1-1. Invenergy and energyRe provide clean energy expertise to solve New York's clean energy infrastructure challenges.

1.3 Strong financial backing, with unparalleled stakeholder representation

Our team knows that the transformative infrastructure of tomorrow requires financial backing from well-capitalized investors today. Leading Light Wind unites an investor group that brings unmatched, dependable capital deployment committed to seeing the project to fruition, as well as direct labor investment in the project. Leading Light Wind's investors include New York based Blackstone Infrastructure Partners, CDPQ, FirstLight Power, and Ullico Infrastructure Fund.

This multi-stakeholder investor group brings organized labor and the renewable energy industry together to ensure that labor not only benefits from Leading Light Wind's job creation potential, but also vests

them in its success through the direct participation of labor pension funds. Our unique approach redefines how inclusive, collaborative, and responsible development of offshore wind in the New York Bight—and beyond—can be achieved.

1.4 An unrivaled, tailored clean energy solution for New York State

Leading Light Wind proposes a bold vision that charts the clean energy future in New York as the beacon of an American offshore wind future. **Combining value-at-scale and a grand vision for an offshore wind re-industrialization, our team is proud to present a preferred, all-in strategy for NYSERDA. We offer a 2,100 MW facility partnered with a nearly [redacted] Supply Chain Investment Plan (SCIP) that uniquely addresses New York State's priorities.** However, recognizing the need to balance resolute action with the flexibility necessary to accommodate different stakeholder priorities, Leading Light Wind also proposes a series of alternative strategies to best maximize project optionality.

These options include a wide range of flexible project solutions from which NYSERDA can choose as it selects an optimal project portfolio for the solicitation:

1. Two distinct project capacities
2. An optional energy storage project
3. Thoughtfully chosen SCIP options to catalyze New York's offshore economy
4. A commitment to maximize economic benefits to New York, even in our standalone proposals

[redacted]

Capacity optionality to accommodate New York's ambitious clean energy goals

As established leaders in large-scale clean energy solutions and complex infrastructure projects, Leading Light Wind's team is ready to execute an all-in strategy for NYSERDA. We also understand the need for flexible options to meet New York's ambitious goals. Leading Light Wind proposes two project capacity alternatives, as measured at the point of interconnection (POI), each of which will have an energy optimized overbuild:

- The 2,100 MW project alternatives deliver maximum efficiency and value at scale in Leading Light Wind's New York Bight lease acreage.
- The 1,320 MW project alternatives deliver on our promise to be a flexible partner of choice.

As discussed in this proposal, this COD has been informed by extensive, early engagement with regulatory agencies, stakeholders, and subject-matter experts.

We are confident that this COD represents an ambitious, yet realistic, view of the time required to complete the development, state and federal permitting, interconnection, engineering, procurement, and construction workstreams necessary to deliver the project.

Battery storage option that drives reliability and decarbonization

New York's investment partner of choice for offshore wind supply chains

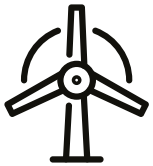
As an American-led offshore wind project with deep connections to New York State and expertise in the clean energy transition, Leading Light Wind is uniquely positioned to expand American offshore capabilities and build the next generation of supply chains across diverse geographic regions in New York.

Leading Light Wind is the partner of choice to build out offshore wind supply chain capabilities. Leveraging longstanding relationships with suppliers and our unparalleled expertise, our team has thoughtfully packaged the SCIP offerings to provide NYSERDA the opportunity to select the best investment

partner for the State of New York and to strengthen the local, long-term supply chain for the domestic offshore wind industry.

Leading Light Wind's SCIP facilities include key partners [redacted]. Each facility has been selected based on the potential value it can provide to the Leading Light Wind project, as well as the benefits it can deliver to the state's offshore wind industry and overall economic growth. The proposed SCIP facilities include:

[redacted]



[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Figure 1-5. Leading Light Wind is committed to supporting the creation of a durable and local supply chain in New York State.

[redacted]

Standalone bid options that support local benefits

Leading Light Wind is deeply committed to creating a durable and local supply chain in New York State. We believe that one of the best ways to accomplish that is to support the continued utilization of the supply chain facilities for blades or nacelles (or both) in which the state intends to invest through ORECRFP22-1. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

1.5 New York is poised to unleash American offshore wind

From building new infrastructure, to revitalizing ports and delivering strategic supply chain investments, our team is ready to unleash the American offshore wind industry in The Empire State.

In line with our vision for an offshore wind-led re-industrialization of New York infrastructure, the SCIP partnerships are just a small window into Leading

Light Wind's approach to charting the American clean energy future. In addition to multiple project bids and SCIP optionality, the Leading Light Wind team identified visionary core infrastructure investments that work in tandem with every project capacity and SCIP option outlined in the bid.

As the only American-led project, we're personally invested and are ready to roll up our sleeves in support of offshore wind and New York. We highlight these core infrastructure investments below.

A relationship-driven vision for New York's offshore wind industry

As outlined in Section 1.4, Leading Light Wind is ready to be NYSERDA's partner of choice to build out the state's offshore wind supply chain.

[redacted]

Leading Light Wind will tap our American know-how to build New York's offshore wind industry with NYSERDA.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

1.6 New York workers are the foundation of the nation's clean energy future

New York has the strongest workforce in the world. We firmly believe that diverse, domestic know-how is ready to be cultivated and will carve out an American leadership position in the offshore wind industry. This starts right here in New York.

The Climate Act recognizes that workers are at the front lines of climate change and that a well-trained, organized, and diverse workforce is the cornerstone to building a new, industry-leading clean energy economy here in New York State.

The Leading Light Wind Jobs and Workforce Plan is an unmatched commitment to utilize union labor and generate transformational workforce opportunities. By aligning with the ambitious efforts to create green jobs outlined in the Climate Act, **Leading Light Wind brings together union capital investment and union jobs to facilitate an energy transition for everyone.**

To meet this promise, Leading Light Wind executed a Memorandum of Understanding (MOU) with North America's Building Trades Unions (NABTU) that memorializes our commitment to union construction on our project. This MOU, along with carefully cultivated partnerships and training programs, will support the creation of a training pipeline and establish a world-class New York workforce to construct the project.

Recognizing the historic inequities woven into our social fabric and the disproportionate impacts climate change and legacy polluting power plants have on frontline communities, Leading Light Wind's MOU with NABTU endorses hiring and job training practices to promote a diverse workforce, including the hiring and training of veterans and persons from communities that represent minorities, women, LGBTQ+ persons, persons with disabilities, and other disadvantaged groups.

A rebalancing of equity is long overdue in the energy industry, and the energy transition presents significant opportunities to transform the status quo. In addition to labor being a direct investor in the project, via New York based Blackstone Infrastructure Partners and Ullico Infrastructure Fund, our labor agreement with NABTU and our hiring priorities ensure that Leading Light Wind will usher in a just and equitable transition to the new clean energy economy.

We will center the needs of frontline communities as envisioned by the just transition principles and strategies expressed in the New York State Climate Action Council. **Leading Light Wind is dedicated to creating a clean energy economy that is designed, engineered, and built by diverse American labor.**

Figure 1-10. Leading Light Wind is dedicated to creating a clean energy economy that is designed, engineered, and built by diverse American labor.

1.7 There's a place for everyone in our clean energy vision

Meaningful stakeholder engagement is central to Invenergy and energyRe's partnership and builds on our companies' shared history of empowering the communities where we live and work. **Humility, creativity, and connectivity are our guiding principles of engagement to ensure this happens.**

We have crafted the Leading Light Wind Stakeholder Engagement Plan with the belief that the individuals and organizations potentially affected by the project have a right to be involved in project development and to influence project decision-making. [redacted]

Our New York-based project team includes experts who have worked on some of the largest projects in the region. The team is on the ground and actively engaged in conversations with key stakeholders, building a coalition of support across geographic areas [redacted] and through representatives of environmental and fisheries groups.

Leading Light Wind will elevate the voices of frontline communities to ensure they define what a clean energy transition looks like for their communities. Guided by **humility**, we've identified key stakeholders whose voices will be prioritized in this process: residents, local businesses, elected officials, environmental advocacy and environmental justice organizations, the commercial and recreational fishing community, nonprofit organizations, institutions, indigenous nations, state and federal agencies, and organized labor.

Through **creativity**, one of our principles of engagement, we're committed to designing a project that allows offshore wind energy development, community needs, and offshore wind energy development to thrive and coexist. Leading Light Wind is working to identify shared interests across different stakeholders, create opportunities for mutual learning and understanding, and collaboratively develop actionable goals.

Through our engagement principle of **connectivity**, we believe that clear communication with stakeholders, early and often, will influence project decision-making for the better. We acknowledge that uncertainties are inevitable during project development, and we commit to being open about project needs and updates.

Through **humility, creativity, and connectivity** our goal is to continue to build a stakeholder outreach process that is inclusive and considers the full scope of potentially affected parties. The process directs engagement efforts toward lifting up and including the voices of those historically left out of development decisions.

Figure 1-11. Stakeholders potentially affected by the project.

1.8 Benefits beyond the Bight

Leading Light Wind will harness the transformational economic opportunities of the offshore wind industry to maximize benefits across New York State. We're listening and working hand in hand with community stakeholders to center and address the priorities identified in our conversations.

Our project is intentionally and thoughtfully designed to deliver material benefits and opportunities to all New Yorkers, directing investments and resources to communities historically excluded from decision-making in infrastructure development, reducing burdens on frontline communities, and charting a more equitable and just clean energy future.

Leading Light Wind is prepared to establish a $300 million community benefits program associated with our 2,100 MW project alternative. The community benefits program encompasses Leading Light Wind's direct partnerships, required fisheries and wildlife monitoring funding, [redacted]. Leading Light Wind is proud to showcase its initial partnerships, which are anticipated to drive progress in priority areas: offshore wind workforce training, just transition/MWBE opportunities, youth education, research and data collection, and innovation.

In addition to direct investments or grants, through our Empire Equity Accelerator proposal Leading Light Wind is committed to exploring opportunities for community equity. We recognize the demonstrated leadership of New York State in this regard. As part of the Community Investment Fund, Leading Light Wind is evaluating ways to offer meaningful participation, including direct ownership, in the operational phase of this 30+ year infrastructure project. In Canada, Invenergy has been at the forefront of Community equity participation in projects, bringing 14 Regional County Municipalities and a First Nation in as equity on Invenergy projects. In the United States, Invenergy has partnered with Lafayette Square though a joint venture called Reactivate, providing capital, technical assistance, and dedicated executives to build and operate community solar energy solutions.

The Leading Light Wind community benefits program leverages Invenergy and energyRe's experience delivering New York's clean energy transition through the Clean Path New York model. The Community Investment Fund will be guided by a board of directors representing communities and stakeholder groups that serve as hosts to the project. The board and governance will be constituted after the project secures an OREC contract with NYSERDA.

Leading Light Wind has identified broad categories for investment to provide focused benefits in our priority communities. These align with New York State's leadership to facilitate a just transition:

Empowering local communities: Contribute to youth education, climate resiliency, social equity, public health, and air quality with a focus on supporting the most at-risk, frontline members of our local communities.

Building an inclusive next generation workforce: Support workforce development and education programs focused on pathways for priority populations to access green, family-sustaining jobs.

Accelerating the offshore wind supply chain: Foster the long-term sustainability of the offshore wind industry in New York State through various investments, including supporting capacity and access for Tier 3 and Tier 4 suppliers.

Leading environmental research: Support environmental research that fosters innovation and collaboration within the offshore wind industry.

Our team is intentional about pursuing partnerships that support existing offshore wind initiatives established by New York City and New York State, that reflect the priorities of project stakeholders, and that provide benefits specifically designed to reach disadvantaged and environmental justice communities, as well as other priority populations.

[redacted]

1.9 Conclusion

By delivering clean, reliable energy and executing a visionary offshore wind supply chain build-out, Leading Light Wind will ensure New York keeps its promise to catalyze a just transition that creates healthier communities and economies for all New Yorkers.

Leading Light Wind will play a critical role in advancing public health, creating good-paying jobs, supporting local supply chains, creating and revitalizing key ports, and building a globally leading offshore wind industry in New York.

Over time, the project will serve as an economic development engine and deliver on stakeholder-led community priorities.

Our team's unique American-led perspective of an offshore wind reindustrialization will revitalize key ports and energy infrastructure across the state. At the same time, our holistic, stakeholder-led approach to engagement will ensure that community benefits are informed by New Yorkers and specifically tailored to deliver the best outcome to the state.

Leading Light Wind will leverage our partnerships with unions to create inroads to opportunity for diverse and frontline New York communities. Fueling job creation and catalyzing a new domestic industry, the project will drive new economic opportunity across the state, making New York a more attractive place to live, work, and do business.

New York's history is one of innovation and opportunity. The next few years will be crucial to channeling this ethos to meet the mandates in the Climate Leadership and Community Protection Act. Leading Light Wind's American-led team is ready to be NYSERDA's partner of choice to deliver on their promise to create a just transition to a new clean energy economy.

[redacted]

[redacted]

[redacted]

02
Impacts of COVID-19 on proposer and project development

02 Impacts of COVID-19 on proposer and project development

2.1 Impacts of COVID-19 on Leading Light Wind operations

Since the start of the COVID-19 pandemic, Leading Light Wind's health, safety, and environment (HSE) and emergency preparedness specialists have implemented mitigation strategies recommended by New York State and the Centers for Disease Control. We regularly review new emerging evidence and guidelines to ensure that our measures and strategies are up to date with the latest understanding of COVID-19. The result is a best-in-industry foundation to guide our teams and partners to make better decisions with confidence about what they need to do, as well as what they should avoid.

In recent years, both Invenergy and energyRe have invested heavily in cloud-based IT infrastructure. In March 2020, as the seriousness and impact of the COVID-19 pandemic became apparent, this investment allowed both organizations to transition to a fully remote working environment for all nonessential staff. This transition was nearly seamless, with minimal to no loss of productivity on our major projects.

As the virus and the public health environment continue to evolve, challenges related to the ongoing COVID-19 pandemic remain in both daily life and in business environments. However, with increased public immunity associated with vaccination and previous infection and with public health requirements receding, both Invenergy and energyRe have largely transitioned to a more hybrid work environment for nonessential staff, combining the flexibility of work-from-home with the collaboration and networking benefits of an in-person work environment.

The investment in cloud-based infrastructure and the lessons learned during the entirely remote period in the early days of the pandemic continue to provide significant benefits for our organizations, allowing us to conduct business either fully remotely, hybrid, or in-person as appropriate. This enables us to effectively collaborate with internal and external stakeholders, but also helps our project delivery partners optimize workflow to meet project requirements and timelines, while keeping our respective employees safe during this ongoing pandemic. As a result, Leading Light Wind has managed to minimize business and project continuity risk.

Our capabilities are enabled by best-in-class digital infrastructure for a modern digital workforce, including the following:

- Robust IT infrastructure capable of serving critical remote operations
- High-performing, secure cloud-based platforms, such as the Autodesk suite of products and other specialty technical products
- Advanced staff training in remote applications
- Contemporary, streamlined workflows
- Advanced project controls and reporting
- Advanced financial management

Going forward, Leading Light Wind will continue to closely track and review emerging evidence, as well as state and federal guidance, in order to quickly respond to changes in the COVID-19 landscape. We will focus on the following key efforts:

Protect staff and workers

Leading Light Wind will continue to update our COVID-19 protocols to align closely with New York State and Centers for Disease Control guidelines. We will continue to encourage our staff to follow enhanced hygiene protocols, social distancing, mask-wearing, and other recommendations or requirements as outlined by the prevailing state and federal guidelines.

Engage health, safety and environmental (HSE) professionals

Leading Light Wind will deploy HSE professionals and emergency preparedness professionals on project sites to control and monitor the workforce. Routine refresher training will be provided to update the workforce with the latest guidelines and address corrective measures.

Perform enhanced project risk assessment and mitigation

The Leading Light Wind project management team will perform frequent project risk assessments, including worker availability and deployment, material delivery, manufacturing, and construction.

Closely monitor the supply chain and intervene to prevent significant disruptions

Leading Light Wind and its project partners have well-established supply chains, matured over the years from successfully delivering major energy projects in New York. We will assign procurement specialists to closely monitor the supply chain and intervene when a potential disruption is identified. Such interventions would include engaging alternative suppliers to augment supply capabilities.

Sustain project performance through digital technology

Leading Light Wind envisions leveraging our powerful digital technology platforms for design development, material procurement, permitting, community engagement, project management, and project financing of the project.

03
Proposer qualifications

03 Proposer qualifications

3.1 Introduction

Invenergy Wind Offshore LLC (Proposer) is the bidding entity for the Leading Light Wind project and will be the counterparty for the NYSERDA OREC contract. As seen in Figure 3-1 on the following page, the Proposer is a newly formed limited liability company backed by six well-capitalized firms, including four financial investors (Blackstone Infrastructure Partners, CDPQ, FirstLight Power, and Ullico Infrastructure Fund) and a project developer (Forward Power Offshore, a joint venture between Invenergy Renewables and energyRe).

Development of the Leading Light Wind project is led by Forward Power Offshore, whose two member organizations have the experience and management capabilities necessary to develop and operate the project. Forward Power Offshore's experience leverages a 20-year track record with onshore renewable development in the United States and 18 years in New York, including the ongoing collaborative development of the Clean Path New York project alongside project partner New York Power Authority (NYPA). Once operational, this HVDC transmission project will transform the New York clean energy landscape and deliver nearly 7.5 terawatt-hours (TWh) of renewable electricity to New York City annually.

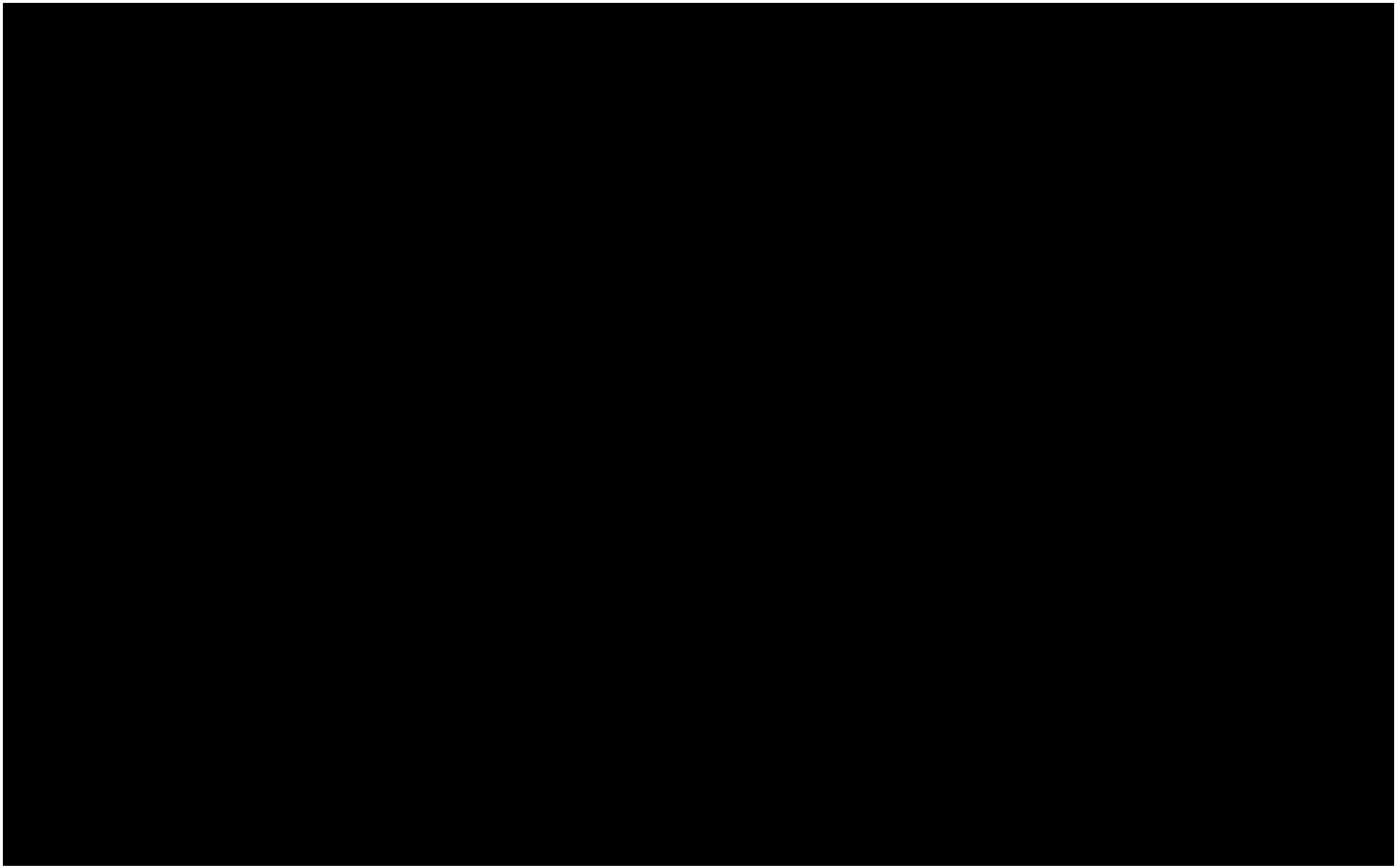
With unparalleled financial backing and supported by organizations with a successful track record in developing challenging infrastructure projects in New York and across the world, Leading Light Wind has the resources and experience to execute on its project development plans and achieve on-time commercial operation. This section provides additional detail on the ownership of Leading Light Wind, the Proposer's prior experience, and the development team that will bring this project to fruition.

3.2 Organizational chart, project officers, and right to submit a binding proposal

As shown in Figure 3-1 on the next page, Proposer is wholly owned and managed by NY Bight Offshore Holdings LLC, which is owned by an investor consortium of five holding companies:

- **Forward Power Offshore LLC** is a wholly owned subsidiary of Forward Power Offshore Holdings LLC, which is ultimately a 50/50 joint venture between energyRe and Invenergy. As discussed in greater detail in Section 3.3, Invenergy is the world's largest privately held developer and operator of renewable power, while energyRe (an affiliate of Related Companies) is a New York-based company focused on solving complex infrastructure and energy challenges.
- **Atlas Renewables Holdings L.P.** is indirectly controlled by Blackstone Inc. ("Blackstone"), a Delaware corporation listed on the New York Stock Exchange, and part of Blackstone's infrastructure strategy ("Blackstone

Figure 3-1. Leading Light Wind organizational chart.



Infrastructure"). Blackstone Infrastructure targets a diversified mix of core+, core, and public-private partnership investments across all infrastructure sectors, including energy infrastructure, transportation, digital infrastructure, and water and waste, with a primary focus in the US.

- **CDPQ Investments (US) Inc.** is a subsidiary of CDPQ, which manages and directs public pension funds to create opportunities and position enterprises to succeed. CDPQ is a global investment group present in all major markets with CAD $392 billion in assets and offices in ten countries.
- **FirstLight PSP Offshore Wind LLC** is a subsidiary of Public Sector Pension (PSP) Investments, which is FirstLight Power's corporate parent. FirstLight Power is a leading clean power producer, developer, and energy storage company serving North America. Its portfolio includes over 1,400 MW of hydroelectric generation, pumped hydro energy storage, and solar generation.
- **Ullico Infrastructure NY Bight Holdco LLC** is a wholly owned subsidiary of the Ullico Infrastructure Fund, which provides institutional investors with access to infrastructure investments that deliver long-dated, low-volatility, and inflation-linked cash flows. Ullico is the only labor/union-owned North American insurance and investment company. Its portfolio of investments spans the spectrum of infrastructure space, including power, utilities, energy, transportation, and digital infrastructure.

Collectively, the investor consortium backing Leading Light Wind provides unmatched financial resources to develop and execute the project.

Development of the Leading Light Wind project is being led by Invenergy and energyRe (the project sponsors). Pursuant to the terms of the NY Bight Offshore Holdings limited liability company agreement and Proposer's limited liability company agreement, the Proposer has all rights and authority to submit a binding Proposal. Bios for the project's contributing officers from Invenergy and energyRe are provided on the following pages. A Diversity, Equity, and Inclusion (DEI) plan for selecting new project officers has been developed by energyRe's Tanya Diaz-Goldsmith, who has been appointed as the overall DEI Officer for Leading Light Wind (see Section 3.4).

Invenergy officers

Michael Polsky

With more than 40 years' experience in the energy industry, Michael Polsky, founder and CEO of Invenergy, is widely recognized as a pioneer and industry leader in the cogeneration and independent power industry in North America. Under his leadership, Invenergy has grown to be the largest privately held renewable energy developer and operator in the world. Before establishing Invenergy in 2001, Michael founded SkyGen Energy, a developer, owner, and operator of natural-gas-fueled generating plants. SkyGen was purchased by Calpine Corporation in 2001, and Michael was appointed as a member of the Board of Directors.

Jim Murphy

As Invenergy's cofounder, President, and Corporate Business Leader, Jim Murphy is responsible for the general management of the company, leading and overseeing the legal, finance, government affairs, communications, and administration functions. Jim has negotiated more than $40 billion in private equity and debt investments, power plant acquisitions and sales, and project financing over his 40 years in the energy industry. He has managed organizations across the continuum from startup through growth and eventually liquidity events. Jim serves on the board of the American Clean Power Associationand formally served on the Board of Directors of the American Council on Renewable Energy (ACORE). Prior to the formation of Invenergy, he was Chief Financial Officer at SkyGen Energy LLC.

Bryan Schueler

Bryan Schueler leads Invenergy's Construction Business segment, including procurement, construction, and project management for all Invenergy projects as well as key domestic and international functions including environmental strategy and compliance, offshore wind, and Invenergy's Japan presence. During his time at Invenergy, Bryan has been involved in all aspects of the development of Invenergy's wind, solar, natural gas, storage, offshore wind, transmission, and desalination projects. A 30-year veteran of the power industry, Bryan has experience in plant operations and engineering, as well as the development, permitting, and construction of wind, solar, natural gas, biomass, and landfill gas projects. Before joining Invenergy, he was a project director at Calpine Corporation and SkyGen Energy.

Meghan Schultz

Meghan Schultz leads Invenergy's finance and capital markets team, which is responsible for raising capital for all power projects that Invenergy builds around the world, as well as the company's global risk function. Her responsibilities also include portfolio finance for operating projects, execution of M&A transactions, and investor relations with Invenergy's investor and lender partners. Meghan has overseen the execution of more than $28 billion in private equity investments, power plant acquisitions and sales, and project debt and tax equity financing. She has been involved in the execution of over 18,000 megawatts of renewable energy projects and 3,000 megawatts of new natural gas projects. Prior to joining Invenergy in 2008, Meghan was a Vice President at Bank of America and at ABN AMRO.

Bill Bradley

Bill Bradley leads Invenergy's legal and compliance departments. Previously, Bill was General Counsel for GE Energy Financial Services, GE's global energy investment division, where he was part of the senior leadership team and was responsible for legal, compliance, and regulatory affairs. Bill has extensive experience in global law firms and as in-house counsel for companies, where he has developed and managed sophisticated legal teams. His work in the energy and financial services industry has been principally focused on power and infrastructure development, finance, M&A, and capital market transactions.

Jesse Campbell

Jesse Campbell is a Senior Vice President of Financial Operations and Administration at Invenergy. Jesse oversees Invenergy's accounting, tax, treasury, financial planning, financial systems, business transformation, and real estate functions. Prior to Invenergy, Jesse was the Chief Financial Officer at Suzlon Wind Energy Corporation (SWECO) from 2015-2020, where he led all of SWECO's North American finance, human resources, and IT functions.

Will Borders

Will Borders is a Senior Vice President, Legal, and Chief Compliance Officer at Invenergy. In his current role, Will oversees Invenergy's multidisciplinary global compliance function, ensuring that business activities across the company meet and exceed global regulatory and contractual requirements. Previously Will served as Invenergy's Deputy General Counsel with oversight of all legal matters for the company, including financing transactions, mergers and acquisitions, general commercial transactions, compliance and corporate governance best practices, government and regulatory affairs, corporate formation and maintenance and employment-related issues. Prior to Invenergy, Will was in the energy practice of DLA Piper.

Kelly Speakes-Backman

Kelly Speakes-Backman is the Executive Vice President of Public Affairs at Invenergy, LLC, the leading privately held developer, owner, and operator of sustainable energy solutions. A nationally recognized thought leader in the clean energy industry, Kelly leads Invenergy's communications, government affairs and marketing activities. Immediately prior, she served as the Acting Assistant Secretary for the Office of Energy Efficiency and Renewable Energy of the Department of Energy in the Biden administration, leading the office's $3.2 billion portfolio of renewable power, energy efficiency, and sustainable transportation. Kelly has spent more than 25 years working on energy and environmental issues in the public, private, and NGO sectors.

energyRe officers

Jeff Blau

Jeff Blau has served as Chairman and Founding Partner of energyRe since its formation in November 2021, and is CEO and a partner of Related Companies. In his position at energyRe, Jeff led the recruitment of the company's executive team, and continues to oversee the company's foundational, nation-leading renewable energy projects. As CEO of Related, he is responsible for directing and overseeing new developments worth over $60 billion in virtually every sector of the real estate industry, with a strong emphasis on sustainability and environmentally responsible development. Jeff also serves on the Board of Directors of the Central Park Conservancy, the New York City Partnership Fund, Robin Hood, the Urban Land Institute, the Association for a Better New York, the Union Square Partnership, the Real Estate Roundtable, Wharton Graduate School, University of Michigan, Trinity School, and Mount Sinai Medical Center.

Miguel Prado

Miguel Prado is CEO of energyRe. Miguel oversees the management and expansion of generation and transmission assets to meet the growing demand for reliable, resilient, and responsive renewable energy solutions with domestic sources that create economic and community benefits in American cities. Prior to his current position, Miguel served as CEO of North America at EDP Renewables, a global leader in the renewable energy sector. Under his leadership, EDP Renewables North America tripled its growth and the value of the company's publicly traded shares. Miguel was a key driver of the company's growth to the fourth-largest wind generation company in the world. Miguel managed EDP Renewables 1,000 US-based employees and oversaw the company's 8.8 GW of renewable projects under management, more than $11 billion of assets and a development pipeline of more than 15 GW.

Kenneth P. Wong

Kenneth P. Wong is a Founding Partner of energyRe, and Chief Operating Officer and Director of International Development of Related Companies. He is responsible for overseeing the day-to-day operational, corporate, and business functions of the company, and oversees development activities in international markets. Kenneth has over 40 years of business experience overseeing the development of a broad range of real estate assets from retail shopping centers to theme parks and planned communities, both in the US and internationally, representing well over $30 billion worth of assets. His executive experience includes developing and operating businesses in public and private companies, bridging the worlds of real estate, entertainment, design, and technology. Kenneth rejoined Related in March 2008 from Westfield America, where he served as President and was responsible for all operations, development, leasing, marketing and management of the $15 billion Westfield portfolio.

Pedro Pereira

Pedro Pereira is Chief Financial Officer and Chief Business Development Officer of energyRe. Pedro directs energyRe's corporate development activities, managing investments and financing to meet the growing demand for renewable energy solutions, overseeing the company's strategy and planning functions, and advancing the management and expansion of the corporate areas across the different business platforms. Prior to joining energyRe, Pedro was the Global Head of Business Development and a member of the Investment Committee at EDP Renewables. In these roles, Pedro led the vision and strategy definition for new markets with the implementation of the company's international growth platform, all international M&A activities, and global or regional partnerships. Pedro also served as the Director of Finance at EDP Renewables North America – having originated and executed $4 billion of tax equity investments and project financings in the US, Canada, and Mexico.

Ryan Brown

Ryan Brown serves as Chief Operating Officer of energyRe. Prior to joining energyRe, Ryan was Executive Vice President of EDP Renewables North America for the Eastern Region, Mexico, and Canada. In his role, Ryan led the company's business in eastern MISO, PJM, NYISO, ISO-NE, the southeast, Mexico, and Canada, as well as oversaw Government and Regulatory Affairs for the platform. Ryan was responsible for a region that successfully developed 33 wind and solar projects totaling nearly 4,300 MW in operation or under construction, and built a robust project pipeline to deliver additional growth. He was also a member of EDPR North America's seven-person executive team and a board member of Mayflower Wind, a Shell and Ocean Winds offshore wind farm joint venture.

Charles John O'Byrne

Charles John O'Byrne is Executive Vice President of Policy at energyRe and Executive Vice President for Policy at Related Companies. He serves in a leadership role on a wide range of assignments involving government affairs on the federal, state, and local levels; labor issues; litigation matters; and questions of strategy on projects within the Related portfolio, including environmentally conscious real estate developments and pioneering urban energy solutions that address increasing demands on cities. Charles was trained as an attorney, and his career prior to joining Related involved government, religion, academia, and business. A former Jesuit, he worked at Columbia and Harvard universities as a chaplain and teaching fellow. He also served as Associate General Counsel for the Archdiocese of New York. Charles spent more than five years in state service acting as Chief of Staff to the Senate Minority Leader, Chief of Staff to the Lieutenant Governor, and Secretary to former Governor David A. Paterson.

Glenn Goldstein

Glenn Goldstein is President of Clean Path NY for energyRe and leads energyRe's New York portfolio, which includes overseeing large-scale infrastructure and generation projects. With over 25 years of experience in development and complex legal matters, Glenn brings expertise to every element of the development process, including site acquisition and planning approvals, financing, construction, design, leasing, and property management. As President of Related Retail, Glenn, in conjunction with other Related principals, was instrumental in the development of the 650,000-leasable-square-foot Shops & Restaurants at Hudson Yards. One of New York City's premier locations for fashion and dining, Hudson Yards has set a new benchmark for shopping in a dynamic, mixed-use setting. Prior to his work at Hudson Yards, Glenn led the development of several large-scale retail destinations including Gateway Center phases I and II, the Bronx Terminal Market, College Point Retail Center, Clifton Commons, and The Hub Office and Retail Complex.

3.3 Proposer experience

As previously discussed, Forward Power Offshore (a joint venture of Invenergy and energyRe) is leading the development of Leading Light Wind. The capabilities and experience of both entities are described separately herein.

Invenergy

Invenergy's name is synonymous with innovation in an industry undergoing transformation. As the world's largest privately held developer and operator of renewable power, Invenergy works with leading utilities, global brands, and public sector partners to take energy infrastructure projects from the drawing board to reality. Invenergy's nearly 1,800 employees are united by a vision to be innovators building a sustainable world. Headquartered in Chicago, and with three established offices in New York (including New York City), the company has successfully developed over 30 gigawatts of power projects across the Americas, Europe, and Asia. Invenergy projects enable a more sustainable, flexible, and resilient grid. Figure 3-2 on the next page shows operating, under construction, or contracted project capacity that Invenergy has developed across four core technologies since its founding in 2001.

In addition to Invenergy's four core technologies, Invenergy recently announced its first green hydrogen project. Located in Illinois, the Sauk Valley Hydrogen project will use solar energy and electrolyzer technology to produce up to 52 tons of green hydrogen a year. The project has an anticipated operations date of April 2023.

Transmission experience

Because the core of Invenergy's business model is project development and long-term ownership and operations, the company takes great care to ensure the longevity, reliability, and cost-effectiveness of its assets, especially the transmission and interconnection infrastructure for its projects. Since 2001, Invenergy has built all required transmission and distribution lines, generator step-up transformers, and substations for its facilities in CAISO, ERCOT, MISO, NYISO, PJM, WECC, SERC, SPP, Canada, and in the TVA territory, as well as internationally.

Invenergy has developed, permitted, and constructed this infrastructure across various terrains, state, and local jurisdictions, and in vastly differing environmental and regulatory conditions. This experience adds to over 702 miles of high-voltage transmission lines, over 2,592 miles of distribution lines, 88 substations, 102 generator step-up transformers, and 5,284 pad-mounted transformers, of which several have been built for utilities.

Invenergy is also active in the development of HVDC transmission projects, including the 175-mile, 1,300 MW Clean Path New York project (along with energyRe) and the 800-mile, 5,000 MW Grain Belt Express project in the Midwest.

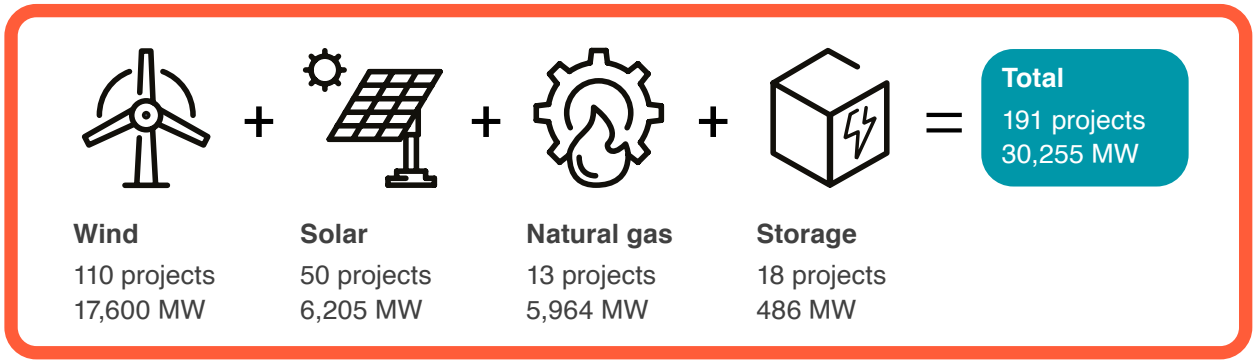


Figure 3-2. Invenergy's portfolio consists of four core technologies.

Invenergy solutions

Invenergy's unique combination of full-service solutions, end-to-end execution ability, and relationship-driven approach has won it a reputation for meeting customer's needs with high-value projects delivered on time and on budget. Traditionally, Invenergy's approach has been to develop, build, own, and operate projects, but the company provides a full range of services and flexible structures to serve utilities, corporate buyers, asset owners, and financial institutions.

Full range of services and flexible structures

- Development-transfers
- Build-transfers
- Engineering, procurement and construction (EPC)
- Joint Development Agreements
- Power Purchase Agreements (PPAs)
- Short- and long-term operations, and maintenance and asset management

Invenergy has deep technical expertise at every step of the project lifecycle. This is rooted in an engineering culture that recognizes the critical importance of project aspects like system design, transmission, and interconnection, which other companies are often comfortable outsourcing. End-to-end, fully integrated capabilities allow Invenergy to serve as the single entity responsible for project development, construction, financing, and operations, with seamless execution from one phase to the next.

Invenergy's involvement in projects, from early development through operations, ultimately benefits customers through higher project efficiency and quality. Invenergy's operations group constantly reports on how the latest equipment and system configurations perform under real-life conditions in the field. This immediately shapes procurement and design considerations by Invenergy's development, engineering, and construction groups working on pipeline projects, keeping Invenergy at the forefront of project design and construction practices and methods. Invenergy boasts an impressive portfolio of 180 projects totaling 28,505 MW of power.

In addition to the services and capabilities it offers, Invenergy embraces a relationship-driven approach to business, based on the belief that a project can only be considered successful if all parties are engaged and satisfied. Customers, EPC contractors, and financial institutions that have choices about the power sector companies they work with consider Invenergy a preferred partner. That is why Invenergy has successfully completed over $35 billion in transactions over the past two decades and over 50% of its projects represent repeat business.

End-to-end, fully integrated capabilities

- Project development
- Permitting
- Engineering
- Transmission
- Interconnection
- Finance
- Project construction
- Asset management
- Operations and maintenance

More information on Invenergy can be found here: https://invenergy.com.

energyRe

energyRe is an independent New York-based company focused on solving complex challenges and providing clean energy solutions. Guided by the values of community engagement, government partnership, and a demonstrated commitment to sustainability, energyRe is working towards a clean energy future for all New Yorkers. Currently, energyRe has under development across 17 states: 10.5 GW of renewable generation across wind, solar, storage, and offshore wind projects, 528 miles of transmission and 155 MW of distributed generation assets. energyRe is active in the development of HVDC transmission projects, including the 175-mile, 1,300 MW Clean Path New York project (along with Invenergy). This development pipeline represents a capital investment of $11 billion.

The executive team at energyRe has significant experience in renewable energy, infrastructure, engineering, and real estate development; energyRe's founding partners are principals of Related Companies, the most prominent private real estate firm in the US with over $60 billion in assets owned or under development. Related started exclusively as an affordable housing developer in 1972 and today is one of the largest developers of affordable and workforce housing in the United States. Related's developments include the 28-acre Hudson Yards neighborhood on Manhattan's West Side, the transformative Willets Point community in Queens with 2,500 100% affordable housing units, as well as luxury condominiums, rentals, and offices across the United States.

Named to Fast Company magazine's list of the 50 Most Innovative Companies in the World, Related is a champion of environmentally conscious real estate and continuously advances the design, construction, and operation of its properties to reduce their environmental footprint. In 2008, Related committed that every building developed in the United States, regardless of asset class, shall be certified LEED Silver or better.

The principals of energyRe have developed the following marquee projects involving interconnection to Con Edison (ConEd) transmission infrastructure.

Hudson Yards cogeneration microgrid. Nearly every Eastern Rail Yard building at Hudson Yards was planned with the intention of installing cogen to help meet high-level LEED requirements. But the plants would have been small because each building's individual demand for hot and chilled water varies greatly over the course of the day or week. Commercial buildings peak in the afternoon, residential buildings peak in the morning and evening, and the retail and cultural facilities are busiest over the weekend when the commercial buildings are nearly empty.

In response, we consolidated the power and thermal demands of the buildings, establishing a microgrid and connecting the buildings to a thermal loop. Related established one larger plant instead of four smaller ones, making more than four times as much cogen capacity economically rational. This single-plant solution capitalizes on the mixed-used program of Hudson Yards.

Just as crucially, Related did not have to build out a costly electrical distribution network to implement the microgrid. Instead, the cogen plant delivers power directly to the ConEd grid, and ConEd offsets this power from the Eastern Rail Yard buildings' electricity bills. In the event that ConEd's grid fails, breakers open to isolate Hudson Yards from the rest of the grid, and cogen power will be delivered directly to the buildings.

All told, Related's 13.3 MW cogen plant, thermal loop, and ConEd interconnection cost nearly $200 million. To recoup some of this cost, Hudson Yards sells various forms of power to the Eastern Rail Yard buildings and tenants through a subsidiary set up for its power business. This setup allows Hudson Yards to cover ongoing operating costs and the facilities' mortgage payments. It comes with a binding commitment that rates will be no higher than they would be if the microgrid did not exist.

Time Warner Center load management energy conservation. Time Warner Center (now known as Deutsche Bank Center) is a two-million-square-foot mixed-use skyscraper developed by Related Companies in 2003 and managed by Related Management thereafter. The facility has foot traffic of approximately 5,700 people per day for entertainment, luxury condominiums, retail shops, and hotel and commercial office space.

Time Warner Center, in partnership with NYSERDA and utiliVisor, undertook a load management energy conservation project that optimized chilled-water production for the past two years. Since the project has been implemented, approximately 1,407,014 kWh has been saved.

Gateway Center battery storage project. Gateway Center, a mall for big-box stores in Brooklyn's East New York that is owned by Related, is the site of a 5 MW lithium-ion battery energy storage project, the largest battery storage project in New York City. The battery connects in front of the meter for dispatch based on ConEd's signal.

Enel X, the developer of the battery system that leases the space from Related, said in a statement, "The system's design enables a direct relationship between Enel X's energy storage resource and ConEd, while simplifying the lease transaction from a real estate perspective by removing the complexities of energy management and tenant participation from the structure."

The battery generates revenue by delivering capacity to the utility as part of its Brooklyn-Queens Neighborhood Program, which uses flexible resources to defer expensive grid upgrades.

More information on energyRe can be found here: https://www.energyre.com/.

Proposer experience

Project	Location	Project type, size, and technology	COD	Construction financing year	Permanent financing year	Form of debt financing	Form of equity financing	Capacity factor (est.)			Capacity factor (act.)			Availability factor			Reference
								2021	2020	2019	2021	2020	2019	2021	2020	2019	
Sheldon Wind Energy Center (Invenergy) Sheldon is Invenergy's first operating wind farm in New York. The project has a capacity of 112.5 MW and utilizes 75 GE 1.5 SLE wind turbines. The wind farm began commercial operation in March 2009 and produces enough electricity to power more than 23,400 homes.	Wyoming County, NY	• Generation • Wind • 112.5 MW	Mar. 2009	2008	2008	Construction Loan	Tax and Cash Equity	22.17%	26.00%	24.50%	22.36%	24.78%	24.50%	97.75%	97.69%	96.39%	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529
Orangeville Wind Energy Center and Orangeville Energy Storage (Invenergy) Orangeville consists of a 94 MW wind power generation facility and a 20 MW lithium-ion battery storage facility in Wyoming County, New York. The wind facility was completed in 2014, while the battery storage facility was completed in 2021. The wind project utilizes 58 GE 1.6-100 turbines, producing enough electricity to power more than 25,900 homes, while the battery storage utilizes Powin's Stack system to provide grid services to NYISO and complement the output of the wind power facility.	Wyoming County, NY	• Generation • 94 MW Wind • 20 MW Storage	Mar. 2014 & Dec. 2021	2013	2013	Construction Loan (Wind)	Tax Equity (Wind), 100% Sponsor Equity (Storage)	26.36%	34.90%	33.08%	27.08%	34.01%	33.07%	91.58%	91.62%	89.72%	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529
Number Three Wind (Invenergy) Number Three Wind is currently under construction in Lewis County, NY. Once complete, the project will have a capacity of 104 MW and utilize 24 Vestas V150 turbines to produce enough electricity to power more than 60,000 homes.	Lewis County, NY	• Generation • Wind • 104 MW	Q4 2022	2021	2022 (Targeted)	Construction Loan	Currently Raising Tax Equity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529
Grand Ridge Energy Center (Invenergy) Three clean energy technologies are co-located at Grand Ridge Energy Center, including a 210 MW wind farm, 36 MW of battery storage, and a 20 MW solar farm, all developed and operated by Invenergy. The first project phase began operating in 2008 and the latest came online in 2016. A battery system helps maintain power quality and reliability for the PJM electric grid. The project provides enough power for 54,000 homes.	LaSalle, IL	• Generation • 210 MW Wind • 20 MW Solar • 36 MW Battery Storage	2008-2016	2008 & 2009 (Wind)	2008 & 2010 (Wind)	Construction Loan (Wind, 2008), Construction and Term Loan (Wind, 2009)	Tax Equity (Wind, 2008), Tax Equity Loan (Wind, 2009), 100% Sponsor Equity (Solar, Storage)	25.34%	27.94%	28.75%	25.49%	27.02%	28.54%	94.11%	97.48%	96.53%	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529

Table 3-1. Invenergy and energyRe have experience developing and operating large complex infrastructure projects.

Proposer experience

Project	Location	Project type, size, and technology	COD	Construction financing year	Permanent financing year	Form of debt financing	Form of equity financing	Capacity factor (est.)			Capacity factor (act.)			Availability factor			Reference
								2021	2020	2019	2021	2020	2019	2021	2020	2019	
Traverse Wind (Invenergy) Traverse Wind Energy Center is a 998 MW wind power generation facility in Custer and Blaine Counties that began operations in March 2022. The project is sited on more than 100,000 acres and consists of 356 2.5- and 2.8-MW wind turbines, and an 84-mile transmission route. Invenergy developed, designed, and managed construction for the project and also serves as the initial project operator.	Custer and Blaine Counties, OK	• Generation • Wind • 998 MW	Mar. 2022	2019/2020	2021	Bridge and Construction Loans	Project sold to AEP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529
Samson Solar Energy Center (Invenergy) Samson Solar is a 1,310 MW project that spans across three Texas counties and is being constructed over five phases. Once fully complete in late 2023, Samson Solar will be the single largest solar project in the US. To-date, the project has secured offtake from a wide variety of partners, including AT&T, McDonald's, Honda, Google, the City of Denton, and Garland Power & Light.	Franklin, Lamar, and Red River Counties, TX	• Generation • Solar • 1,310 MW	2022-2023	2021	2022	Bridge and Construction Loans	Tax Equity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529
Energía del Pacífico (EDP) (Invenergy) EDP is an LNG-to-power project currently in operation in El Salvador. The project includes a 380 MW gas-fired power plant that runs on natural gas, a 28 MW common steam turbine generator, an offshore liquified natural gas import terminal, and a floating storage regasification unit that delivers gas to the power plant via a subsea natural gas pipeline. It includes a 44-kilometer 230 kV double-circuit transmission line from Acajutla to Ahuachapán and its associated substations. EDP is under a 20-year agreement with the local power distribution companies of El Salvador.	Port of Acajulta, El Salvador	• Generation • LNG-to-power • 380 MW	May 2022	2019/2021	2019/2021	Construction and Term Loans	100% Sponsor Equity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Beth Conley 1 S. Wacker Drive Suite 1800 Chicago, IL 60606 312.429.2529

Table 3-1 (continued). Invenergy and energyRe have experience developing and operating large complex infrastructure projects.

Proposer experience

								Capacity factor (est.)			Capacity factor (act.)			Availability factor			
Project	**Location**	**Project type, size, and technology**	**COD**	**Construction financing year**	**Permanent financing year**	**Form of debt financing**	**Form of equity financing**	**2021**	**2020**	**2019**	**2021**	**2020**	**2019**	**2021**	**2020**	**2019**	**Reference**
Deutsche Bank Center (energyRe) The Deutsche Bank Center (fka the Time Warner Center) changed the face of Manhattan in a dramatic way, adding drama to the city's skyline and serving as an urban catalyst that redefines the Columbus Circle neighborhood. Related worked closely with the City of New York and the MTA on the development of the soaring 2.8-million-square-foot vertical mixed-use property.	New York, NY	• 2.8 million total square feet	2004	2000	2004	Term Loan with Construction Component	100% Sponsor Equity through JV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Jon Weinstein 30 Hudson Yards New York, NY 10001 212.801.3902
Hudson Yards (energyRe) Hudson Yards, Manhattan's first-ever LEED GOLD Neighborhood Development, is at the center of New York City's rapidly changing West Side. The largest private real estate development in New York since Rockefeller Center, Hudson Yards is codeveloped by Related Companies and Oxford Properties Group.	New York, NY	• 28 total acres • 14 acres of open spaces • 18.1 million total square feet	2016-2024	2013-2017	2016-2024	Construction Loan, Construction Preferred Equity, Permanent Loan	100% Sponsor Equity through JV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Jon Weinstein 30 Hudson Yards New York, NY 10001 212.801.3902
The Grand LA (energyRe) The Grand LA is a multiphase master-planned development to reenvision and redevelop underutilized government-owned parcels adjacent to the Civic Center and key cultural institutions such as the Music Center, Walt Disney Concert Hall, The Colburn School of Music, and the Museum of Contemporary Art. The result is a dynamic mixed-use district fitting for the cultural center of Los Angeles.	Los Angeles, CA	• 3.2 total acres • 1.56 million total square feet	2022	2020	2022	Construction Loan	100% Sponsor Equity through JV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Jon Weinstein 30 Hudson Yards New York, NY 10001 212.801.3902

Table 3-1 (continued). Invenergy and energyRe have experience developing and operating large complex infrastructure projects.

The Sheldon Wind Farm, Invenergy's first operating wind energy center in New York, is located in Wyoming County. The project has a capacity of 112.5 MW and utilizes 75 GE 1.5 SLE wind turbines. The wind farm began commercial operation in March 2009 and produces enough electricity to power more than 23,400 homes.

Sheldon Wind Energy Center			
Partner	Invenergy		
Location	Wyoming County, NY		
Project type	Generation		
Project size	112.5 MW		
Project technology	Wind		
COD	March 2009		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	22.17%	22.36%
	2020	26.00%	24.78%
	2019	24.50%	24.50%
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	97.75%	
	2020	97.69%	
	2019	96.39%	
Reference	Beth Conley 1 S. Wacker Drive, Suite 1800, Chicago, IL 60606 312.429.2529		

Project description

The Sheldon Wind Farm is Invenergy's first renewable facility to reach operations in New York. Invenergy developed, constructed, and operates the project.

The project is located in Sheldon, New York, on approximately 21,300 acres of land leased from approximately 85 landowners. The site is located atop two ridgelines and rolling hills along the tops of the ridges. The surrounding land is predominantly agricultural usage (cropland and pasture).

In 2011, Invenergy entered into a ten-year agreement to sell Renewable Energy Credits (RECs) from the wind farm to the New York State Energy Research and Development Authority. Sheldon interconnects to the NYISO transmission system via the Sheldon substation, which was constructed adjacent to NYSEG's 230 kV Stoelle Road–Meyer transmission line.

Sheldon Wind Energy Center (continued)

Sheldon substation

The Sheldon substation, developed by Invenergy to interconnect the Sheldon Wind Farm, is a 230 kV substation in a 3-breaker ring bus configuration. The in-service date was in 2008 and the facility is currently in operation. Ownership was transferred to NYSEG, which currently operates the facility.

Benefits

The Sheldon Wind Farm produces enough electricity to power more than 23,400 American homes. Its emissions reductions are equivalent to removing 30,700 cars from the road.

The project employed more than 1,000 workers during peak construction and employs nine full-time operations and maintenance staff. The project invests more than $2.9 million annually in wages, benefits, local taxes, and landowner payments.

Grand Ridge Energy Center is the world's largest co-located wind, solar, and energy storage facility, totaling 266 MW. It maintains power quality and reliability for the PJM electric grid and serves as an innovation and research center for Invenergy.

Grand Ridge Energy Center			
Partner	Invenergy		
Location	LaSalle County, IL		
Project type	Generation		
Project size	210 MW wind, 20 MW solar, 36 MW battery storage		
Project technology	Wind, solar, storage		
COD	2008 - 2016		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	25.34%	25.49%
	2020	27.94%	27.02%
	2019	28.75%	28.54%
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	94.11%	
	2020	97.48%	
	2019	96.53%	
Reference	Beth Conley 1 S. Wacker Drive, Suite 1800, Chicago, IL 60606 312.429.2529		

Project description

Grand Ridge Energy Center is located in LaSalle County, Illinois, 80 miles southwest of Chicago. Three clean energy technologies are co-located, including a 210 MW wind farm, 36 MW of battery storage, and a 20 MW solar farm, all developed and operated by Invenergy.

The first phase of the project began operating in 2008 and the latest came online in 2016. Renewable energy from Grand Ridge helps consumers meet sustainability goals, while its battery system helps maintain power quality and reliability for the PJM electric grid. The project serves the PJM power market, which stretches from northeastern Illinois all the way to the Eastern seaboard.

A center of innovation

Grand Ridge is the site of Invenergy's first solar project and its first storage project. The Brookfield solar test bed facility is located on site. Here, engineers and operators are able to evaluate and compare the performance of various system configurations and equipment types as well as test new operations strategies and techniques.

Grand Ridge Energy Center (continued)

The experience of developing, owning, and operating these projects has given Invenergy confidence in development, battery chemistry, deployment, and operations, paving the way for its large solar and storage portfolio today.

Invenergy is also funding the collection of data from five telemetry units that are attached to bald eagles to better understand their behavior and interaction with the landscape and operational wind facilities. This research is being conducted in partnership with the US Fish and Wildlife Service in Illinois.

Honors

The site has won both *Power Engineering* and *Renewable Energy World Magazine*'s Project of the Year Award as well as Energy Storage North America's (ESNA) Innovation Award.

Benefits

The project produces enough renewable energy to power 54,000 US homes. It provides fast-response regulation service to the PJM market. Emissions reductions from the project are equivalent to removing 68,000 cars annually from the road.

The project generates $4.88 million annually in wages, benefits, local taxes, and landowner payments. Three hundred thirty jobs were created during construction, and the project employs six full-time operations and maintenance staff.

Energía del Pacífico, Ltda. de C.V. (EDP) is an LNG-to-power project at the Port of Acajutla, El Salvador. This $1 billion project, the largest private investment to date in El Salvador, achieved commercial operations in May 2022 and will meet about one third of El Salvador's total electricity needs while significantly reducing the amount of carbon and sulfur pollution in the air.

Energía del Pacífico, Ltda. De C.V. (EDP)			
Partner	Invenergy		
Location	Port of Acajutla, El Salvador		
Project type	Generation		
Project size	380 MW		
Project technology	Liquefied natural gas to power project		
COD	May 1, 2022		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	N/A	N/A
	2020	N/A	N/A
	2019	N/A	N/A
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	N/A	
	2020	N/A	
	2019	N/A	
Reference	Beth Conley 1 S. Wacker Drive, Suite 1800, Chicago, IL 60606 312.429.2529		

Project description

In 2013, the Government of El Salvador issued a call for electricity supply aimed at securing a 20-year supply of new electric power generation from sources other than heavy fuel. EDP secured the winning bid.

EDP consists of the following:

- 380 MW power plant that runs on natural gas, with one 28 MW common steam turbine generator
- Offshore liquefied natural gas (LNG) import terminal, including a dedicated, permanently moored, floating storage and regasification unit (FSRU)
- Approximately 1.8 km subsea natural gas pipeline installed under the seabed delivering gas to the power plant
- 44-kilometer 230 kV double circuit transmission line from Acajutla to Ahuachapán and its associated substations

EDP's development, construction, and operations are led by Invenergy and supported by El Salvador-based partners Grupo Calleja, VC Energy de Centroamérica, and Quantum Energy. EDP includes El Salvador's first LNG-fueled power plant and the region's first FRSU.

Energía del Pacífico, Ltda. De C.V. (continued)

Challenges

Laying the groundwork for this project had its challenges, including regulatory approvals for offshore gas storage and transmission, the complex scope of the transmission network, designing novel physical components, and minimizing environmental and visual impacts. As project lead, Invenergy is leveraging decades of development, engineering, finance, construction and operating experience to execute this complex project alongside its partners. Also, most part of the construction of this project was executed during the worst spike of the COVID-19 pandemic. COD was declared in May 2022, two months before the deadline according to the PPAs.

Investing in El Salvador

EDP completed project financing for the LNG-to-power project in December 2019. The project brings approximately $1 billion in foreign direct investment, making it the largest private investment ever in El Salvador. Leading global financial institutions — Overseas Private Investment Corporation (succeeded by the United States International Development Finance Corporation), International Finance Corporation (IFC), IDB Invest, Finnish Export Credit Ltd., and KfW IPEX-Bank — are lenders to the project.

EDP's ground-breaking development and project financing has been recognized by multiple awards, including Latin Finance's Infrastructure Financing of the Year Award and Latin Lawyer's Project Finance (Energy) Award. EDP's successful financing demonstrates Invenergy's ability to proficiently structure project financing and to maintain and develop successful relationships with a wide range of partners. EDP has also been recognized by the financing institutions as an exemplary project in the management and prevention of impacts originated by the COVID-19 pandemic to keep workers safe while the project continued progressing on schedule. This project was selected by the IFC to prepare a study case due to the excellent gender-based violence prevention and response provided by the project team during execution.[1] EDP was also awarded by the Americas Energy Summit & Exhibition with the Americas LNG & Gas Project of the Year Award in 2022.

Complex transmission infrastructure

For the project, Invenergy is building a 44-kilometer (27.3-mile) transmission line and three substations. The line will run from the coastal port town of Acajutla through mountainous terrain to Ahuachapán. It will connect to and strengthen the Central American Interconnection System (SIEPAC), supplying electricity to six Central American nations. The transmission is a showcase of Invenergy's execution abilities as the ROW negotiations had to be finalized before power plant construction could begin.

Benefits

EDP provides cleaner, more reliable energy for El Salvador, diversifying the energy mix and meeting more than 30% of the country's energy demand. Reliable power generation will drive economic growth and contribute to the stability of the region. The project created over 2,000 jobs during construction and more than 60 permanent jobs in the operation phase.

Invenergy is heavily invested in the social and economic advancement of the municipality of Acajutla. Invenergy is providing more than $500,000 of projects and initiatives each year that will improve the quality of life for local communities through improvements in basic infrastructure and social services. These include improvements in public streets and roads, a wastewater treatment plant in Acajutla, new powerlines for remote boroughs without access to power supply, and donations of miscellaneous supplies to the communities of Acajutla, Ahuachapán, Sonsonate, San Pedro and Santo Domingo de Guzmán.

[1] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gbv-edp

Related worked closely with the City of New York and the Metropolitan Transportation Authority (MTA) on the development of Deutsche Bank Center (fka Time Warner Center). Sitting atop the third busiest subway station in the New York City transit system, Deutsche Bank Center proves that thoughtful urban design with a complementary mixture of uses and transportation improvements creates a whole project that is greater than the sum of its parts. Deutsche Bank Center addressed the City's concerns to develop a positive neighborhood catalyst, while simultaneously meeting MTA's need to maximize the value of its site.

Deutsche Bank Center			
Partner	energyRe		
Location	New York, NY		
Project type	Mixed use development		
Project size	2.8 million square feet		
Project technology	N/A		
COD	2004		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	N/A	N/A
	2020	N/A	N/A
	2019	N/A	N/A
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	N/A	
	2020	N/A	
	2019	N/A	
Reference	Jon Weinstein 30 Hudson Yards, New York, NY 10001 212.801.3902		

Project description

The Deutsche Bank Center (fka Time Warner Center) changed the face of Manhattan in a dramatic way, adding drama to the city's skyline and serving as an urban catalyst that redefines the Columbus Circle neighborhood.

Related worked closely with the City of New York and the MTA on the development of the soaring 2.8-million-square-foot vertical mixed-use property.

Deutsche Bank Center (continued)

Active nearly 24 hours a day, the 80-story building reflects the pace and cadence of the city around it. It includes the following features:

- Bustling commercial office center, home to Deutsche Bank
- 338,000-square-foot retail and dining complex featuring world-renowned chefs Thomas Keller, Masa Takayama, and Michael Lomonaco
- 5-star Mandarin Oriental Hotel with 198 rooms and 46 suites
- 40,000-square-foot Equinox® Fitness Club
- 122-seat Jazz at Lincoln Center
- 199 luxury residences

Benefits

Completed in 2004, Deutsche Bank Center quickly became a mixed-use destination like New York City had never seen before. Today, its shops attract more than 16 million visitors annually and have helped establish the neighboring entrance to Central Park as the most popular entry to Manhattan's most beloved green space.

Acting as a bridge between the mature neighborhoods of Midtown Manhattan and the Upper West Side, Deutsche Bank Center created a new center of gravity for the Columbus Circle neighborhood due to its scale, diversity of offerings, and sensitive architectural and urban design.

Hudson Yards, Manhattan's first-ever LEED GOLD Neighborhood Development, constructed over the Eastern Rail Yard of the Long Island Rail Road, is at the center of New York City's rapidly changing West Side. At the nexus of Chelsea and Hell's Kitchen, Hudson Yards is the largest private real estate development in New York since Rockefeller Center and co-developed by Related Companies and Oxford Properties Group.

Hudson Yards			
Partner	energyRe		
Location	New York, NY		
Project type	Mixed-use development		
Project size	18.1 million square feet		
Project technology	N/A		
COD	March 2019		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	N/A	N/A
	2020	N/A	N/A
	2019	N/A	N/A
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	N/A	
	2020	N/A	
	2019	N/A	
Reference	Jon Weinstein 30 Hudson Yards, New York, NY 10001 212.801.3902		

Project description

Hudson Yards is far more than a collection of towers and open spaces. It is a model for the 21st-century urban experience; an unprecedented integration of buildings, streets, parks, utilities, and public spaces that forms a connected, responsive, clean, reliable, and efficient neighborhood. The development is part of New York City's goal to transform the broader 42-block Hudson Yards District from a largely vacant, underdeveloped area into a vibrant mixed-use neighborhood of workers, residents and visitors is also being achieved ahead of projections, with over 30 million square feet of new development completed or in construction since the rezoning in 2005.

Building an entire new neighborhood in the heart of Manhattan from the ground up afforded us the opportunity to recalibrate every aspect of a 21st-century, urban mixed-use neighborhood.

Hudson Yards (continued)

Since opening in March 2019, Hudson Yards has become a thriving destination for foodies, fashionistas, art lovers, park goers and tourists—not to mention home the world's most innovative businesses and trendiest urban dwellers. Hudson Yards is home to dozens of restaurants and one-of-a-kind shopping experiences; The Shed, a unique cultural center; the first Equinox Hotel®, world-class medical facilities and lush gardens; and Edge, the Western Hemisphere's highest outdoor observation deck. All of this is in addition to state-of-the-art office space, and the finest in luxury residences and affordable rental apartments.

To build the first half of Hudson Yards, a "platform" was constructed over the Eastern Rail Yard of the Long Island Rail Road. Completed in 2016, the 10-acre platform bridges 30 working tracks, three subsurface tunnels used by Amtrak and New Jersey Transit, and the Gateway Tunnel, which is not yet in service.

The platform, which weighs more than 35,000 tons, is supported by 300 caissons — ranging from four to five feet in diameter and 20 to 80 feet in depth — that were drilled into the bedrock between existing tracks. In total, 25,000 tons of steel and 14,000 cubic yards of concrete were used in its construction. Throughout construction, all train lines remained operational.

Supported by an advanced technology platform, operations managers monitor and react to power demands and temperature changes in order to enhance the employee, resident, and visitor experience. Communications are supported by a fiber loop, designed to optimize data speed and service continuity for rooftop communications, as well as mobile, cellular and two-way radio communications.

Resilience

Whatever the potential disruption — superstorm, brownout — Hudson Yards has the onsite power-generation capacity to keep basic building services, residences, and restaurant refrigerators running. Because it is built above a rail yard, the first level of Hudson Yards is well above the flood plain.

A unique electrical interconnection will allow the cogeneration plant to disconnect from the utility during grid outages and restore power to tenants.

The 895-foot-tall tower at 10 Hudson Yards features a 1.2 MW cogeneration plant that generates power, hot water, and chilled water with twice the efficiency of standard systems. It remains operational in the event of a power outage. A stormwater retention tank replenishes cooling towers and irrigate terrace landscaping, and an Operation and Energy Control Center coordinates security, building performance, and visitor experience throughout Hudson Yards.

Hudson Yards (continued)

Economic benefits

Hudson Yards is a new economic engine for New York City. The project contributed more than $10 billion to the City's GDP during construction and serves as a significant source of revenue to the MTA. Hudson Yards is well known as the largest private sector project in US history and an enormous source of jobs through construction and associated industries. The first wave of construction at Hudson Yards, comprising nearly 7.5 million square feet, was built predominantly with union labor.

Related created the "Hudson Yards Hiring Network" in 2018 to help assure that as many of the operational jobs being created by our new Hudson Yards development would be made available to city residents who might have additional barriers to employment. The Hiring Network coordinates the efforts of multiple city agencies and at least ten community nonprofits that service the needs of those who are justice-involved, have physical and mental health disabilities, live in public housing, or are veterans or homeless.

Environmental benefits

Hudson Yards is Manhattan's first-ever project to receive the LEED GOLD Neighborhood Development designation.

A 13.3MW cogeneration facility will provide over 50% of the electrical and thermal demand of the Eastern Yards, avoiding 25,000 million tons of greenhouse gas emissions each year (equal to the annual emissions of 5,000 cars).

Nearly 10 million gallons of stormwater will be collected each year from building roofs and public plazas, then filtered and reused in mechanical and irrigation systems to conserve potable water for drinking and reducing stress on New York's sewer system. Captured rainwater is used to irrigate the over 200 mature trees and 28,000 plants in the public park.

The Grand LA is a visionary project to revitalize downtown LA's cultural and civic core with a mix of commercial, retail, cultural, and residential units stitched together with great public spaces and world-class architecture.

The Grand LA			
Partner	energyRe		
Location	Los Angeles, CA		
Project type	Mixed use development		
Project size	1.56 million square feet		
Project technology	N/A		
COD	Est. 2022		
Estimated and actual capacity factor (past three years)	**Year**	**Estimated**	**Actual**
	2021	N/A	N/A
	2020	N/A	N/A
	2019	N/A	N/A
Availability factor (past three years)	**Year**	**Availability factor**	
	2021	N/A	
	2020	N/A	
	2019	N/A	
Reference	Jon Weinstein 30 Hudson Yards, New York, NY 10001 212.801.3902		

Project description

The Grand LA is a multiphase master-planned development to re-envision and re-develop underutilized government-owned parcels directly adjacent to the Civic Center and key cultural institutions such as the Music Center, Walt Disney Concert Hall, The Colburn School of Music, and the Museum of Contemporary Art. The Grand is a 24-7 destination for shopping, dining, entertainment and hospitality, as well as a paradigm-shifting place to live. The result is a dynamic mixed-use district fitting for the cultural center of Los Angeles.

Part of The Grand Avenue Project is a visionary public-private partnership with the Los Angeles Grand Avenue Authority to revitalize downtown LA's cultural and civic core with a mix of commercial, retail, cultural and residential uses stitched together with great public spaces and world-class architecture. This multi-phased master planned development is re-envisioning and re-developing underutilized government-owned parcels directly adjacent to the Civic Center and key cultural institutions.

The Grand LA (continued)

The Grand includes 176,000 square feet of retail space anchored by chef-driven restaurants and a collection of shops; more than 400 residences of which 20% is affordable housing units; a luxury hotel and more. The development also includes a large, vibrant public plaza with a series of landscaped, open terraces. Key project components funded by Related include these:

- Grand Park (12-acre public park, 3 million visitors yearly, completed 2012)
- The Emerson residential tower (271 residences, 5,000 square feet of retail/restaurant, completed 2014)
- The Broad contemporary art museum (completed 2015)
- The Grand (3.2 acres, 436 residences, 309 hotel rooms, 1,036-space parking garage, 175,000 square feet retail/restaurant/entertainment, 1.56 million total square feet, completed 2022)

Designed by Frank Gehry, The Grand includes a dynamic mix of hotel, dining, nightlife, and residential anchored by a central public plaza above subterranean parking. Destination restaurants and shopping are spread among a series of landscaped open terraces along with a 39-story residential tower, 20% of which are affordable-rate units.

As part of Related's longtime commitment to the larger Grand Avenue Project, Related also developed Grand Park.

The Grand LA (continued)

Benefits

The Grand generates broad community benefits including an estimated 10,000+ new jobs—8,310 construction jobs and 3,280 permanent jobs during operations. The Grand is working with local labor advocates and human service agencies to create construction and permanent employment opportunities for formerly incarcerated individuals, nonnative English speakers, those without a high school diploma, and other populations that face employment barriers.

The project provides much-needed affordable housing, $1.3 billion in one-time total economic output for Los Angeles County, $397 million in revenues to the City of Los Angeles, and $68 million in revenues to the County of Los Angeles over the next 25 years.

The destination attracts thousands of visitors from across the nation and around the world, along with downtown residents and visitors from other communities throughout the region.

The Grand exceeds energy efficiency requirements through high-efficiency heating, cooling, and hot water systems, LED lighting, ENERGY STAR equipment and appliances, and smart controls. Use of the city's potable water supply is reduced through significant rainwater collection and reuse for irrigation systems and water efficient fixtures.

The Grand offers residents and visitors access to sustainable and unique amenities including EV charging stations, on-demand electric vehicle car sharing, and over 150 bicycle parking spaces. The Grand's site design enhances the neighborhood fabric with mixed uses and a pedestrian-friendly streetscape.

3.4 Proposer's project team and responsible entities

The Leading Light Wind project team draws on a diverse set of experiences in the renewable energy and offshore sectors. We have compiled an experienced team focused on a shared mission to support New York state in achieving its Climate Leadership and Community Protection Act goals; to achieve a 100% carbon free electricity system by 2040, to reduce greenhouse gas emissions 85% below 1990 levels by 2050, to achieve a target of 70% of New York's electricity from renewable energy sources by 2030, and to develop 9,000 MW of offshore wind energy by 2035. A project team chart is provided in Figure 3-3 along with corresponding bios.

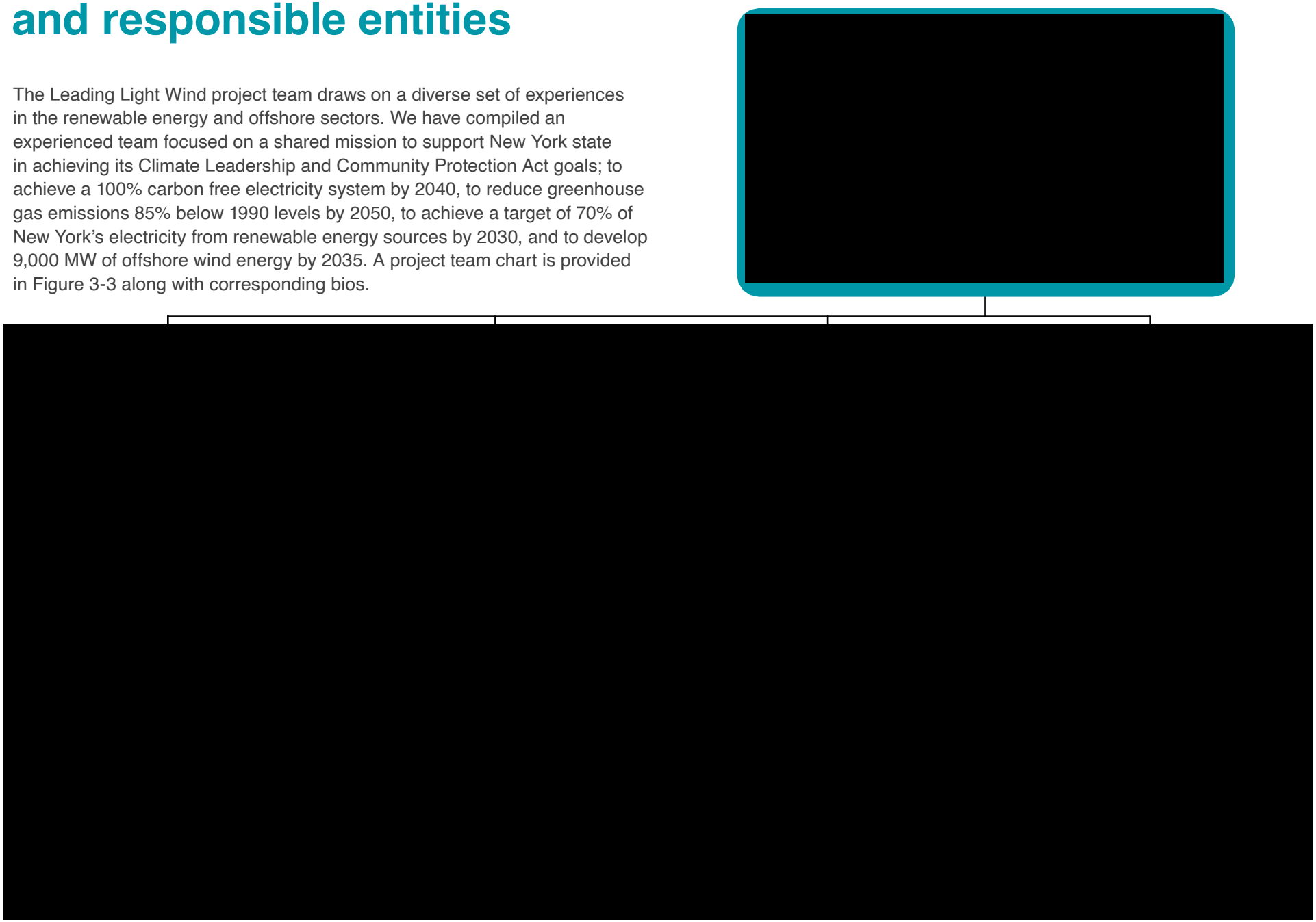


Figure 3-3. Leading Light Wind project team chart.

Development and finance

Joshua Weinstein

Joshua Weinstein is Vice President, Offshore Development at Invenergy and leads Invenergy's offshore wind development efforts. Joshua has over 16 years of offshore wind industry experience, with a focus on project development and interconnection. Prior to joining Invenergy, Joshua was the head of DNV's North American power system planning business. Prior to DNV, Joshua was Vice President, Business Development and Operations for Offshore Wind at Principle Power, where he oversaw the development of floating offshore wind projects in Europe and APAC.

Nash Tahmaz

Nash Tahmaz is Senior Vice President, Offshore Wind for energyRe. Nash has more than 20 years of experience in the energy industry and more than a decade of experience in offshore wind. Prior to joining energyRe, he was Leader, Offshore Wind Execution at Equinor ASA/UK, where he led the US East Coast offshore wind business development working group on behalf of the partners BP and Equinor. Nash was also involved among others in the development and bankability of Hywind Scotland, the world's first floating offshore wind farm, and Dogger Bank, the world's largest offshore wind farm, where he was head of operations and safety.

Wes Jacobs

Wes Jacobs is a Senior Director, Offshore Wind at Invenergy and the Project Director for Leading Light Wind, directing development activities for the project. He has over 20 years of experience in energy, with roles spanning capital project development, supply chain management, economic analysis, and new business development. Before joining Invenergy, Wes was a Business Development Manager for Atlantic Shores Offshore Wind, where he led strategic supply chain localization initiatives, including design and implementation of the $848 million local spend commitment for Atlantic Shores 1, a central element of the company's winning bid into New Jersey's second offshore wind solicitation.

Louis Feldman

Louis Feldman is the Deputy Project Director and Director of Project Execution for Leading Light Wind. Louis has been with Invenergy since 2019 and has held project development and project management roles for wind, solar, and battery storage. His experience includes working as the developer, manager, and director for the 300 MW Outlaw Wind project in Atchison County, MO, which came online in 2021 and managing execution of over 1 GW of solar generation in Wisconsin. Prior to joining Invenergy, Louis supported various project management and project engineering roles with Shell, with a focus in deepwater offshore transportation and installation.

Jorge Ayala

Jorge Ayala is a Senior Manager, Offshore Wind at Invenergy, working primarily on interconnection strategy and execution. Prior to joining Invenergy, Jorge worked on business development with Equinor, where he focused on the interconnection solution for Empire Wind 2, which was awarded an Offshore Wind Renewable Energy Credit (OREC) contract by NYSERDA in January 2021. Prior to Equinor, Jorge worked at National Grid, working on large-scale energy project development with National Grid, including work related to the Revolution Wind offshore wind project and work as an electric trader.

Katya Samoteskul

Katya Samoteskul is a Senior Manager, Offshore Wind at Invenergy, working primarily on transmission line development. Katya has 10 years of experience in the energy industry, including 7 years with Invenergy, with her experience spanning solar, wind, energy storage and natural gas projects. Until June 2021, she led Invenergy's development team in Indiana, growing the portfolio from 450 MW to about 3,000 GW in 3 years. Her team's responsibilities included real estate work, stakeholder engagement, permitting, property tax abatements and engaging with various internal and external multidisciplinary teams to find solutions to numerous challenges.

Jonathan Furman

Jonathan Furman is an Associate at energyRe, where he focuses on M&A and financing solutions across a variety of renewable energy technologies. Before joining energyRe, Jonathan served as Advisor to the United States Secretary of Transportation, focusing on infrastructure development and finance, emerging transportation technologies, and transportation safety. Jonathan collaborated directly with senior Department of Transportation leadership and served as the Secretary's primary liaison with members of Congress, executive branch officials, and private sector stakeholders.

Nick Wagner

Nick Wagner is a Development Analyst on the Offshore Wind team at energyRe where he provides support on development activities, surveying, due diligence, stakeholder engagement, and real estate work. Prior to joining energyRe, Nick was a Technical Advisory Services Analyst with Arup's Transaction Advice group, advising owners, sponsors, and lenders on the structuring, financing, and delivery of projects in the energy and infrastructure sectors. Among his recent experience, Nick has conducted technical due diligence for the potential acquisition of a stake in a portfolio of offshore wind farms along the US Atlantic coast and advised on the successful acquisition of a large portfolio of district energy systems.

Permitting, design, and construction

Megan Schneir

Megan Schneir is the Director of Finance and Capital Markets for Leading Light Wind. Megan has been with Invenergy since 2016 and has supported and lead closings, fundings and conversions of debt and tax equity financings for onshore wind, solar and thermal projects in the US. Prior to joining Invenergy, Megan worked in investment banking at KeyBanc Capital Markets, supporting various sell-side transactions.

Alberto Osorio Liebana

Alberto Osorio Liebana is Senior Director, Offshore Engineering and leads the Offshore Engineering team at Invenergy. Alberto has over 19 years of experience leading and managing multidisciplinary engineering and construction teams on major, complex infrastructure projects. Alberto's experience spans a wide range of project types and technologies through development and EPC phases, including offshore projects, thermal power plants, biofuel facilities, transmission lines, and other infrastructure projects. Most recently, Alberto served as Project Director for the Energía del Pacífico (EDP) LNG to power facility in El Salvador.

Guillaume Hardouin

Guillaume Hardouin is a Manager, Offshore Engineering at Invenergy. Guillaume has almost 20 years of engineering experience, with a focus on the offshore space in oil and gas as well as offshore wind. Prior to joining Invenergy, Guillaume was a Senior Field Development Engineer and Study Manager at TechnipFMC on its New Energy Ventures team, where he worked on a wide variety of efforts for the Magnora Offshore Wind partnership. These included management of desktop studies for seabed investigation, and environmental impact assessment and technology screening and recommendations for turbines, foundations, cables, and mooring.

Tom Egan

Tom Egan is a Manager, Renewable Electrical Engineering at Invenergy. Tom has been involved as an electrical engineer in over 2 GW of wind, solar, battery storage, and thermal power generation projects. On the offshore wind side, Tom manages and leads the evaluation of potential interconnection technology solutions and directs desktop studies. Prior to joining Invenergy, Tom was an electrical engineer with the Kiewit Engineering Group.

Shannon Stewart

Shannon Stewart is a Senior Director of Environmental Compliance & Strategy at Invenergy, where she leads federal and Article VII permitting for offshore wind and provides strategic input to renewable energy and transmission projects onshore. Shannon has over 25 years of energy industry experience focused on policy advancement, permitting for complex infrastructure projects, and stakeholder engagement. Shannon has held senior level positions with Department of Energy, Department of the Interior, a California public utility, and an environmental consulting firm. She is a recognized leader in the energy and environmental field.

Daniel Birmingham

Daniel Birmingham is a senior manager on Invenergy's offshore wind procurement team. He leads Invenergy's interactions with Tier 1 contractors for the Leading Light Wind project, including strategic partnering and procurement efforts. Prior to joining Invenergy's offshore wind team, Daniel spent five years supporting the development and construction of Invenergy's renewable energy pipeline in Mexico and Latin America. He started his career in oil and gas operations.

Brian Kerkhoven

Brian Kerkhoven is a Director of Labor Relations at Invenergy and the Labor Liaison Officer for the Leading Light Wind project. Brian's relationships with labor leaders throughout New York City, Long Island, and New York State uniquely position him to be an effective interface between Leading Light Wind and organized labor. Brian joined Invenergy with nearly a decade of labor experience after serving as the Energy Policy Advisor for North America's Building Trades Unions (NABTU). He played an integral role developing the relationships between labor and the nascent offshore wind industry in the US, leading to the first of its kind Memorandum of Understanding between organized labor and the eventual Project Labor Agreement signed between NABTU and Orsted.

Jeff Lee Romero

Jeff Lee Romero is a Director of Local Content for Invenergy and Leading Light Wind. A development finance attorney and urban planner by training with over 20 years of experience in community and economic development, Jeff thrives in helping private and public sector stakeholders to innovate and grow. Jeff has experience overseeing high-profile industrial and manufacturing initiatives and programs, including the New York City Industrial Development Agency program. He also oversaw NYCEDC's efforts in applying for and winning a $50M award under the federal new markets tax credit program. As a Principal at Karp Strategies, Jeff oversaw a number of projects in the Northeast to grow local offshore wind supply chains. Prior to joining Karp Strategies, Jeff spearheaded the economic development practice at Capalino.

Diversity, equity and inclusion

Tanya Diaz-Goldsmith

Tanya Diaz-Goldsmith is the Director of Talent Development & Diversity for Related Companies and the Director of Diversity, Equity, and Inclusion for energyRe. She leads organizational diversity efforts, working to embed best-in-class diversity and inclusion practices into all facets of the business to support the company's commitment to advancing equity. Tanya has developed robust strategies to promote diversity that prioritize a holistic, people-centric approach and makes use of her decades of experience in real estate and nonprofit. Prior to joining Related, Tanya was the Senior Director of Learning & Organizational Development at the YMCA of Greater New York, where she led learning and development programs and organizational culture initiatives for over 4,400 staff. Tanya is a proud member of the board of directors of Rehabilitation Through the Arts, and sits on their DE&I committee. RTA is committed to breaking the cycle of incarceration by helping people in prison develop critical life skills through the arts.

Communications and external affairs

Michael Porto

Michael Porto is the External Engagement Director for Leading Light Wind. He leads Leading Light Wind's overall communications and engagement strategy for elected and government officials, NGOs, local communities, labor, fisheries, and tribal communities. He has over 15 years of experience working at the intersection of sustainable infrastructure and public policy. Before joining Leading Light Wind, he served as Manager of City Government Affairs with Con Edison for nearly seven years. While there, he led the company's NYC government relations efforts, including the revamp of the company's Clean Energy Commitment. Previously, he was Director of Outreach and Planning at the Waterfront Alliance, and created the first version of WEDG, or Waterfront Edge Design Guidelines, a tool to promote resiliency, ecology, and public access for waterfront sites.

Amy Varghese

Amy Varghese is the Vice President of External Affairs for energyRe. She leads energyRe's external communications, such media engagement and content management, that support the company's clean energy project portfolio—including the 1,300 MW HVDC Clean Path New York transmission project. Prior to joining energyRe, Ms. Varghese held several positions in New York City and State public service, including as Director of Communications for the Office of the New York City Comptroller and Press Secretary for Empire State Development, where she led communications for many of New York's largest infrastructure initiatives—including the redevelopment of the Moynihan Train Hall, the expansion of the Jacob K. Javits Center, Atlantic Yards and the UBS Arena.

In addition to employees, Leading Light Wind will supplement the team with targeted experts across a wide range of disciplines:

[redacted]

[redacted]

3.5 NYISO experience

Leading Light Wind (via Invenergy) has an extensive track record as a developer, asset owner, and operator in NYISO dating back to the completion of the 112.5 MW High Sheldon Wind Farm, New York in 2009. In total, Invenergy has developed or is developing nearly 900 MW of capacity in New York State, including 267 MW of operating projects and an additional 626 MW of contracted projects. Invenergy currently operates four projects in the NYISO market: the Sheldon, Marsh Hill, and Orangeville wind farms and the Orangeville battery storage project. A list of Invenergy's operating and contracted projects is provided in Table 3-2.

Project name	Technology	Capacity (MW)	Project status	Year of operation	Utility territory
High Sheldon (Sheldon)	Wind	112.5	Operating	2009	NYSEG
Marsh Hill	Wind	16.2	Operating	2014	NYSEG
Orangeville	Wind	94.0	Operating	2014	NYSEG
Shoreham	Solar	24.9	Operating	2018	LIPA
Orangeville	Storage	20.0	Operating	2021	NYSEG
Number Three	Wind	105.8	Under construction	[redacted]	National Grid
Horseshoe	Solar	[redacted]	Contracted	[redacted]	National Grid
Alle-Catt	Wind	[redacted]	Contracted	[redacted]	National Grid

Table 3-2. Invenergy-developed NYISO projects by project status.

Invenergy is an active participant in the NYISO Committee process (via Invenergy Energy Management LLC) and a voting member on the Management Committee, Business Issues Committee, and Operating Committee.

Invenergy has experience with transmission services provided by the Long Island Power Authority/PSEG Long Island and NYPA. These include the following:

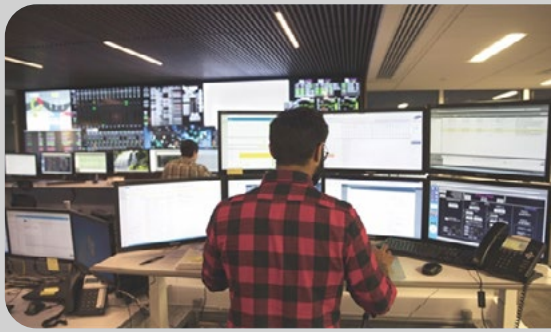
- Development and construction of the 24.9 MW Shoreham Solar project, which is interconnected to Long Island Power Authority's transmission system. The project included developer-completed construction of a 69 kV substation and other associated transmission facilities, which were later turned over to Long Island Power Authority/PSEG Long Island.
- Ongoing active development of three renewable projects (Bull Run Wind, Bull Run Solar, and Verona Solar Energy Center) that will be interconnected to the NYPA transmission system. All three projects are currently under study in the NYISO Interconnection process, under Attachment X of its tariff, and have not yet reached Interconnection Agreement (IA) negotiation.
- Co-development of the Clean Path New York HVDC transmission project through Forward Power (Invenergy and energyRe JV) along with partner NYPA. NYPA will develop and own the northern segment of the transmission system, including the converter station and the interconnection facility at the withdrawal point near Fraser Substation in Delaware County, NY. Forward Power will develop and jointly own the southern segment of the transmission system, including the converter station and the associated interconnection facility at the Rainey Substation in Queens, NY.

Upon achieving commercial operations, Invenergy Wind Offshore LLC will assume NYISO market participant duties for the Leading Light Wind project. Invenergy Services LLC will be the entity that operates the control center and acts as the Agent for the projects in the NYISO markets.

Invenergy operates its US and Canadian fleet from a state-of-the-art Invenergy Control Center in downtown Chicago, Illinois. The control center runs 24-7-365 to maintain fleet availability. Invenergy operators and engineers manage the monitoring, dispatch, and control of the company's wind, solar, and energy storage facilities. Power marketing functions including scheduling, market submissions, and energy trading are also performed from the control center. This enables coordination and continuous improvement by facilitating real-time communication and forward planning between generation facilities, power markets, off-takers and transmission providers. Invenergy also maintains a full-time Backup Control Center (BCC) in Lombard, Illinois for seamless operational continuity in the event of disruptions to control center operations.

Invenergy energy management services

- Real-time scheduling
- Day-ahead market offers
- Congestion mitigation tools
- Transmission between markets
- Settlements
- Registration and ancillary services



[redacted]

04
Project description and site control

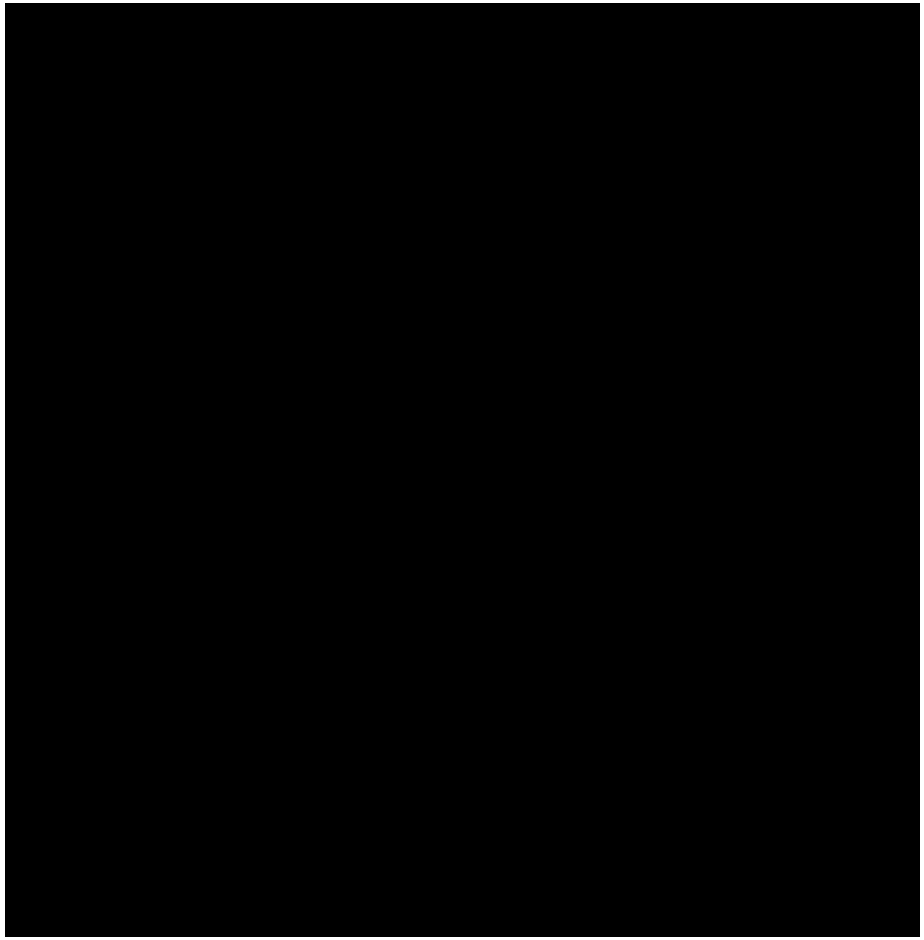
04 Project description and site control

4.1 Overview

The Leading Light Wind project options presented herein are the result of a thoughtful, thorough, and robust assessment of various project design and development options across the full scope of the project, including turbine layout and orientation, cable routing, and interconnection.

Leading Light Wind has considered a wide variety of factors including other ocean users, the shared boundary with lease area OCS-A 0541, efficient use of cable routing space, and avoidance of sensitive areas. Taken together, these considerations will ensure the development of a responsible and ultimately successful offshore wind project.

This section provides an overview of the project, including its location, the offshore wind generation facility, cable routing, and interconnection plan.



4.2 BOEM lease

Leading Light Wind will be located within BOEM Lease Area OCS-A 0542, approximately 48 miles east of Atlantic City, NJ and part of the New York Bight (Figure 4-1). Invenergy Wind Offshore LLC holds a 100% interest in the lease area.

The lease has an effective date of May 1, 2022 and initial term of 39 years, further divided into a preliminary term (1 year), a site assessment term (5 years), and an operations term (33 years). Per the lease, these terms may be modified or extended.

A copy of the full BOEM lease for the Leading Light Wind project is provided in Appendix A.

4.3 Site plan

Offshore wind generation facility site

[redacted]

Project grid interconnection

[redacted]

[redacted]

Key consideration criteria for onshore routing

- Minimize impacts to communities
- Minimize impacts to nearby disadvantaged communities (DACs)
- Avoid environmental justice areas if possible
- Minimize impacts to environmental resource areas
- Minimize instances of traversing through residential neighborhoods
- Minimize number of utility crossings (in process of being identified)

The proposed primary route

[redacted]

[redacted]

4.4 Interconnection rights

[redacted]

[redacted] the converter station solutions under consideration are commercially available and technically viable for the site.

[redacted]

[redacted]

4.5 Turbine capacity density assumptions

Leading Light Wind is not proposing an offer capacity of under 1,000 MW for any of our projects or bid alternatives, and therefore this section is not relevant to our proposal.

05
Energy resource assessment and plan

05 Energy resource assessment and plan

5.1 Introduction

This section summarizes Leading Light Wind's wind resource assessment and energy yield analysis. The analysis has been prepared by Leading Light Wind's project engineering group and meteorology consultants using data collected from on-site floating light detection and ranging (LiDAR) buoys (see Section 5.2). [redacted]

These estimates are based on available data and will be updated periodically as more data is collected and the project design is refined. Leading Light Wind estimates the available energy using methods intended to reproduce results expected by a third-party energy consultant. Our experience financing utility-scale wind projects, then operating these projects, establishes the basis of these methods. We use a measure-correlate-predict (MCP) approach that includes the steps shown in Figure 5-1.

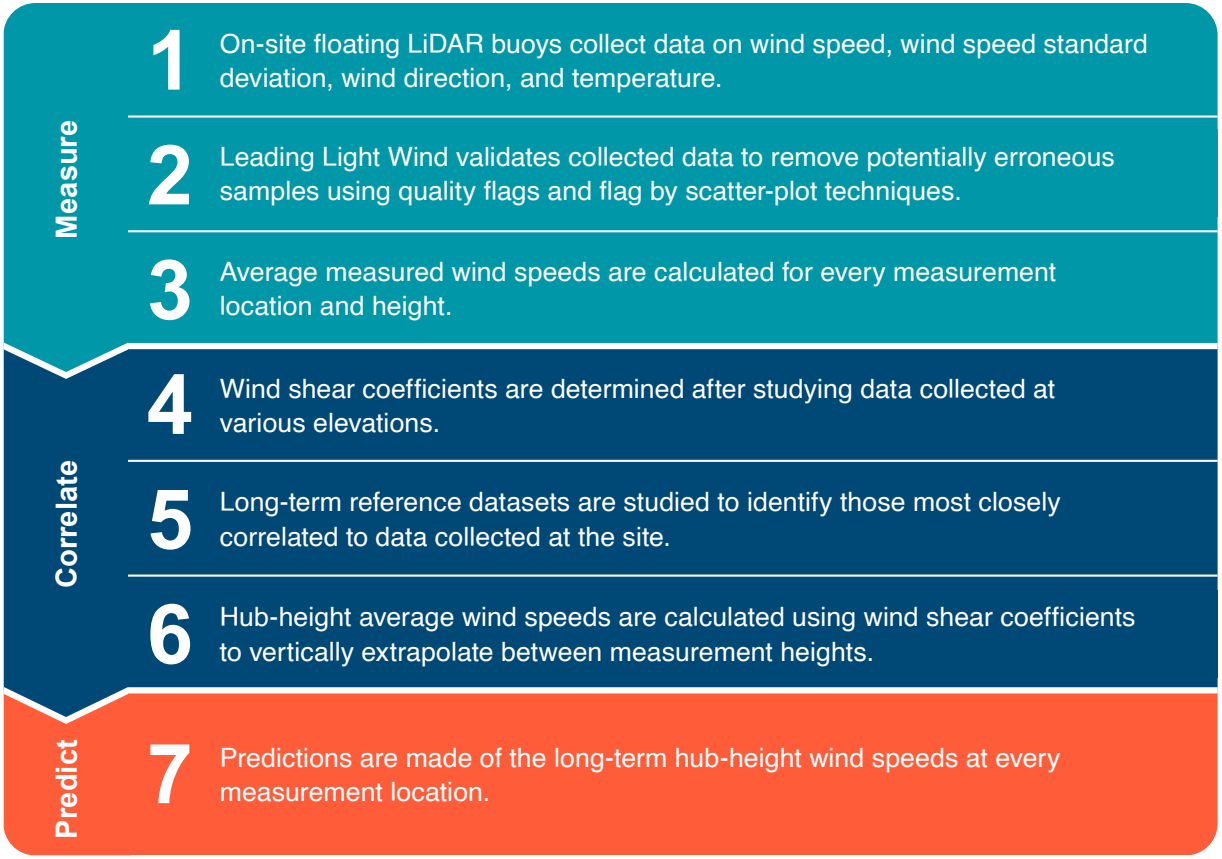
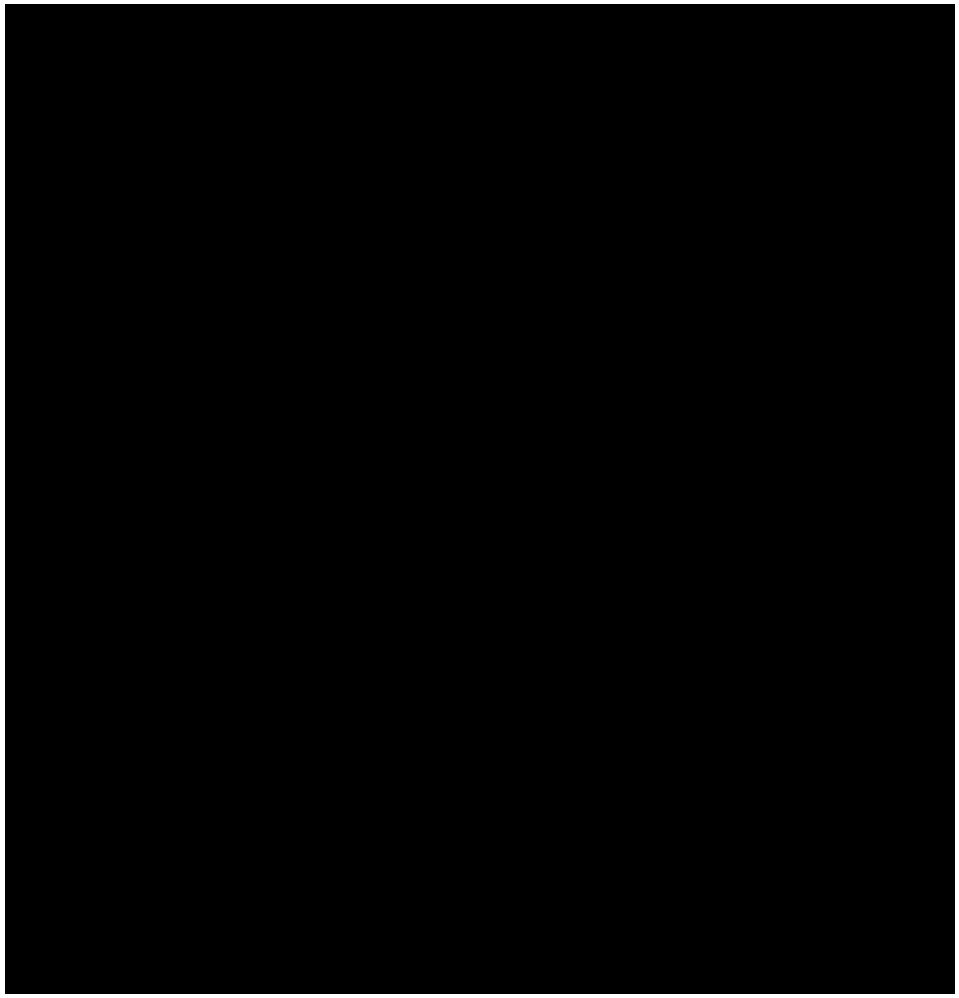


Figure 5-1. Leading Light Wind uses a measure-correlate-predict approach.



Leading Light Wind processed floating LiDAR buoy data and produced long-term time series data for each mast and adjusted wind resource grids, which were then used in the energy modeling program [redacted].

The process described above reflects a thoughtful, deliberate, and data driven approach to drive accuracy in the energy yield analysis, and is consistent with state of the art methods to model offshore wind farm production.

5.2 Summary of data

The wind resource campaign consists of [redacted] floating LiDAR systems (FLSs) near the lease area (see Figure 5-2 and Table 5-1).

Before deployment, each buoy underwent a pre-deployment verification and port site acceptance test to ensure the quality and accuracy of the data collected. The standard of documentation was reasonable and sufficient to verify traceability of the instrumentation throughout the monitoring campaign. All verifications concluded that the FLSs met the minimum key performance indicators and acceptance criteria for wind speed accuracy, as defined by the Carbon Trust Offshore Wind Accelerator (OWA) Roadmap. FLS buoy documentation and verification for E05 and E06 is publicly available [redacted] Both the EOLOS FLS200 and Fugro Seawatch technologies have recently been independently verified as having reached the highest commercial maturity rating (Stage 3).

[redacted]

At more than 50 km of distance from the nearest shore where the lease is located, there is low spatial variability of the metocean conditions (wind, waves, current, temperature). As a result, the combination of the [redacted] FLS buoys [redacted] provided excellent coverage of metocean condition measurements near the site. [redacted] This location is ideal for capturing measurements consistent with highest wind and waves locations of our lease area, based on calibrated regional metocean models.

[redacted]

[redacted]

5.3 Description of data

The energy assessment is based on approximately [redacted] of measured wind data from [redacted] to the present at measurement heights up to [redacted], shown in Table 5-2 below.

[redacted]

[redacted]

The floating LiDAR units were set up to record data during the timelines shown in Figure 5-5 and at the heights listed in Table 5-2 above. The LiDAR units were positioned on the buoys such that the height of the device lens was approximately two meters above sea level. The height above sea level of the LiDAR units has been incorporated into the heights listed in Table 5-2.

The FLSs were programmed to record mean wind speed and direction, maximum wind speed, and dispersion components during ten-minute intervals.

5.4 Wind resource assessment (including report)

Measured wind speeds

The data supplied (Table 5-3) was processed and compensated for motion using the manufacturer's algorithm. Processed remote sensing wind data was subject to a further quality checking procedure by Leading Light Wind to identify records that were affected by equipment malfunction and other anomalies.

[redacted]

Cross-site correlation

To bring all the measurement periods to a consistent period of record, missing and historic wind speed and direction data at the primary measurement levels of each measurement location were synthesized from neighboring LiDAR on a ten-minute directional basis, as shown in Table 5-4 on the following page.

[redacted]

[redacted]

[redacted]

Long-term correlation

Hourly measured on-site data was correlated to long-term reference data from [redacted] to predict long-term wind speeds at measurement height. Both [redacted] global reanalysis wind datasets were evaluated for their correlation to onsite data, and [redacted] was chosen due to its higher correlation coefficient. Further, the [redacted] data has potential consistency issues in this area, in the later part of its period of record, so it was not utilized in the measure-correlate-predict process (Table 5-5). The resulting long-term wind rose and wind frequency distribution is shown in Figure 5-6.

[redacted]

Shear

Shear coefficients (Table 5-6) for each measurement location were determined by analyzing measured shear at each tower averaged in a diurnal of each month and hour of day. These shear values were used to extrapolate wind speed at each tower to the specific turbine hub heights.

Turbulence

Post-processed turbulence intensity measurements were available at the floating LiDAR buoy locations. However, it is widely accepted that turbulence intensity (TI) measurements from LiDAR devices (volume measurements) are not directly comparable to TI measurements from meteorological masts using cup anemometers (point measurements), which is currently the wind industry standard. [redacted]

[redacted]

5.5 Wind conditions and electrical output

Method

Leading Light Wind used [redacted] software to model wind flows across the site and calculate the gross energy production from the planned wind farm. The [redacted] mesoscale wind flow model for Leading Light Wind was produced by adjusting a wind resource grid (WRG) to multi-height meteorological data from the [redacted] long-term correlated FLS buoys (see Figure 5-7). Measured hourly timeseries [redacted] and project long-term site-average hourly timeseries wind data are provided in the Hourly Wind Speed Timeseries attachment. [redacted] uses the long-term wind speed data, turbine power curves, and turbine locations to calculate the turbine performance at each location. Site-specific air density is included in each measurement location. The [redacted] wake model, with offshore specific parameters/settings, was used to calculate array losses and energy output of the wind farm. Turbine dimensions, power curves, thrust curves, and operational parameters (temperature derate, high wind hysteresis cut-out) for this analysis were provided by the turbine vendor.

[redacted]

Project configuration

The production estimates provided herein assumes the project will be built [redacted]. Additional turbine details are outlined in Table 5-7.

[redacted]

Full power curve specifications are provided in Appendix E. The power curves provided are based on air densities of 1.225 kg/m^3 and have been adjusted to the site air density of [redacted] using International Electrotechnical Commission 61400-12-1 in the energy production analysis.

There are a number of neighboring wind farms close to the Leading Light Wind project area (Figure 5-8 and Table 5-8). Information on the turbine models, sizes, and locations was identified from public Construction and Operation Plan (COP) documentation (ASOW 1, 2, and 3, Ocean Wind 1) or assumed by Invenergy based on a 2030 Commercial Operations Date (ASOW-NY, Community Offshore Wind, and Hudson South B). Wake impacts from these six wind farms were included in the energy model.

Energy output

Expected long-term P50 net energy (inclusive of all losses and wake effects) is shown in Table 5-9 on the next page.

Turbine performance characteristics

Details on air density-adjusted power curves, cut-in and cut-out wind speeds, and other operational characteristics are provided in Appendix E.

[redacted]

[redacted]

Losses

Project energy losses have been either assumed based on regional estimates and historical operational data, or directly calculated in timeseries energy capture in [redacted]. See Table 5-10 for a summary of losses.

Waking losses

- **Internal waking:** [redacted]
- **External waking:** [redacted] nearby wind farms were considered (see Table 5-8).
- **Blockage:** The blockage loss is derived from an empirical relationship that accounts for inter-turbine spacing, turbine dimensions, and atmospheric stability. [redacted]

Availability losses

- **Wind turbine availability:** Leading Light Wind has made a starting assumption for the turbine availability that could be expected from the projects based on the wave climate, anticipated O&M access strategy, and some assumptions regarding the reliability and track record of the turbine technology to be installed in the future. Note that this loss accounts for site access as well. [redacted]
- **Balance of plant and grid availability:** Leading Light Wind has commissioned multiple availability assessment studies. The balance of plant availability value is based on input from design consultants, O&M consultants, converter station OEMs, and data made publicly available through CIGRE standards. [redacted]
- **Electrical efficiency:** Array and export cable designs were generated and an associated net annualized electrical loss for the electrical systems was computed by the Leading Light Wind electrical engineering team. The electrical efficiency calculation includes losses from the turbine transformer, IAC, converter stations, export cable, and onshore AC cabling.

Turbine performance

[redacted]

[redacted]

[redacted]

Environmental

[redacted]

Curtailment/operational strategies

[redacted]

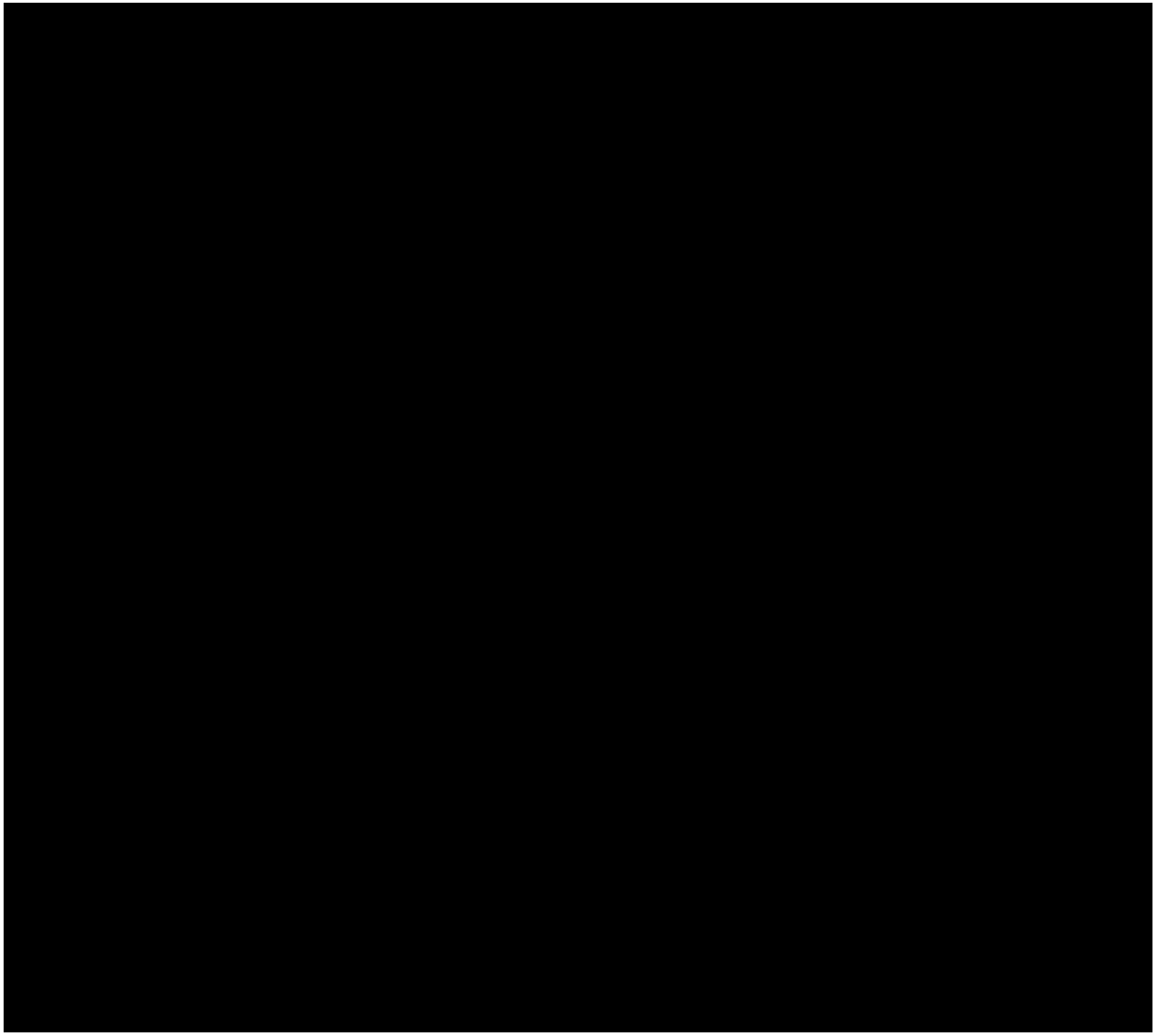
5.6 Energy delivery

Diurnal

The expected long-term average seasonal and diurnal variation in energy production have been assessed from the available data at the project site (Tables 5-11 and 5-12). The long-term average seasonal and diurnal variations in air density were developed from temperature and pressure records at [redacted] and scaled to the site predicted long-term annual site air densities.

Simulated time series of production data were produced using the time series of density, wind direction, and wind speed and the [redacted] energy model.

The resulting expected seasonal and diurnal variations in energy production for each scenario are presented in the following tables in the form of 12-month by 24-hour (12 x 24) matrices. It is noted that the uncertainty associated with the prediction of any given month or hour of day is significantly greater than that associated with the prediction of the annual energy production.



[redacted]

Uncertainty

The main sources of deviation from the central estimate (P50) have been quantified and combined using a probabilistic model, assuming full independence between the sources.

Inter-annual variability

Even if the central estimate was perfectly defined, wind farm energy production varies from year to year due to a number of factors, including natural variation in the wind regime, variations in system availability, and variations in environmental losses. Table 5-13 on the next page presents the inter-annual variability estimated for the site.

Long-term measurement-height wind regime

Table 5-14 presents uncertainties in determining the long-term measurement-height wind speed for the measurement locations on the site.

Project uncertainties

Uncertainties on the P50 energy estimate were calculated based on annual wind speed variance, duration of meteorological data campaign, correlation with the long-term reference station, correlation among on-site FLS buoys, vertical extrapolation, and topography. Wind speed uncertainties are converted to energy uncertainties using the sensitivity ratio, which shows how sensitive the net energy production is to changes in wind speed and is dependent mainly on the wind speed distribution and power curve of the turbine.

[redacted]A summary of the uncertainty values for the Leading Light Wind P50 energy is shown in Table 5-15.

[redacted]

The results of the probabilistic simulation of net energy production are summarized in Table 5-16.

[redacted]

[redacted]

06
Operational parameters

06 Operational parameters

6.1 Introduction

The operational strategy for Leading Light Wind will leverage the extensive asset management, operation and maintenance, and remote operations experience of **Invenergy Services** to maximize the performance of the project and ensure safe and reliable delivery of power to its customers.

As stated in Section 3, Invenergy Services is the asset management and operations affiliate of Invenergy and will operate and maintain the Leading Light Wind project. The organization operates and maintains over 16 GW of energy projects, including wind, solar, storage, and natural gas facilities. With over 18 years of in-house operations experience, Invenergy Services utilizes its extensive experience and industry knowledge to tackle the challenges of operating and maintaining clean energy assets, with a focus on safety, long-term ownership, and exceptional performance of each project under its management.

Invenergy Services offers a suite of clean energy services including on-site operation and maintenance, balance of plant, remote operations, asset management, energy management, and engineering technical support and data analytics.

Invenergy Services has robust experience with remote operations and maintains a 24/7 remote monitoring and control center, the **Invenergy Control Center**, in the company's corporate headquarters in Chicago (Figure 6-1).

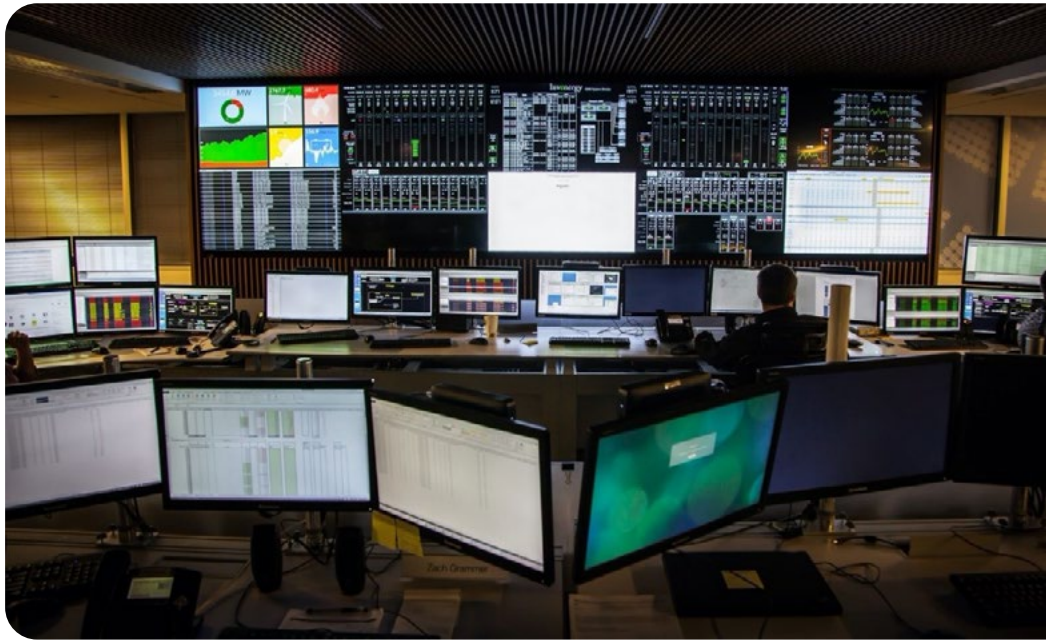


Figure 6-1. Invenergy Services maintains the 24/7 Invenergy Control Center in Chicago.

The Invenergy Control Center is staffed around the clock with real-time operators, power schedulers, and Supervisory Control and Data Acquisition (SCADA) support personnel. They constantly monitor the status of the operating equipment in the field, communicate in real time with project stakeholders, address faulted turbines, and perform remote troubleshooting and resetting of impacted units. Invenergy Control Center staff coordinate closely with the field operations teams to provide real-time feedback about equipment status and assist with safely addressing maintenance or troubleshooting needs.

[redacted]

Invenergy Services has a strong track record of success, having **received the Excellence in Operations award three times** from the American Clean Power Association (formerly known as the American Wind Energy Association).

6.2 Planned outage requirements

As discussed in Section 4, the Leading Light Wind project will be comprised of wind turbine generators (WTGs), an OFCS, an ONCS, and the inter-array and export cables needed to transmit power to the grid. Each system will be designed and operated to provide reliable generation and transmission of the project's electricity.

During the project's operating life, planned preventative maintenance activities will be performed on a cyclical basis to verify the equipment is functioning within the design specifications and remains fit for electricity generation and transmission.

[redacted] These durations will be configuration dependent and are expected to decrease over the life of the project as technical repair capabilities within the industry improve. The sections below provide additional details on the planned outage requirements for these system configurations, including the frequency and duration of such outages and the anticipated scopes of work.

Wind turbine generators

Each WTG will undergo an annual preventative maintenance cycle. [redacted]. During that time, the specific WTG undergoing maintenance will be offline and unable to generate power. All other WTGs not undergoing maintenance will remain online and capable of producing power for delivery to the grid. To minimize the impact on production, maintenance activities will be planned to coincide with the lowest wind regime periods for the Leading Light Wind project.

The scope of each preventative maintenance cycle will vary over the course of the project life and will be influenced by the specific Original Equipment Manufacturer (OEM) maintenance manual. For example, certain activities may occur each calendar year while other activities may occur on a longer maintenance interval (e.g., every 2 years, 4 years, 10 years). The general scope of annual maintenance includes but is not limited to the following:

- Inspections of the WTG subsystems and components
- Functional testing of safety features
- Functional testing of fans, switches, filters, etc.
- Greasing/lubrication of the mechanical systems
- Cleaning of accessible areas

Adherence to this maintenance schedule, in accordance with the OEM maintenance manual, is a requirement for full warranty support of the WTG during the OEM's warranty period.

The inspections performed during annual maintenances will allow the technicians to monitor the health of the components and identify and address issues requiring remediation before the capability of the WTG is impacted. Each WTG under consideration for use at the Leading Light Wind project comes equipped with the OEM's condition monitoring system. This system continuously monitors vibrations across the drivetrain components to identify abnormal readings and alert the operation and maintenance and engineering staff to components that may be experiencing incipient failure or degraded performance.

In addition to the diagnostics capabilities provided by the OEM, the Invenergy Performace Analytics Team have designed and implemented a variety of in-house analytics tools which monitor turbine power curve settings, and downtime status for optimized operations of Invenergy's generation fleet. By combining the OEM-supplied CMS system and Invenergy's sophisticated in-house analytics tools, potentially failing components can be identified early, allowing the operation and maintenance team to proactively schedule necessary corrective work to repair or replace the component before

catastrophic failure of the component occurs. This will increase the availability of the asset and mitigate the effects of unplanned component failures.

Offshore and onshore converter stations and cables

[redacted]

All routine annual maintenance items, major maintenance, and minor capital replacements will be completed within the annual scheduled maintenance outage. Routine annual maintenance items will include items such as inspections, cleaning, adjustments, and measurements that are required during a scheduled outage. Major maintenance items will be required at varying intervals starting at year five. Minor capital replacement items will include 125-volt DC battery systems, heating ventilation air conditioning (HVAC) equipment, and power electronic cooling equipment (motors, fans, pumps, heat exchangers).

[redacted] The necessary maintenance outage for this common equipment will be coordinated to take place near the completion of a pole outage to minimize switching and tagging.

[redacted]

[redacted]

There will be no scheduled maintenance of the cable system. However, there will be regular surveys conducted to ensure that the burial depth of the cable is maintained. Also, the temperature of the cable system will be monitored using a distributed temperature sensing system. If issues become apparent through either the survey or the sensing system, maintenance will be performed on the cable system, preferably while keeping the system online if possible.

6.3 Expected operating constraints and operational restrictions

Wind turbine generators

The primary environmental factors that may impact the operation of WTGs include wind speed and temperature. These parameters are discussed in the following sections.

Wind speed operational limits

Table 6-1 provides the minimum and maximum wind speed limits for each of the two primary OEM's WTG models. The maximum wind speed limit is a safety feature of the WTGs to protect the units from damage during periods of extremely high sustained winds.

[redacted]

Temperature operational limits

[redacted]The operating temperature range is a safety feature of the WTGs to protect the units from damage when operating during periods of extreme heat or cold.

[redacted]

Crew access restrictions

Environmental conditions may also impact crew accessibility, which may result in longer than typical downtime for troubleshooting and planned or unplanned maintenance. The primary parameter of note is wave height.

As the primary solution for the operation and maintenance personnel to access the WTGs and OFCS platform, Leading Light Wind will utilize a Service Operations Vessel (SOV) (Figure 6-2). With this approach, a full shift of technicians can stay on-station for two weeks at a time.

The vessel is expected to transit back to the operation and maintenance port at the conclusion of the two-week shift cycle for approximately eight hours of refueling and shift changes before returning to the project location. Thus, weather permitting, the wind farm will be staffed on a nearly continuous basis through the year, allowing for quick access to troubleshoot issues and return faulted turbines to service.

The SOV will be equipped with dynamic position capabilities and a “walk to work” motion-compensated gangway system to allow the technicians safe access to the WTGs or OFCS during periods of high wave heights. The vessel will have a minimum significant wave height transfer capability of 2.5 meters. It will be supplemented with a dedicated daughter craft and potentially a Crew Transfer Vessel (CTV) to enhance the utilization of safe access windows. The CTV can be used to transfer spare parts, consumable supplies, and technicians to and from the operation and maintenance port to allow the SOV to stay on-station beyond the proposed two-week period.

Leading Light Wind may utilize helicopter services to facilitate technician transfers and equipment access when weather conditions prevent access from the SOV, daughter craft, or CTV.

Figure 6-2. Leading Light Wind will use a Service Operations Vessel for operation and maintenance personnel to access the WTGs and OFCS platform.

07
Business entity and financing plan

07 Business entity and financing plan

7.1 Introduction

As discussed in Section 3, Leading Light Wind is owned and funded by its co-developers, Invenergy and energyRe, along with a consortium of investors including: Blackstone, CDPQ, PSP FirstLight, and Ullico Infrastructure Fund. Currently, the project is financed 100% by sponsor equity. However, at Final Investment Decision (FID), the sponsors expect to have both construction loan lenders and tax equity investors committed to finance the project using a combination of project finance debt, tax equity, and sponsor cash equity.

Collectively, the sponsors and investor consortium have the financial resources and financing expertise necessary to execute on the Leading Light Wind project. By entity, financial strength and financing experience includes the following:

Invenergy

Invenergy: Over nearly two decades, Invenergy has completed more than $48 billion in financial transactions. Its highly experienced capital markets team is unparalleled in the renewable energy sector in the United States. Invenergy maintains strong relationships with a wide range of financial partners including international and domestic banks, multilateral development banks, export credit agencies, tax equity investors, and financial investors (see Figure 7-1). As a result, Invenergy has direct access to a variety of capital sources allowing it to optimally finance each project on an individual basis. In 2021 alone, Invenergy closed more than $4 billion in project financings, including construction financing for Invenergy's 998 MW Traverse Wind Energy Center in Oklahoma, America's largest single-site wind facility. Invenergy has been recognized with Power Finance & Risk Borrower of the Year or Deal of the Year awards in 2012, 2013, 2016, and 2017.

energyRe

energyRe: The principals of energyRe have substantial resources and a successful track record investing and raising capital for large-scale development and infrastructure projects. A core strength of energyRe is its ability to creatively and efficiently finance projects to maximize value for all stakeholders. Its financing approaches have historically included a variety of different sources: general and limited partner equity, conventional construction and permanent debt, taxable and tax-exempt bonds, tax credits, preferred equity, and multiple other sources. energyRe has an extensive network of debt and equity relationships that includes many of the world's largest banks, insurance companies, pension funds, sovereign wealth funds, and other financial institutions. energyRe has historically sourced $5 billion to $10 billion of debt and equity capital per year and has done so at scale across economic cycles.

Blackstone: Blackstone Infrastructure Partners is an active investor across energy, transportation, digital infrastructure, and water and waste infrastructure sectors. Blackstone seeks to apply a long-term buy-and-hold strategy to large-scale infrastructure assets, with a focus on delivering stable, long-term capital appreciation together with a predictable annual cash flow yield. This approach to infrastructure investing focuses on responsible stewardship and stakeholder engagement to create value for investors and the communities Blackstone serves. As of 2021, Blackstone had approximately $881 billion in assets under management.

PSP FirstLight: FirstLight Power, which is majority owned by PSP Investments, is a leading clean power producer and energy storage company in New England with a portfolio that includes nearly 1,400 megawatts of pumped-hydro storage, battery storage, hydroelectric generation, and solar generation — the largest clean energy generation portfolio in New England today. Based in Burlington, MA, with operating offices in Northfield, MA and New Milford, CT, FirstLight provides stewardship of and recreational access to 14,000 acres of land and waters along the Connecticut, Housatonic, Shetucket, Still, and Quinebaug Rivers.

CDPQ: CDPQ invests constructively to generate sustainable returns over the long term. As a global investment group managing funds for public retirement and insurance plans, CDPQ works alongside its partners to build enterprises that drive performance and progress. CDPQ is active in the major financial markets, private equity, infrastructure, real estate, and private debt. As of the end of 2021, CDPQ's net assets totaled CAD $419.8 billion.

Ullico: For more than 90 years, Ullico has provided financial and insurance products and services to meet the needs of union employers and employees. In 2010, Ullico launched an investment fund to assist in the construction, maintenance, and refurbishment of America's infrastructure. The fund currently has over $4 billion in investor commitments on behalf of over 200 investors, with 21 portfolio investments across water, wastewater, telecommunications, electricity transmission, power generation, transportation, and gas transmission subsectors. It is exploring opportunities in all infrastructure-related subsectors.

Figure 7-1. Invenergy has successfully worked with numerous financial institutions.

Project name	Location	Type and size	Date of construction and financing	Form of debt and equity financing	Project status
AEP North Central Wind Energy Facilities: Traverse, Maverick, and Sundance	Oklahoma	Traverse: 999 MW Wind Maverick: 287 MW Wind Sundance: 199 MW Wind	December 2020 (Sundance & Maverick) March 2021 (Traverse)	$1.06B construction financing	Operating
Lackawanna Energy Center	Jessup, PA	1,485 MW Natural gas combined cycle	December 2016	$1.0B senior debt facilities	Operating
Energía del Pacífico	El Salvador	380 MW “LNG-to-power" natural gas-fired power plant/offshore floating storage and regasification unit	November 2019 (thermal plant) February 2021 (floating storage and regasification unit)	Thermal plant: $657M construction-to-term loan Floating storage and regasification unit: $128M construction-to-term loan	Operating
High Sheldon Wind	Wyoming County, NY	112.5 MW Wind	December 2008	Tax equity: $83M Common equity: $82M	Operating
Orangeville Wind	Wyoming County, NY	94 MW Wind	June 2013	Construction loan, Tax equity: $80M Common equity: $100M	Operating
Marsh Hill Wind	Steuben County, NY	16 MW Wind	June 2014	Tax equity: $14M	Operating
Shoreham Solar Commons	Brookhaven, NY	25 MW Solar	July 2017	Construction loan, build-transfer agreement	Operating

Table 7-1. A sample of Invenergy’s successfully financed projects.

Santander Bank memorandum

In support of the financing plan for the project, Leading Light Wind is including a memo authored by Santander Bank (see Financing Plan attachment). This memo discusses the financing plan for the project in further detail and provides an expert third-party view on the necessity and financeability of the OREC construct offered by NYSERDA.

7.2 Financial statements

Audited financial statements available for the project cosponsors are as follows:

Invenergy: Invenergy Renewables LLC's 2019, 2020, and 2021 audited financial statements are provided in Appendix F.

energyRe: energyRe has no published audited financial statements at this stage. Additional details regarding energyRe's financial resources, its parent companies and capabilities can be made available upon request.

7.3 Investment tax credit

All applicable federal and state tax credits and incentives will be reviewed and utilized as appropriate.

For previous projects, Invenergy has executed a tax equity commitment to monetize the project tax benefits, including the investment tax credit and accelerated depreciation. This commitment will be negotiated in the months leading up to final notice to proceed to the lead construction contractors. Execution of the tax equity commitment will likely occur simultaneously with execution of debt financing for construction of the project, with funding occurring on or around COD.

7.4 Ability to provide security

As demonstrated in the sections above, the project cosponsors and investor consortium have the financial strength and the required facilities to provide required security. Invenergy retains the right to post security on behalf of the project. Through previously executed agreements, Invenergy has a track record of posting sufficient security to NYSERDA.

Typically, for projects under long-term power sale contracts like this one, the project sponsors will provide credit support to backstop their obligations. The typical credit support structure is based upon providing cash, a performance bond, or an irrevocable standby letter of credit from an issuer with a senior unsecured debt rating equivalent to A- (S&P) or A3 (Moody's) or better. Invenergy maintains substantial revolving corporate and letter-of-credit facilities, which have the capacity to support the security obligations of the project during the development period.

Once the project achieves FID, around the time of final notice to proceed to the construction contractors, all security will be provided by a project-level letter of credit facility, which will cover the construction and operating periods.

7.5 Description of any credit issues

Invenergy: [None]

energyRe: [None]

7.6 Credit and financial issues

Invenergy: [None]

energyRe: [None]

7.7 Project insurance program

Leading Light Wind will procure and maintain an insurance program in accordance with offshore wind industry standards and compliant with lender requirements. [redacted]

[redacted]

Construction phase insurance coverage

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Operational phase insurance coverage

[redacted]

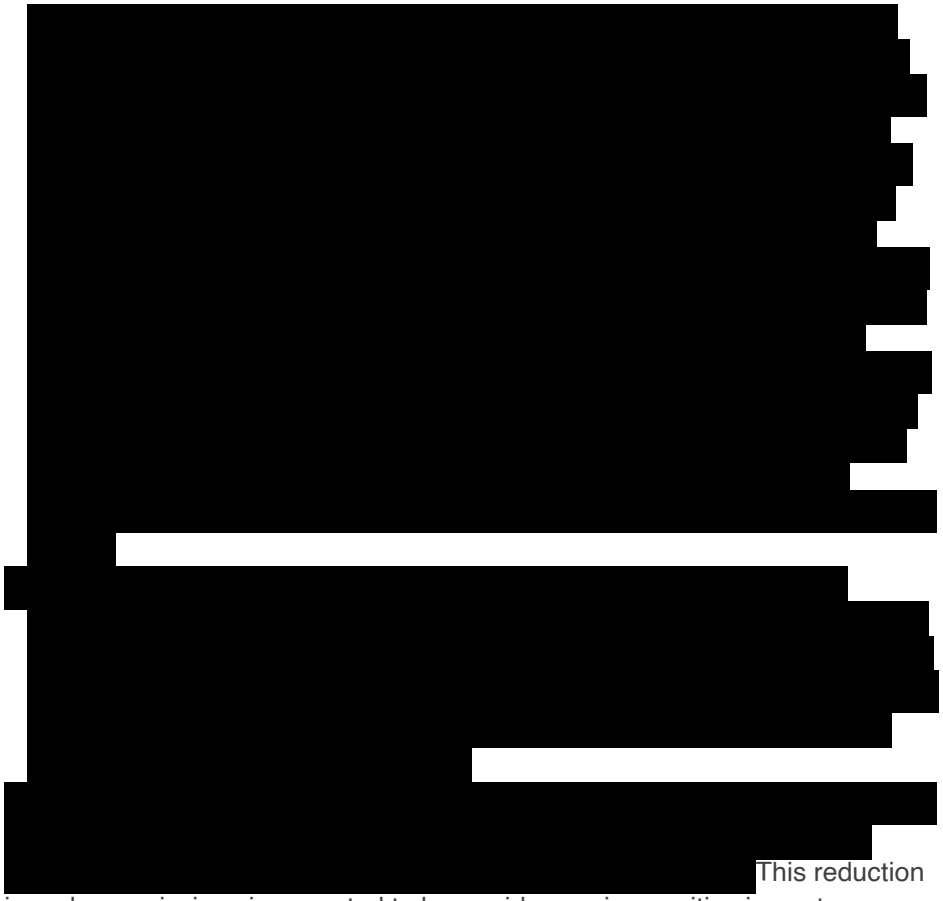
[redacted]

As an established power producer and leader in the renewable energy space, Leading Light Wind has developed strong insurance carrier partnerships fostered through dialogue and collaboration. Insurance carriers recognize the proposer's prioritization of risk and loss control management. Leading Light Wind will engage insurance carriers early and cooperate with insurer property risk engineering teams throughout the development process. Typically, a favorable risk engineering report from the insurer will have a positive impact on pricing and terms and conditions.

In the August 7, 2022 edition of the Wall Street Journal, it was reported that FM Global, one of the nation's leading business insurers, will provide a 5% reduction in annual premium to encourage its insureds to better protect their property against wildfire, floods, and hurricanes. While FM Global has not offered coverage on prior offshore wind projects,

[redacted]

[redacted]



This reduction in carbon emissions is expected to have wide-ranging positive impacts, including mitigating harm from extreme weather events and rising ocean levels for the project and for New York's physical infrastructure, businesses, and coastal residents in the coming decades.

7.8 Life of the project and depreciation

We assume the GAAP depreciable life to be up to 35 years for most of the wind equipment and facilities. New transmission facilities will be depreciated over a range of 40 to 60 years depending on the sub-asset classes within the overall line and converter stations. All project facilities will be depreciated for tax purposes in accordance with the most up-to-date IRS guidance.

The operating life of the project assets is expected to be as follows:

35 years
Wind design life

40 years
New transmission facilities design life

7.9 Inflation estimates

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

08
Interconnection and deliverability plan

08 Interconnection and deliverability plan

8.1 Introduction

[redacted]

Since the conclusion of the BOEM auction in February 2022, the Leading Light Wind team has been working to evaluate and mature interconnection solutions for our project. The team's process has been built on early and dedicated stakeholder engagement. The team has considered a wide range of pertinent factors, including feasibility, cost effectiveness, potential grid upgrades and their associated cost, minimizing the project's cabling footprint, and compliance with NYSERDA's RFP requirements, including the cabling and Meshed Ready requirements.

Taken together, this has resulted in the following:

[redacted]

- Ongoing consideration of several routing alternatives and plans for continued dialogue with key stakeholders, including federal, state, and city agencies
- Evaluations of the system's ability to accept offshore wind injections and forward projections of how to create capacity where little currently exists
- Consideration of grid benefits and congestion forecasted for interconnection
- Filing and advancement of multiple NYISO interconnection requests that fit the project configurations proposed herein
- Evaluation and preparation for interconnection to support an eventual meshed-grid configuration

Additional detail on this process and Leading Light Wind's proposed interconnection and deliverability plan is provided in this section and in the associated attachment.

8.2 Interconnection requests and status

[redacted]

[redacted]

8.3 Interconnection process

All Leading Light Wind queue positions are within the New York Control Area and will follow the NYISO interconnection process. All positions are Large Interconnection Facilities, which at minimum must complete an SRIS and Class Year Facilities Study before executing Interconnection Agreements. [redacted] An SRIS report must be finalized and approved by the NYISO Operating Committee before a position can be eligible to join a Class Year. [redacted]

8.4 One-line diagrams

One-line diagrams for each potential project size were prepared by Leading Light Wind staff and are available in the Interconnection and Deliverability Plan Attachment.

8.5 Interconnection and transmission upgrades

Leading Light Wind acknowledges that updates to transmission infrastructure are expected to facilitate offshore wind interconnection. The team has evaluated these needs according to NYISO study methodology. Leading Light Wind made these assessments both for individual injections and for a selection of combinations using Minimum Interconnection Standard and Deliverability Interconnection Standard. The Minimum Interconnection Standard (MIS) is designed to ensure reliable access to the New York State Power System, and does not impose any deliverability test or deliverability requirement on the proposed project. A project must meet the MIS for reliability in order to interconnect and obtain Energy Resource Interconnection Service (ERIS). The Deliverability Interconnection Standard (DIS) is designed to ensure that the proposed project is deliverable throughout the New York Capacity Region where the project will interconnect, and also that the Developer of the project restores the transfer capability of any other interfaces degraded by the project's interconnection. Reinforcements under DIS are also subject to ensured reliability and good utility practice as required under MIS.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

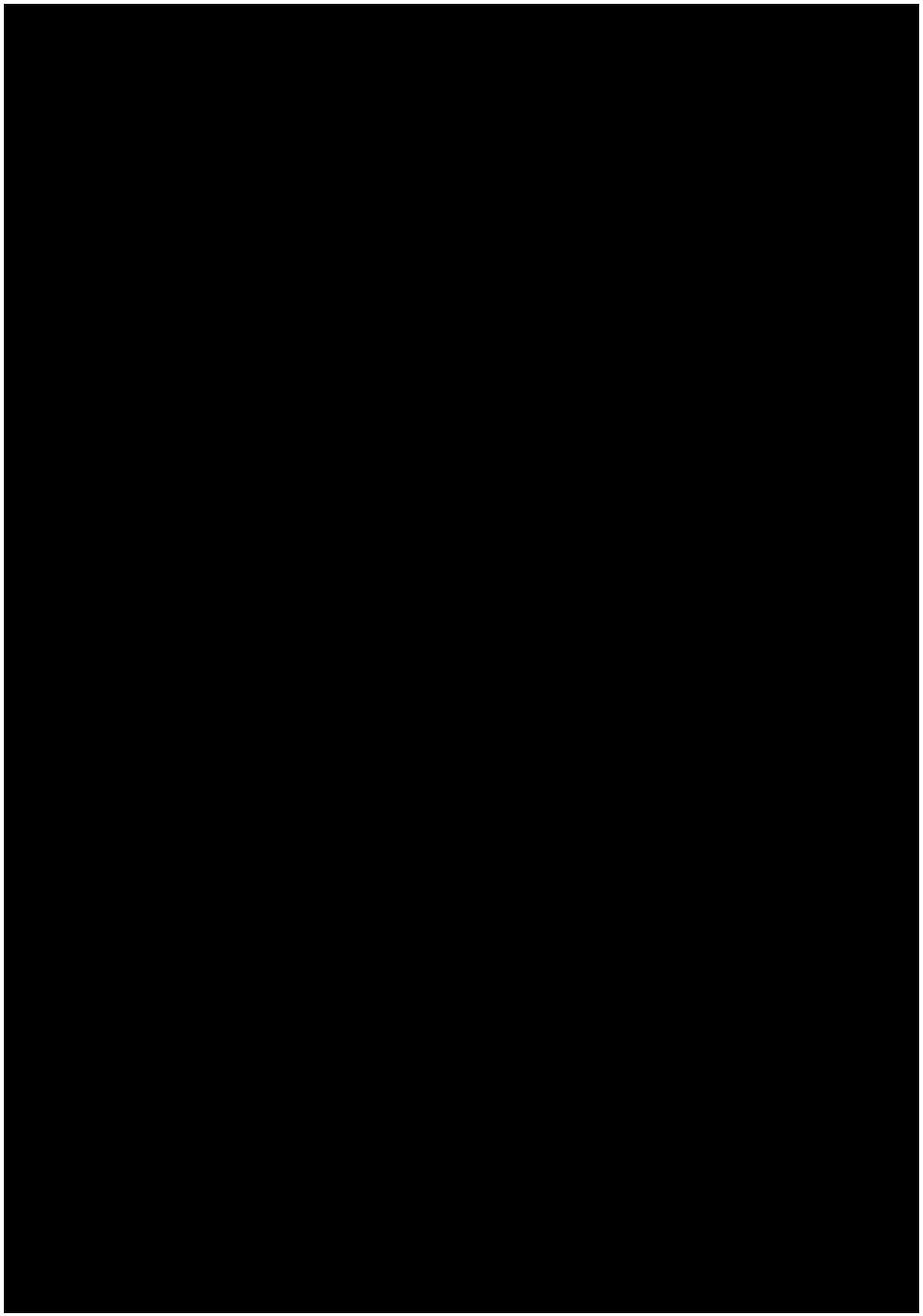
[redacted]

8.6 Electricity delivery requirements

Leading Light Wind does not propose to interconnect an offshore wind generation facility to an adjacent control area. Therefore, this section is not relevant to this proposal.

8.7 Capacity of the injection point

[redacted]



8.8 Submarine and terrestrial cable route maps

Overview

The Leading Light Wind project is located approximately 48 miles offshore from Atlantic City, NJ and approximately 80 miles from Long Island, NY.

A map of the primary submarine transmission cable route is provided in Figure 8-1. The map of the proposed terrestrial route from the ONCS to the proposed POIs is provided in Figure 8-2 on the next page.

Development of the primary export cable route

The strategy for defining the primary export cable route was to identify a route that is least impactful to the environment and existing uses, while also being technically feasible. Key variables that have been assessed in the route development include assessing the marine environment and its sensitive areas, cultural resources, land resources, existing marine uses and local communities.

To create the primary route, the project collected public domain data and leveraged privately held data to build an alternatives assessment for marine and terrestrial HVDC and HVAC routing and siting. Preliminary feedback from various agencies was collected and incorporated into the route design.

[redacted]

Further submarine and terrestrial route refinement is expected as numerous workshops and consultations with various external project stakeholders continue to take place.

Description of the primary export cable route

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

8.9 Power grid benefits

Leading Light Wind worked with Leidos, a leading energy consulting firm, to evaluate the potential for curtailment and congestion at various POIs under consideration for the project.

[redacted]

Key modeling assumptions included:

- Representation of all previously contracted offshore wind projects, including South Fork Wind, Empire Wind 1, Sunrise Wind, Empire Wind 2, and Beacon Wind. Project POIs, capacities, and CODs modeled on the best available data.
- Representation of the Champlain Hudson Power Express HVDC transmission line and the Clean Path New York HVDC transmission line into New York City/NYISO Zone J.
- Achievement of New York's overarching 70% renewables by 2030 target.

[redacted]

[redacted]

[redacted]show significant grid benefits and extremely minimal issues associated with project curtailment and system congestion.

8.10 Meshed Ready detail

Leading Light Wind worked with several parties to develop a plan to meet the Meshed Ready technical requirements. [redacted]The deliverables in our corresponding Appendix G submission outline the plan in detail. A summary of our plan, assumptions and concerns from the deliverables included in the Interconnection and Deliverability Plan Attachment.

09
Fossil repurposing proposal

09 Fossil repurposing proposal

[redacted]

10
Environmental assessment and permit acquisition plan

10 Environmental assessment and permit acquisition plan

10.1 Introduction

Leading Light Wind prepared this Permitting Plan in support of the proposed project on Lease OCS-A 0542 to demonstrate a complete, credible, and achievable plan for successfully obtaining necessary permits. Over the past 20 years, Invenergy and its affiliates have successfully developed more than 30 gigawatts of projects that are in operation, construction, or are contracted, including more than 890 megawatts of wind, solar, and advanced energy storage projects in New York State. Invenergy's extensive track record with onshore renewable development in New York includes the ongoing collaborative development of the Clean Path New York project. Once operational, this HVDC transmission project will transform the New York clean energy landscape and deliver nearly 7.5 TWh of renewable electricity to New York City annually. These projects further the New York State renewable energy policy goals to significantly increase the state's energy capacity from renewable sources. As a result, Invenergy has gained transmission and renewable energy project permitting expertise through deep experience in establishing such types of energy projects in New York (Table 10-1).

Invenergy has successfully developed over 30 GW of projects, including more than 890 MW of wind, solar, and energy storage projects in New York State.

Agency	Permit
Federal permits and approvals	
FAA	Determination of No Hazard/Lighting Plan Approval
FWS	Endangered and Protected Species Consultations
USACE	Wetlands Permit
State permits and approvals	
Article 10	Certificate of Environmental Compatibility and Public Need
Article VII	Certificate of Environmental Compatibility and Public Need
94-C	Permit for a Major Renewable Energy Facility
SEQRA	Environmental Impact Assessment
Section 68	Certificate of Public Convenience and Necessity
NYSDEC	SPDES General Permit for Construction Activity
NYSDOT	Special Use Permit for Oversize/Overweight Vehicles
NYSDOT	Highway Work Permit
Local permits and approvals	
Host Towns	Town Road Use Agreements
County Highway Depts	County Road Use Agreements
Host Towns	Town Host Agreements
County IDAs	Town-County-School PILOT Agreements

Table 10-1. Invenergy has deep renewable energy permitting experience in New York State.

Leading Light Wind recognizes that early engagement with regulatory agencies is key to developing strong and lasting relationships that promote effective project permitting. Leading Light Wind is proactively engaging with federal, state, and local agencies on permits and consultations for developing Lease OCS-A 0542. This Permitting Plan reflects our approach of early and active information-sharing, focused discussion of potential issues, and collaborative identification of solutions to improve the quality and efficiency of agency decision-making processes and sustainable development.

In addition to our understanding of proactive engagement with agencies at all levels, Leading Light Wind has a comprehensive understanding of federal, state, and local regulatory requirements. Leading Light Wind has developed a tried-and-true strategy for preparing complete applications and obtaining all required permits within strict time frames. This Permitting Plan applies demonstrated successful approaches from prior projects. It strategically addresses environmental impacts through a continuous assessment of design, and a consideration of environmental factors that allows for avoidance, minimization, and mitigation of impacts while meeting the proposed schedule.

10.2 Project description and location

For a detailed description of the Leading Light Wind project components, please see Section 4 of this proposal document – Project Description and Site Control.

10.3 Approach to obtaining all necessary permits and approvals

Successful projects require engaging regulatory agencies and other stakeholders in honest, open, and meaningful dialogue early and often throughout the life of a project. Identifying the least environmentally intrusive and permittable project is the goal of such an approach.

Existing relationships between Invenergy and agency staff and other stakeholders are valuable. However, the Leading Light Wind team is committed to building relationships of trust specific for this project. Building trust with agency personnel and other stakeholders will take time and dedication. Invenergy's effective permitting approach has been successfully applied to our 890 megawatts of wind, solar, and advanced energy storage projects in New York State, including the Clean Path New York project. Invenergy has proved that early identification of stakeholders, issues, concerns, and opportunities is essential to achieving successful project outcomes.

Leading Light Wind is actively engaging agencies and stakeholders about the project. The guiding principles to cultivate mutually respectful relationships throughout the various stages of the project (such as development, permitting, construction, and operation) include the following:

Transparency and accountability. Collaboration and consultation with agencies, communities, and other stakeholders at every stage of development, starting early to identify key issues, resolve challenges, and work collaboratively

Responsible development. Minimizing environmental and community impacts with input from agency experts and other stakeholders on resource impacts and means to avoid, minimize, and mitigate such impacts

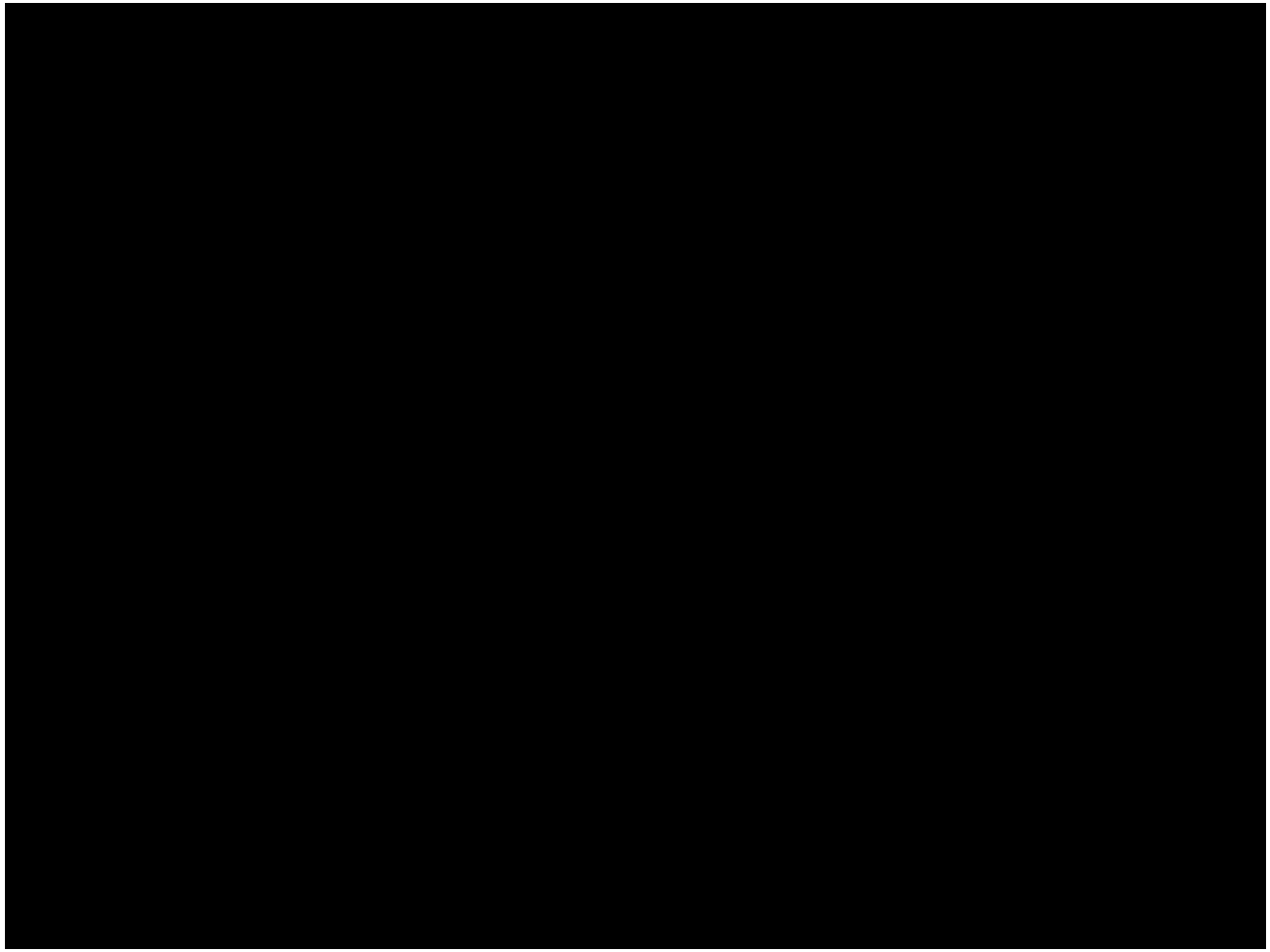
Ongoing communication. Long-term communication with agencies and stakeholders to support project operations including compliance monitoring

Incorporating these guiding principles and specific to the Request for Proposals (RFP), this Permitting Plan identifies the following:

1. A strategic plan for successfully obtaining necessary permits within the proposed project milestones
2. The required federal, regional, state, and local permits and approvals, and the status of each permit or approval
3. An approach that fosters collaboration and trust with permitting agencies to support permit and approval timelines
4. Means for incorporating input from agencies and stakeholders into the project

In addition, Leading Light Wind developed a permitting schedule (Table 10-2) that reflects the following:

- Achievement of the proposed COD date
- Understanding of critical activities
- Strategic planning
- Effective resource management



10.4 Strategic plan for successful regulatory review and permitting

Our guiding principles, as mentioned above, and overarching federal, state, and local permits and approvals provide the framework for the project's permitting strategy and timeline. This framework is discussed in the following sections, with a primary focus on sensitive resources of importance to many federal and state agencies and stakeholders.

Federal permitting

The federal approval of an offshore wind project encompasses the review and approval of a Construction and Operations Plan (COP) by the Bureau of Ocean Energy Management (BOEM). The COP includes a description of all planned facilities, including onshore and support facilities, as well as anticipated project easements. The COP describes activities related to the project including construction, commercial operations, maintenance,

decommissioning, and site clearance procedures. The COP provides the basis for analyzing environmental and socioeconomic effects and operational integrity of the developer's proposed construction, operation, and decommissioning activities.

BOEM will review the COP and conduct the National Environmental Policy Act (NEPA) environmental review of the COP through an Environmental Impact Statement (EIS). As there are multiple federal laws that Leading Light Wind must adhere to (see Table 10-3, Permit Matrix, at the end of this section), BOEM and identified cooperating agencies will evaluate Leading Light Wind in a single EIS and issue a joint record of decision (i.e., One Federal Decision). As the lead agency, BOEM manages and advances the NEPA process, ensures the environmental and technical review process is conducted properly, and prepares and delivers an EIS for public review (Figure 10-1). BOEM will coordinate the EIS development with cooperating agencies, including tribal, federal, state, and local government entities with jurisdiction, special expertise, or related decision-making capacity.

As the COP is being prepared, Leading Light Wind will support BOEM's coordination and consultation with cooperating agencies in Table 10-3, such as the US Coast Guard (USCG), US Environmental Protection Agency (USEPA), US Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service (USFWS), US Department of Defense (DoD), Bureau of Safety and Environmental Enforcement, and the New York State Department of State. Early engagement with cooperating agencies is critical to ensure

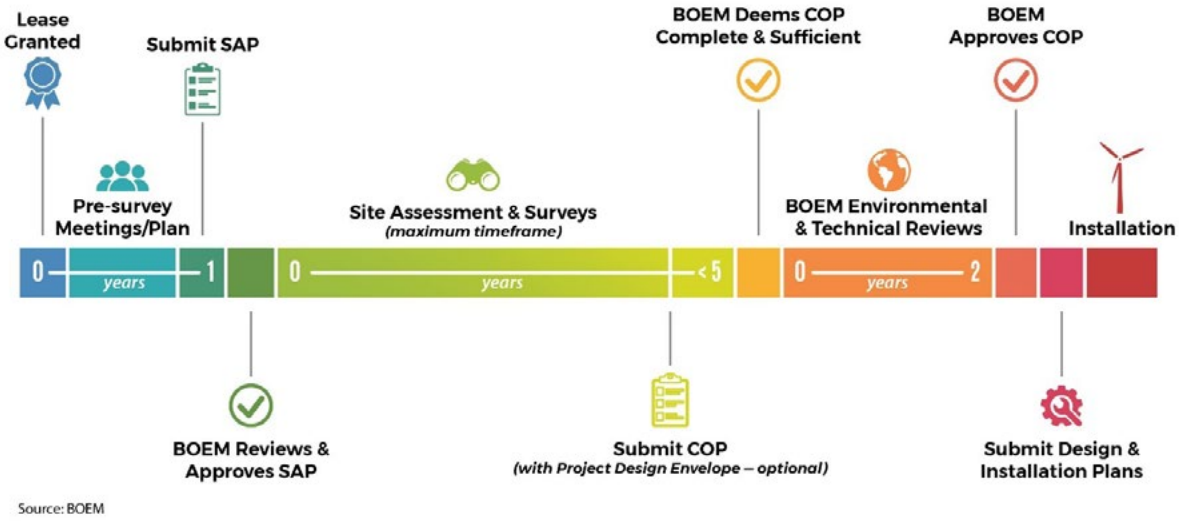


Figure 10-1. Overview of the BOEM process.

that the joint NEPA analysis meets all agency requirements or standards, considers all connected and cumulative actions of cooperating agencies, and specifically addresses the agency action under consideration to effectively support cooperating agency decision making.

Opportunities

Coordination by Leading Light Wind with federal, state, and local agencies will occur throughout the NEPA process, from data collection to preparation of the COP, review, and approval of the COP, and during construction, operation, and decommissioning.

Of note to the federal permitting process, BOEM is preparing a Programmatic EIS (PEIS), as announced in its Notice of Intent to Prepare a Programmatic Environmental Impact Statement for Future Wind Energy Development in the New York Bight (2022). The PEIS will analyze the potential impacts of wind energy development activities in the New York Bight, as well as identify programmatic avoidance, minimization, mitigation, and monitoring measures that would apply to future offshore wind projects in the New York Bight. The stated purpose of the PEIS is to help BOEM make timely decisions on COPs submitted for the New York Bight.

Leading Light Wind accepted BOEM's invitation to become a consulting party under the National Historic Preservation Act associated with the PEIS. We have also actively engaged in the PEIS NEPA process, including participating in public meetings, and submitting scoping comments on the Notice of Intent. Invenergy's scoping comments recommended that BOEM coordinate with the lessees and agencies with jurisdiction by law or special expertise in the New York Bight and

encouraged BOEM to adopt guiding principles in developing and analyzing avoidance, minimization, mitigation, and monitoring measures. Invenergy is also working collaboratively with the other lessees in the New York Bight on the PEIS through coordination with the American Clean Power industry association. In addition, Invenergy is coordinating with Lease OCS-A 0541 on wind turbine layout and alignment of key corridors as part of preliminary design packages.

Leading Light Wind will prepare a comprehensive, complete COP that will include information specified in 30 CFR Part 585 to a level of detail that will minimize the time required for BOEM to deem it complete. The COP will include the baseline information requirements and impact producing factors relevant to all onshore and support facilities, as well as anticipated project easements for construction, commercial operations, maintenance, decommissioning, and site clearance procedures.

Leading Light Wind will define the project design envelope to provide the maximum design scenario and flexibility described in this Permitting Plan, including the type and number of wind turbine generators, foundation types, OFCS, cable types, and installation techniques. The COP will provide information BOEM needs to fully comply with requirements under other applicable federal laws including but not limited to NEPA, Clean Air Act, Clean Water Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, Marine Mammals Protection Act, and National Historic Preservation Act.

Following COP submission, Leading Light Wind will apply to the Federal Permitting Improvement Steering Council to be a Covered Project under Title 41 of the Fixing America's Surface Transportation Act and placed on the Permitting Dashboard. The Permitting Dashboard is an online tool for Federal agencies, project developers, and interested members of the public to track the Federal government's environmental review and authorization processes for large or complex infrastructure projects aimed at improving coordination, transparency, and accountability. A Coordinated Project Plan (CPP) will be developed by Federal agencies in partnership with Leading Light Wind. In developing the CPP, agencies will collaborate to establish:

- Roles and responsibilities for all entities with permitting responsibilities
- A permitting schedule with interim and final milestones, with potential focus areas for additional interagency coordination noted
- Potential avoidance, minimization, and mitigation strategies
- Plans and a schedule for public and tribal outreach and coordination

The CPP will serve as the foundation for interagency coordination and early identification of anticipated issues that could delay completion of the permitting process. Throughout the permitting process, BOEM will refer to this document, bringing together all cooperating agencies to proactively address issues as they arise and if needed, to adjust timelines ensuring new responsibilities and requirements are understood by all.

Data collection

Leading Light Wind is establishing protocols for offshore and onshore data collection and surveys to characterize the lease area and transmission corridors to inform the federal permitting process. This data will also support the preparation and submittal of a COP to BOEM. In August 2022, Invenergy met with BOEM to discuss its comprehensive data collection strategy and timeline to characterize the lease area and potential cable routes. In consideration of BOEM guidelines, Invenergy and BOEM discussed key data collection principles that will guide Invenergy's efforts, including:

Key data collection principles

- Leveraging existing data and science where applicable
- Consulting past-project precedents when designing data collection strategies
- Ensuring that new information collected matches the scale and/or complexity of the proposed project and addresses any key scientific questions
- Conducting purposeful data collection that is useful in filling data gaps and evaluating potential project impacts
- Adapting survey scopes over time, allowing for refinements based on previous survey results and findings
- Considering data needs for NEPA analysis
- Engaging with relevant stakeholders
- Identifying opportunities to supplement the COP

[redacted]

[redacted]

[redacted]

[redacted]

Through an in-depth desktop analysis of all available data for each resource in and around the lease area and transmission corridors, Leading Light Wind identified significant existing information for characterizing the site and evaluating potential impacts. This information will also inform the federal permitting process by providing information on existing and historical information. Key studies include the NYSERDA aerial digital surveys, Atlantic Marine Assessment Program for Protected Species, and the Northwest Atlantic Seabird Catalog, shown in Figure 10-3.

The recent aerial digital surveys conducted by NYSERDA from 2016-2019 provide quarterly, high-resolution photographs of all marine animals present on the sea surface captured beneath the survey plane in each season. The NYSERDA aerial digital surveys identified birds, marine mammals, sea turtles, and occasionally sharks, rays, and large fish in the study area for characterizing the existing environment. Leading Light Wind is working with federal and state agencies, research organizations, and other New York Bight leaseholders to identify data gaps and scientific needs to support targeted data collection efforts for the preparation of the COP. In addition, we are participating in NYSERDA's Environmental Technical Working Group (E-TWG), Fisheries Technical Working Group (F-TWG), Maritime Technical Working Group (M-TWG), and are members of the Responsible Offshore Science Alliance (ROSA) and Regional Wildlife Science Collaborative (RWSC).

[redacted]

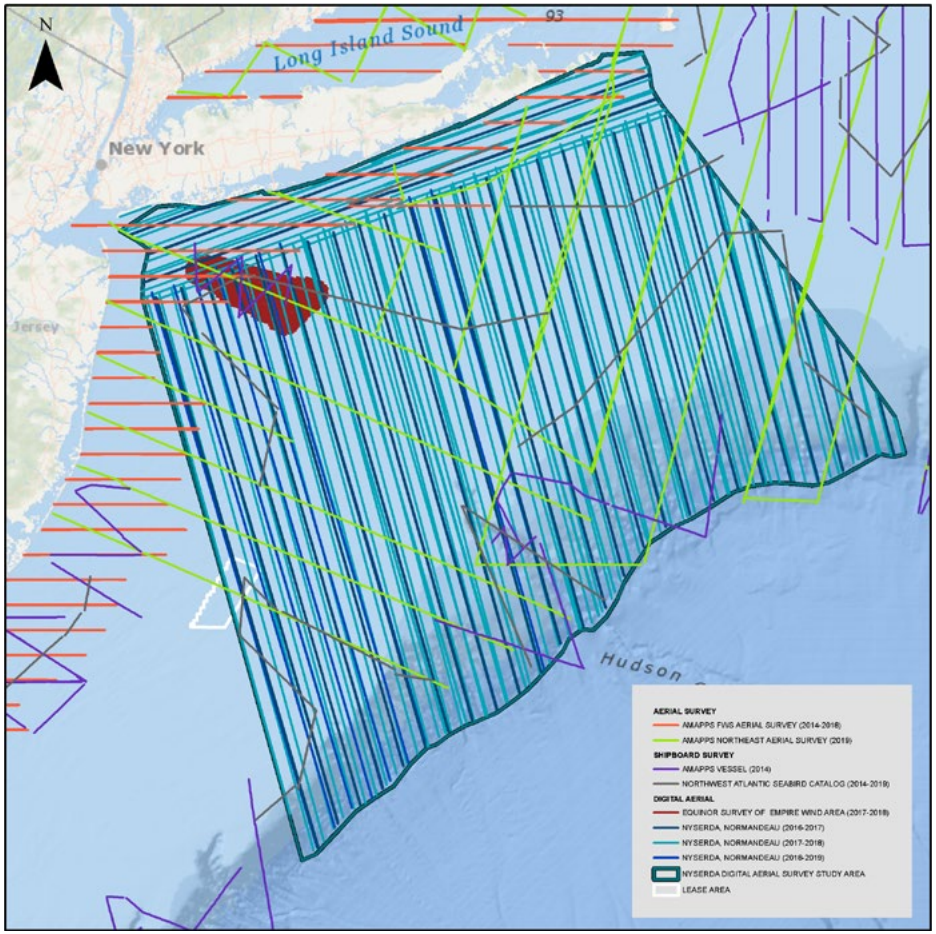


Figure 10-3. Existing survey datasets with applicability to OCS-A 0542.

Leading Light Wind is implementing a targeted data collection strategy focused on the key resources with the longest lead time for preparing the COP. Leading Light Wind [redacted] on benthic communities such as infaunal and essential fish habitat. The data collected [redacted] consistent with BOEM's regulatory requirements under 30 CFR 585; its June 2019 guidance, project design criteria, and best management practices; NOAA's 2021 guidance; and various New York State requirements. Leading [redacted]

[redacted]

Development of permits, including an Incidental Harassment Authorizaton under the Marine Mammal Protection Act, needed to authorize comprehensive project geophysical and geotechnical surveys, are currently underway.

State and local permitting

The New York State PSC and Department of Public Services (DPS) manages the environmental and technical review process pursuant to the New York State Public Service Law for transmission lines greater than 10 miles long and over 100 kV design capacity through the Article VII process. The review and approval process results in the issuance of the Certificate of Environmental Compatibility and Public Need. Article VII is a "one-stop" permitting process, superseding most required state and local permits for the transmission line and its associated components. Invenergy's extensive portfolio of renewable and transmission projects in New York have created company expertise in New York state and local permitting, including Article VII.

Many state agencies participate in the review as parties to the Article VII proceedings, including the Department of Environmental Conservation, DOT, Department of State, Office of General Services, New York State Office of Parks, Recreation and Historic Preservation, and the New York State Department of Agriculture and Markets. The Article VII application includes detailed information on the proposed location, appearance, cost, construction and maintenance practices, and the need for the facility. The Article VII application will provide the basis for analyzing the environmental and socioeconomic effects of the project and ensures that the facility siting, design, construction, and operation conforms with applicable state and local laws, unless waived.

Leading Light Wind will prepare the Article VII application using its extensive experience gained from permitting transmission projects under Article VII and renewable energy projects under Article 10 of the Public Service Law. Best

practices for Article VII also include establishing a process for community engagement under a Public Involvement Plan. This plan will invite the public to participate with Leading Light Wind and state and local representatives in the preparation and review of the Article VII application. The Public Involvement Plan for Leading Light Wind's Article VII will build on the robust community and stakeholder engagement already underway (see Stakeholder Engagement Plan in Section 16).

Leading Light Wind will develop an Environmental Management and Construction Plan to address how the project will be constructed and how to achieve each condition of the Certificate of Environmental Compatibility and Public Need. The Environmental Management and Construction Plan is the primary post-certification filing; however, the development and submission of Environmental Management and Construction Plan documents may be initiated during the certification process to expedite the project schedule.

Our Article VII application will also reflect proactive engagement with the NYSDPS and each of the state agencies that participate in the proceedings, as well as local agencies that have an interest in how the project will address substantive compliance with local requirements. Leading Light Wind is currently engaged in regular pre-application meetings with key participating agencies to foster a greater understanding of the project and information needed in the application.

Leading Light Wind is providing early development and design stage information to participating agencies in order to obtain feedback to inform decisions on the project and approaches to avoiding, minimizing, and mitigating impacts. This Permitting Plan also integrates key concepts from the Fisheries Mitigation Plan (Section 14), Environmental Mitigation Plan (Section 15), and Stakeholder Engagement Plan (Section 16) to support the strategic plan for successful regulatory review and permitting.

As noted above, Article VII's one-stop shop structure preempts local procedural requirements, such as site plan review or obtaining zoning variances or special permits. However, Leading Light Wind understands the importance of demonstrating that the project will comply with the substantive requirements of the applicable local permits and will thoroughly evaluate each requirement and comply to the maximum extent practicable.

[redacted]

Combining commitment and strategy

Leading Light Wind's strategy for successful permitting combines a commitment to collaborating and building trust with permitting agencies with a process of continuous assessment of methods to avoid, minimize, and mitigate impacts on environmental, social, and cultural resources. Based on a comprehensive understanding of regulatory requirements, the sections that follow highlight our commitments and strategy to addressing sensitive and protected resources and ocean users.

Ensuring navigation safety

[redacted]Leading Light Wind will prepare a Cable Burial Risk Assessment and Navigation Safety Risk Assessment to demonstrate how the design, construction, and operation of the project minimizes impacts to anchorage areas and vessel traffic present in the New York Harbor.

Figure 10-4. Leading Light Wind will minimize impacts to vessel traffic in the New York Harbor.

The USCG will review the project plans with respect to the avoidance of anchorage areas and the safe operation of vessels in federal and state waters. USACE also regulates use of federally designated navigation channels and anchorage areas and is responsible for safe, reliable, efficient, and environmentally sustainable waterborne transportation systems for movement of commerce, national security needs, and recreation. [redacted]

Protecting air quality

As part of the COP, Leading Light Wind will evaluate air emissions associated with construction and operation vessels as part of the federal General Conformity Analysis. We will obtain the applicable air quality permits for any stationary sources, such as emergency generators. Given the designation of the New York-New Jersey-Connecticut Air Quality region as a maintenance area for ambient concentrations of certain pollutants, the General Conformity Analysis will ensure no degradation of air quality occurs during construction or operation of the project. As a cooperating agency in the NEPA process, the US Environmental Protection Agency in its review will confirm compliance with federal air quality regulations and permitting requirements for the issuance of any applicable permits in the OCS. For any air emission sources in New York State, the Article VII application will demonstrate compliance with applicable requirements and protection of ambient air quality standards.

Maintaining water quality

Leading Light Wind will prepare an individual permit application for USACE demonstrating protection of state and federal water quality. As a cooperating agency in the NEPA process, USACE will participate in the BOEM NEPA process as part of the review of the individual permit application and the confirmation of compliance with other federal statutes, including the Clean Water Act, River and Harbors Act, Endangered Species Act, and National Historic Preservation Act. The project components with the potential to impact the sea floor and US waters include installation of foundations and transmission cables, and excavation and dredging. These activities will require an Individual Permit from USACE, and water quality certifications from the New York State Department of Environmental Conservation [redacted].

Protecting biological resources, sensitive habitats, and threatened and endangered species

Leading Light Wind will consider potential impacts on aquatic biological resources and sensitive habitats in federal and state waters. To understand the presence of species in the lease area, we are conducting an in-depth desktop evaluation of protected species and sensitive habitats in and around the lease area, cable corridors, and onshore areas. Using available data on known species observations and habitat locations, Leading Light Wind is evaluating designs to avoid, minimize, and mitigate impacts. Informal consultation has begun with regulatory agencies to discuss and understand the data available, and any potential needs required to understand the presence of species endemic to the area and to initiate determination of potential impacts.

[redacted] Results from the data gaps and scientific needs analysis will inform targeted data collection efforts to further characterize current conditions and ensure compliance with the Marine Mammal Protection Act, Endangered Species Act, and Migratory Bird Protection Act.

[redacted] Identification of presence of protected species such as North Atlantic right whale, harbor porpoise, Kemp's ridley sea turtle, Atlantic sturgeon, and winter flounder, will require close coordination with National Oceanic and Atmospheric Administration and New York State Department of Environmental Conservation [redacted]

[redacted]and is required for obtaining the Section 404 permit for foundation installation and cable placement. Leading Light Wind will rigorously evaluate design and construction practices to avoid impacts, including routing, time of year restrictions, or installation techniques in collaboration with state and federal agencies.

Honoring cultural resources

Leading Light Wind will closely evaluate all types of cultural resources that are listed or eligible for listing on the National Register of Historic Properties, including historic properties, wrecks, National Historic Landmarks, parks, historic sites, and heritage areas and the unique interests of state and federal tribes. We anticipate strategic avoidance of marine archaeological resources. Impacts on historic properties are typically considered in the context of the change in the visual character of the area.

With the project location more than 40 miles from the nearest point of land, the presence of the turbines will not result in any visual impacts (Section 17). The visual effects of onshore components will be fully evaluated in the COP and the Article VII application.

[redacted]

Leading Light Wind has designated a Tribal Liaison Officer for the project who has directed engagement and coordination with all identified and federally recognized Native American tribes. In mid-April 2022, we conducted outreach to tribes through letters and emails inviting them for input [redacted]

Figure 10-5. The North Atlantic right whale is one of the protected species located around the project area.

Leading Light Wind followed up with phone calls and emails. In addition, we invited all applicable tribes to a virtual Teams meeting held on July 19, 2022. The purpose of the meeting was for introductions between our project leadership and the tribes. A key goal was to present the Leading Light Wind project beyond the preliminary information shared in April 2022 and to learn what thoughts the tribes have on engagement and collaboration moving forward. Key to this was to introduce the project timeline as presently understood.

Two tribes attended the virtual Teams meeting held on July 21, 2022: the Delaware Nation Tribal Historic Preservation Office and the Stockbridge-Munsee Community Band of Mohican Indians. On July 25, 2022, BOEM issued the notice to suspend all tribal engagement pending a BOEM-coordinated tribal engagement on a Native American Tribal Communication Plan. There has been no further outreach since that time. In anticipation of the issuance of final guidance for the Native American Tribal Communication Plan, Invenergy continues to gather information and keep the needed tribal points of contact up to date.

Ensuring consistency with coastal zone policies

The State's Coastal Management Plan covers policies applicable to development and use proposals within or affecting the state's coastal area, particularly for effects on significant coastal fish and wildlife habitats and consistency with these policies.

The New York State Department of State's review of our assessment of consistency with each of the relevant enforceable policies of the Coastal Management Plan supports the USACE permit, the BOEM NEPA process, and the Article VII process. We anticipate that the final cable routing will demonstrate avoidance of sensitive habitats.

Acquiring easements for submerged lands

Most navigable waters, including the beds of navigable waters, are owned by the state and are held in trust by the New York State Office of General Services . The New York State Office of General Services have the authority to regulate public and private use of the states' underwater lands in a manner that is consistent with the public interest in navigation, commerce, recreation, etc. In addition, structures and utilities, including fill, located in, on, or above state-owned lands now or formerly underwater, are regulated under the laws protecting public lands. The states require an easement or lease to install utilities above or below lands now or formerly under the waters of state-owned waterbodies. Installation of the transmission cable in New York State underwater lands requires a Submerged Lands Easement from the Office of General Services.

Preserving wetlands and waterbodies

Within state waters, we will obtain permits from the Department of Environmental Conservation and any necessary water quality certifications for pre-construction geophysical and geotechnical surveys.

The Article VII application will provide the detailed and comprehensive analysis to support the New York State Department of Environmental Conservation review of impacts related to freshwater and tidal wetlands; marine resources; State-protected habitats and species; air resources, and impacts to environmental justice areas or DACs and other areas of jurisdiction, including the Section 401 water quality certificate. The transmission interconnection components on land are designed to avoid areas with significant wetlands present.

10.5 Comprehensive listing of federal, regional, state, and local permits and approvals

Table 10-3 summarizes the permits needed to study, develop, construct, and operate the project under federal, state, and local permitting jurisdictions — and the status of each permit or approval. Table 10-3 also identifies the regulatory district and point of contact for each agency, where available. For each required permit or approval, Table 10-3 provides a summary of the information required in the application. The table does not include permits that vessel operators or contractors may need to obtain for purposes that are not specific to construction and operation.

10.6 Fostering collaboration and trust

This Permitting Plan reflects the design philosophy demonstrated on prior Invenergy projects to strategically address environmental impacts through a continuous assessment of design and environmental factors that allows for the avoidance, minimization, and mitigation of impacts while meeting the proposed schedule. As the project is evaluated through the COP and Article VII processes and importance of resources are clearly identified, a detailed site-specific mitigation plan will address impacts in a manner that successfully balances multiple priorities.

To this end, Leading Light Wind strives to build understanding and acceptance of this project among the stakeholders who may participate in or influence the project. We will continually engage with federal, state, and local agencies on their regulatory jurisdictions as they pertain to the project, permit compliance, field surveys, studies, opportunities and constraints, avoidance, minimization and mitigation strategies, and project milestones.

In addition, Leading Light Wind will frequently engage with nongovernmental organizations, tribes, fisheries, and special interest groups, including potential project opponents, to hear their concerns. Frequent and regular engagement with agencies and stakeholders will provide continual feedback that will inform and allow for coordinated adjustments to project decisions and developments, inform approaches to avoiding, minimizing, and mitigating potential impacts.

With a proven track record of successfully developing **more than 890 MW of wind, solar, and advanced energy storage projects in New York**, Leading Light Wind understands and excels at what is required to further the state of renewable energy policy goals to significantly increase the state's energy capacity from renewable sources. Leading Light Wind will leverage a history of engagement with regulatory agencies and stakeholders and demonstrate with this project the integrity and trust on which those relationships were built.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
Federal							
Bureau of Ocean Energy Management (BOEM)	Construction Operations Plan (COP) OCSLA 43 U.S.C. § 1337(p) Energy Policy Act of 2005 30 CFR Part 585	**All planned facilities**, including onshore and support facilities and all anticipated project easements.	[redacted]		Compiled data for all planned facilities and resources, including but not limited to geotechnical and geophysical surveys, shallow hazards, benthic habitat, fish, marine mammals, sea turtles and sea birds, protected species, including information to determine presence, impacts, and mitigation.	BOEM reviews the COP to determine completeness, responses to comments and requests for additional information deemed necessary to support the NEPA review of the COP. Agencies will rely on the Environmental Impact Statement (EIS) to support their decision making.	Annette Ehrhorn Renewable Energy Program Specialist Projects and Coordination Branch Office of Renewable Energy Programs Bureau of Ocean Energy Management Office: 703.787.1623 Mobile: 571.567.6761 Annette.Ehrhorn@boem.gov
	National Environmental Policy Act (NEPA) Compliance - Environmental Impact Statement 40 CFR §§ 1500 et seq.	**All planned facilities**, including onshore and support facilities and all anticipated project easements.			Results of surveys and studies and the COP. BOEM expects that its review of the COP will reflect the outcome of its proposed Programmatic EIS (PEIS), particularly avoidance, minimization, mitigation, and monitoring measures for the NY Bight.	NEPA is needed to approve the COP. BOEM initiates the NEPA process once the COP is deemed complete. BOEM manages and advances the NEPA coordination process to ensure the environmental and technical review process is conducted properly and prepares and delivers the Draft EIS (DEIS) for public review. BOEM will coordinate with cooperating agencies, including tribal, federal, state, and local government entities with jurisdiction by law, special expertise or that will depend on the FEIS to support its decision-making.	
	National Historic Preservation Act (NHPA) Section 106 Consultation 54 U.S.C. § 300101 et seq, 36 CFR Part 800	**All planned facilities**, including onshore and support facilities and all anticipated project easements.			Consider the effects of all planned facilities and activities on historic properties. BOEM will provide reports documenting the identification of historic properties along with the Draft EIS. These include: • The Marine Archaeological Resources Assessment • The Terrestrial Archaeological Resources Assessment • The Report of Visual Effects on Historic Properties, along with viewshed analyses and visual simulations	Regulations at 36 CFR § 800.8 provide for use of the NEPA process to fulfill a Federal agency's NHPA Section 106 review obligations in lieu of the procedures set forth in 36 CFR § 800.3 through 800.6 (i.e., NEPA substitution for Section 106).	
	Facility Design Report (FDR) and Fabrication Installation Report (FIR) Facility Design, Fabrication, and Installation 30 CFR § 585.700 30 CFR § 585.701 30 CFR § 585.701	**All planned facilities**, including onshore and support facilities and all anticipated project easements			An FDR that provides the following information: facility designations, lease, ROW grant/RUE grant number, area, type of facility, location plat, facility drawings, structural drawings, environmental data used for design, engineering design data, design calculations, project-specific studies used in the design and installation, loads imposed on the facility, geotechnical report. An FIR that provides the following information: facility designations; lease; ROW grant/RUE grant number; area; type of facility; fabrication and installation schedule; fabrication information and industry standards; installation process; federal/state/local permits; environmental information on water, waste, vessel; and project easements.	Submit FDR and FIR based on the facilities described in the COP to BOEM. BOEM will review the FDR and FIR and respond with or without objections within 60 days of receipt. Any objections will be provided by BOEM along with requests for actions to be undertaken. Approval of the FDR and FIR approves commencement of fabrication and installation of facilities.	

Table 10-3. Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
U.S. Army Corps of Engineers (USACE)	Individual Permit § 404 of the Clean Water Act (33 U.S.C. § 1344) § 10 of the Rivers and Harbors Act (33 U.S.C. § 403) 33 CFR Part 320 et seq.	Structures and work in navigable waters of the U.S. Discharge of dredged or fill material into waters of the U.S. **(foundations, transmission cables, onshore components)**	[redacted]	[redacted]	Joint Application Form with detailed project description, supporting engineering drawings and materials as required to document facility components and impacts to Waters of the U.S., including wetland delineation, jurisdictional determination, footprint of fill, dredging and dredge disposal plan, and mitigation plan.	USACE will issue a completeness determination that initiates technical review of the application, preparation of a draft permit, public notice, and issuance of the permit. USACE needs to evaluate and approve aspects of the project and must comply with the requirements of NEPA before issuing permits. Water quality certification under CWA Section 401 must be obtained before CWA Section 404 or RHA Section 10 permit. USACE will be a cooperating agency in BOEM's NEPA review of project-specific COPs. USACE would adopt the FEIS to satisfy its requirements under NEPA.	New York District ATTN: Regulatory Branch, Rm 16-400 26 Federal Plaza New York, NY 10278-0090 (917) 790-8511 (Eastern Permit Section, NYC area) (917) 790-8411 (Western Permit Section, all other counties) cenan.publicnotice@usace.army.mil Christopher Minck Regulatory Project Manager NY District USACE Regulatory Branch 26 Federal Plaza, Room 16-406 New York, New York 10278-0090 Christopher.W.Minck@usace.army.mil
	Section 408 Permit: Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408)	Activities that alter, impact, or temporarily or permanently occupy or use a federally authorized civil works project such as the breakwaters and federally maintained channels **(transmission cables)**			Identification of USACE project and description of alteration, technical analysis and design, environmental and cultural resources compliance, real estate easement request, if applicable.	USACE will issue a completeness determination that initiates a 90-day review. If a final decision cannot be made within that 90-day window, USACE will provide written notification with an estimated decision date. Public notice is required. Section 404 permit must be issued before Section 408 permit can be approved.	
U.S. Coast Guard (USCG)	Permit for a Private Aids to Navigation (PATON) 33 CFR Part 66	Matters that affect the safety of navigation and the care and maintenance of maritime aids to navigation **(wind turbine markings, transmission cable)**			Navigation Safety Risk Assessment and Cable Burial Risk Assessment (provided in COP), including a lighting plan submitted in advance of the PATON permit application Form 2554.	USCG will likely be a cooperating agency in the preparation of BOEM EIS. USCG reviews the Navigation Safety Risk Assessment and Cable Burial Risk Assessment for OSW cables to assess impacts to anchorage grounds and ensure compliance with regulations for vessels in navigable waters of the U.S. and identify conditions for lighting and marking. PATON permit applications approval requires prior issuance of USACE CWA Section 404/Rivers and Harbors Act Section 10 permit.	USCG Sector New York, Long Island Sound (D1 and D5) Contact: Elizabeth J. Marshall USCG Sector Delaware Bay Elizabeth.J.Marshall@uscg.mil Matthew K. Creelman Fifth Coast Guard District Matthew.K.Creelman2@uscg.mil John M. Singletary, Gregory P. Hitchen, and Jeffrey M. Yunker USCG Sector NY First Coast Guard District 212 Coast Guard Dr. Staten Island, NY 10305 John.M.Singletary@uscg.mil Gregory.P.Hitchen@uscg.mil Jeffrey.M.Yunker@uscg.mil Michele E DesAutels, Chris S. Sparkman, and Mark E. Cutter First Coast Guard District Michele.E.DesAutels@uscg.mil Chris.S.Sparkman@uscg.mil Mark.E.Cutter@uscg.mil
	Local Notice to Mariners 33 CFR Subpart 72.01	Reports changes to and deficiencies in aids to navigation that are established or maintained and operated by or under the authority of USCG, and any other information pertaining to the waterways within each USCG district that is of interest to the mariner.			Application form with sections of NOAA charts showing the proposed location of the PATON and work proposed.	Once the PATON permit is approved, several Notices to Mariners are issued with information on current and upcoming site assessment, construction, or operations activities. Local Notices to Mariners are available on the Coast Guard Navigation Center Web site.	

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
U.S. Department of Defense (DoD)	Consultation Public Law 114-92, National Defense Authorization Act of 2016, Amendment to § 358, FY11 National Defense Authorization Act 32 CFR Part 211; 10 U.S.C. § 183a.	Location of the offshore **wind turbines and interconnection cables** **Proposed structures** for potential obstruction and radar interference in coordination with the Federal Aviation Administration (FAA).	[redacted]		Proposed structure siting and cable siting information for comparison with known sensitive military operations. Preliminary project layout due at least one year prior to construction if it interferes with radar surveillance or military training route.	DoD facilitates communication of offshore wind turbine and cable siting through its central Siting Clearinghouse. The Navy's cable liaison official provides guidance on potential cable routes across sensitive military areas. Anticipated that DoD will be a cooperating agency in the preparation of BOEM EIS.	DoD Siting Clearinghouse Office of the Assistant Secretary of Defense for Energy, Installations, and Environment 3400 Defense Pentagon, Room 5C646 Washington, DC 20301 – 3400 osd.dod-siting-clearinghouse@mail.mil
U.S. Environmental Protection Agency	Clean Air Act General Conformity and OCS Air Quality Permit 40 CFR Part 55	Activities that may affect compliance with National Ambient Air Quality Standards in nonattainment areas **(Marine vessels or other equipment used for construction or operation)** Exact nature of permits required is determined after submittal of COP to BOEM			Estimate of total direct and indirect emissions from all vessels compared to levels that would equal or exceed the specified pollutant conformity emission thresholds per year in each nonattainment area.	USEPA reviews total air emissions concurrent with NEPA analysis as a cooperating agency in the preparation of BOEM EIS. Exact nature of permits required is determined after submittal of COP.	Mark Austin NEPA Coordinator Arielle Benjamin Environmental Engineer USEPA Region 2 Air Programs Branch
	National Pollution Discharge Elimination System (NPDES) Permit under Section 402 of the CWA (33 U.S.C. § 1342)	Discharges of pollutants from a point source to waters of the United States **(any dredged soil, solid waste, rock, sand) associated with construction**			Site-specific conditions, details of construction plan.	Permit required from EPA for discharges associated with construction and operations. Any discharges into ocean waters must meet water quality guidelines under section 403 of the CWA (33 U.S.C. § 1343). Section 402 requires that the public is notified of a NPDES permit application and given the opportunity to comment.	
	Review of Section 404 of the CWA (33 U.S.C. § 1344)	Impacts to Waters of U.S. including wetlands **(foundations, transmission cables, onshore components)** This review will be a component of the CWA permit review following the USACE review			The information for USEPA is included in the Individual Permit Application. (See data requirements above for Section 404 application to USACE).	USEPA reviews water quality impacts concurrent with NEPA analysis as a cooperating agency in the preparation of BOEM EIS.	

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
U.S. Fish & Wildlife Service (USFWS)	Consultation per Endangered Species Act §7. Take regulated per ESA Sections 9 and 10. 16 U.S.C. 1531 et seq. Other potential (but unlikely) permits Migratory Bird Treaty Act 16 U.S.C. §§ 703-712 Bald and Golden Eagle Protection Act, 16 U.S.C. Part 668; 50 CFR Parts 10, 21, 22	Actions potentially impacting federally threatened and endangered (T&E) species; i.e., "take" or resulting in the destruction or adverse modification of the critical habitat of such species **(turbines, foundations, transmission cables, onshore components)**	[redacted]		Project description with supporting maps and drawings documenting location and dimensions of proposed construction activities and permanent facilities; species survey data; consultation with USFWS, studies as recommended, such as Biological Assessment (BA) for formal consultation process. Details on survey and construction activities; number of vessels; equipment; sound profiles; modeling of noise impacts and other disturbance; estimate of take; proposed mitigation measures, if applicable.	Consult per ESA Section 7 with USFWS to determine species that may be present within the project area during all phases, including leasing, construction, operation, maintenance, and decommissioning through the development of a BA. If BA concludes proposed action may adversely affect listed species or critical habitat, formal consultation will result in a Biological Opinion (BO) that states whether proposed action will jeopardize continued existence of listed species or adversely modify critical habitat. The BO will typically include an Incidental Take Statement (ITS). The terms and conditions of the ITS are non-discretionary. USFWS reviews the COP and Individual Permit Application for compliance with the ESA for most listed terrestrial and freshwater species, but also several marine mammal species. USFWS will be a cooperating agency in the preparation of BOEM EIS.	New York Field Office 3817 Luker Road Cortland, NY 13045 Phone: (607) 753-9334 Fax: (607) 753-9699 FW5ES_NYFO@fws.gov Noelle L. Rayman-Metcalf Endangered Species Biologist U.S. Fish and Wildlife Service New York Field Office 3817 Luker Rd. Cortland, NY 13045 607-753-9334 noelle_rayman@fws.gov Tim Sullivan (land species) U.S. Fish and Wildlife Service New York Field Office 3817 Luker Road Cortland, NY 13045 607.753.9334 Tim.sullivan@fws.gov
Federal Aviation Administration (FAA)	FAA Form 7460-1, Notice of Proposed Construction or Alteration (for Hazard to Air Navigation Determination) 14 CFR Part 77	Presence of structures potentially affecting aviation **(turbines)**			Location and height of turbines more than 499 feet	FAA evaluates whether the project poses a hazard to air navigation based on technical criteria. FAA conducts aeronautical studies to evaluate the risk posed by potential obstruction. BOEM incorporated FAA guidance on marking and lighting as part of COP guidance.	Federal Aviation Administration Eastern Region Airports Division, AEA-600 1 Aviation Plaza Jamaica, NY 11434
National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	Magnuson-Stevens Fishery Conservation and Management Act Consultation, 16 U.S.C. 1801 et seq (MSA)	Actions impacting essential fish habitats (EFH), including coral reefs, kelp forests, bays, wetlands, and rivers necessary for fish reproduction, growth, feeding, and shelter **(surveys, foundations, transmission cables, marine vessels)**			Project description with supporting maps and drawings documenting location and dimensions of proposed construction activities and permanent facilities; species survey data; studies as recommended.	The MSA requires federal agencies to consult with NMFS on impacts of proposed actions on EFH. BOEM completes an EFH assessment to identify effects and required mitigation. NMFS reviews EFH assessment and provides EFH conservation recommendations to avoid, minimize, or offset effects, which BOEM can choose to follow. Any EFH that may be impacted by the proposed action must also be discussed in the EIS associated with BOEM's process. Any conservation recommendations adopted by BOEM to avoid or minimize adverse effects on EFH will be incorporated as terms and conditions in the lease, and BOEM may require additional surveys to define boundaries and avoidance distances. NOAA will be a cooperating agency in the preparation of the BOEM EIS.	Sue Tuxbury, OSW Project Coordinator Greater Atlantic Regional Fisheries Office National Marine Fisheries Service 55 Great Republic Drive Gloucester, MA 01930 Phone: (978) 281-9300 Keith Hanson and Allison Verkade (EFH)

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	ESA Section 7 Consultation, 16 U.S.C. 1531 et seq.	Actions potentially jeopardizing federally threatened and endangered (T&E) species, i.e., "take" or resulting in the destruction or adverse modification of the critical habitat of such species **(surveys, foundations, transmission cables, marine vessels)**	[redacted]		Details on survey and construction activities; number of vessels; equipment; sound profiles; modeling of noise impacts and other disturbance; estimate of take; proposed mitigation measures, if applicable. Project description with supporting maps and drawings documenting location and dimensions of proposed construction activities and permanent facilities; species survey data; studies as recommended.	If BA concludes proposed action may adversely affect listed species or critical habitat, formal consultation will result in BO that states whether proposed action will jeopardize continued existence of listed species or adversely modify critical habitat. The BO will typically include an Incidental take Statement (ITS). The terms and conditions of the ITS are non-discretionary. NMFS administers Section 7 consultations for marine and anadromous species.	Sue Tuxbury, OSW Project Coordinator Greater Atlantic Regional Fisheries Office National Marine Fisheries Service 55 Great Republic Drive Gloucester, MA 01930 Phone: (978) 281-9300 Julie Crocker (Marine Mammals)
	Incidental Take Authorization (IHA) and Letter of Authorization (LOA) under Marine Mammal Protection Act, 16 U.S.C. 1361 et seq.	Actions resulting in incidental "take" (harassment) of small numbers of certain marine mammal species **(foundations, transmission cables, marine vessels)**			For survey and construction activities: data on equipment, sound profiles, modeling of noise impacts, estimate of Level A and Level B take (harassment), proposed mitigation measures, if applicable. IHA applies to surveys which are effective up to 1 year and LOA applies to construction which is effective up to 5 years. Applications for survey and construction activities will be separate.	IHA application submitted for review and approval regarding "take" (only take by harassment) of marine mammals prior to initiation of activity and valid for one year. After receiving an application for an IHA, NMFS publishes a proposed authorization in the Federal Register and open a 30-day public comment period. Once the public comment period closes, the agency will issue an authorization if the agency determines conditions are met. For an LOA, NMFS must issue regulations. NMFS reviews the application for completeness and adequacy, publishes a Notice of Receipt of Application in the Federal Register for public comment, reviews and addresses comments, participates as a cooperating agency under the NEPA process, publishes the proposed rule in the Federal Register and addresses public comments on the rule, and issues the LOA.	Jaclyn Daly Protected Resources Division 1315 East West Hwy Silver Spring, MD 20910 (301) 427-8438 jaclyn.daly@noaa.gov
[redacted]							

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
Bureau of Safety and Environmental Enforcement (BSEE)	30 CFR Part 585	BSEE's authority includes, but is not limited to, permitting, environmental compliance, resource conservation, engineering standards and regulations, oil spill preparedness, inspections, enforcement, and investigations related to **OCS mineral resource activities**	[redacted]		Through a pending proposed joint rulemaking following a Memorandum of Agreement between BOEM and BSEE, BOEM is in the process of transferring safety, environmental enforcement, and compliance to BSEE. BSEE guidelines are in development.	BSEE leads the development of workplace safety and environmental compliance strategies for offshore renewable energy projects and is developing HS&E guidelines for offshore wind farms, and their inspection and enforcement approach. BSEE will be a cooperating agency in the preparation of the BOEM EIS.	Cheri Hunter BSEE Renewable Energy Program Coordinator Cheri.hunter@bsee.gov
Native American Tribal Groups	Government to Government consultation and ongoing stakeholder engagement through the COP and NEPA processes National Historic Preservation Act of 1966, 54 U.S.C. § 300101 et seq, 36 CFR Part 800	Potential effects on historic and cultural resources **All planned facilities**, including onshore and support facilities and all anticipated project easements			Work plans and reports documenting terrestrial and marine archaeological and cultural resources, including the Archaeological Survey Phase IA, and if requested a Phase IB, and Phase II.	As part of the state and federal permitting processes, Native American tribes are consulted on effects of the project.	Various
State							
New York State Department of Public Service, Public Service Commission (PSC or DPS)	Certificate of Environmental Compatibility and Public Need (CECPN) under New York State Public Service Law, Article VII 16 NYCRR Parts 85-88 Environmental Management and Construction Plan (EM&CP) Water Quality Certification, Section 401 of the Clean Water Act.	Siting of major utility transmission facilities lines 125 kV and over a distance of one mile or more **(transmission cable in State waters, onshore cable connection)**	[redacted]		Exhibits that address location of line and ROW, description of transmission facility, summary of studies of environmental impact, Statement of need for the facility, description and analysis of reasonable alternate routes, and any other relevant information to demonstrate compliance with the substantive requirements of all applicable state and local approvals.	NYSDPS will review the application to determine completeness: responses to comments and requests for additional information deemed necessary to support the adjudicatory process. All other State and local permits are superseded, but application must demonstrate compliance with the substantive requirements of all applicable state and local approvals.	Secretary to the Commission Empire State Plaza Agency Building 3 Albany, NY 12223-1350 Phone: (518) 474-6530 Email: secretary@dps.ny.gov Utility Supervisor (Environmental) Office of Electric Gas and Water Department of Public Service 3 Empire Plaza Albany, NY 12223 Office: 518.486.7847 Mobile: 518.225.7677

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
New York State Department of State	Coastal Zone Management Act (CZMA) Consistency certification 15 CFR Parts 923, 930 6 NYCRR § 617 19 NYCRR § 600	Federal Actions that affect any use of natural resources of the coastal zone **(transmission cables in State waters)**	[redacted]		Application that includes: analysis of project consistency with the Coastal Management Program policies and applicable Local Waterfront Revitalization Programs, federal consistency assessment form, including written analysis of the activity's consistency with state and applicable local coastal policies, copy of the completed federal permit application and supporting documentation, copies of applications submitted to involved state agencies, all documentation submitted to siting board if facility subject to Articles VII or 10 of the New York State Public Service Law.	NYSDOS will review as part of Article VII process and/or the submittal of Joint Application. Consistency review manages coastal uses and resources while facilitating cooperation and coordination with involved state, federal, and local agencies. Must submit consistency certification alongside COP.	New York State Dept. of State Consistency Review Unit Suite 1010 99 Washington Avenue One Commerce Place Albany, NY 12231-0001 Contact: Matthew Maraglio Coastal Resources Specialist New York State Department of State Office of Planning, Development & Community Infrastructure 99 Washington Avenue, Suite 1010, Albany, NY 12231 (518) 473-3371 matthew.maraglio@dos.ny.gov
New York State Department of Environmental Conservation	Participates in Article VII proceedings and issues State Pollutant Discharge Elimination System (SPDES) General Permit for Construction Activity and Section 401 Water Quality Certifications	Activities in coastal zone hazard areas (ECL 34), placement of fill in navigable waters, tidal wetlands (ECL 15), freshwater wetlands (ECL 24), discharges of stormwater, and impacts to state-listed T&E species (ECL 11 and 6 NYCRR Part 182) **(transmission cables in State waters, converter station)**			Included in Article VII Application: information on existing conditions and impacts regarding water resources; freshwater and tidal wetlands; marine resources; coastal erosion hazard areas (CEHAs); State-protected habitats, threatened and endangered (T&E) species; air resources, environmental justice areas or disadvantaged communities; climate change impacts and resilience; regulation of invasive species; solid and hazardous waste; wells; and stormwater.	NYSDEC provides comments on the Article VII application to ensure compliance with applicable regulations, NYSDEC evaluates the application to ensure that proposed impacts to natural and environmental resources are avoided and minimized to the maximum extent practicable.	Natural Heritage Program NYSDEC-DFWMR New York Natural Heritage Program 625 Broadway, 5th Floor Albany, NY 12233-4757 http://www.dec.ny.gov/animals/31181.html (518) 402-8935 Kristi Primeau (DEC Primary POC) Bureau of Energy Project Management Division of Environmental Permits 625 Broadway, Albany, New York 12233-1750 P: (518) 402-9157 kristy.primeau@dec.ny.gov
New York State Department of Environmental Conservation Division of Water	State Pollutant Discharge Elimination System (SPDES) Permit for Stormwater Discharges DEC General Permit No. GP-0-20-001	Disturbance of more than 1 acre			Included in Article VII EM&CP: Preliminary Stormwater Pollution Prevention Plan (SWPPP).	Submit Notice of Intent (NOI) to NYSDEC prior to final site plan approval.	625 Broadway Albany, NY 12233-3505 http://www.dec.ny.gov/chemical/43133.html#Forms
New York State Office of General Services	Submerged Lands License, Grant or Easement 9 NYCRR Parts 270 and 271	Structures, including fill, located in, on, or above state-owned lands under water **(transmission cables in State waters)**			Application for use of land underwater, including: design plans approved by all involved agencies, certified copy of deed(s) of applicant's adjacent upland or consent of owner of such adjacent upland with a certified copy of the deed(s), copy of adjoining shorefront deed(s) and tax map section. Duplicate copy of permit/letter issued by U.S. Army Corps of Engineers (USACE). After construction, submit an as-built survey and legal description for approval by NYSOGS.	NYSOGS is consulted on State ownership boundaries during the Article VII process. After the CECPN is issued, and other agencies approve plans or issue permits, including USACE. NYSOGS reviews the application and if approved, issues a permit for construction and collects half of the estimated fee. The easement is finalized and recorded once NYOGS collects the remaining fee based on the as-built survey.	Office of General Service, Bureau of Land Management Corning Tower 26th Floor Empire State Plaza Albany, NY 12242 Phone: (518) 474-2195 LandUnderWater@ogs.ny.gov

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
New York State Office of Parks, Recreation, and Historic Preservation	State Historic Preservation Office Consultation, Determination of Effect 6 NYCRR Part 617	Impacts to the quality of archaeological or cultural property listed on or eligible for listing on the National or State Registers of Historic Places **(transmission cables onshore/offshore components in State waters)**	[redacted]	[redacted]	Work plans and reports documenting the Historic Resources Survey, Archaeological Survey Phase IA, and if requested a Phase IB, and Phase II.	NYSOPRHP reviews application documents as they are submitted online Cultural Resources Information System (CRIS). The Article VII process ensures consultation with NYSOPRHP for potential impacts to the quality of archaeological or cultural property listed on the National or State Registers of Historic Places (or determined to be eligible for listing on New York State Register) and ensures that projects try to avoid or mitigate adverse impacts to such properties. If effect is determined, then preparation of a mitigation plan and Memorandum of Agreement (MOA) is required.	State Historic Preservation Cultural Resources Information System https://cris.parks.ny.gov Mailing address: Peebles Island State Park P.O. Box 189 Waterford, NY 12188-0189 Jessica Schreyer jessica.schreyer@parks.ny.gov 518-268-2205 Timothy Lloyd (Marine Archaeology) Timothy.Lloyd@parks.ny.gov 518-268-2186
New York State Department of Transportation	Highway Work Permit 17 NYCRR Part 131 Special Hauling Permits 17 NYCRR Part 131	Any utility work, including construction in State highway ROW **(interconnection from the landfall site to substation)** Vehicles/loads that exceed the legal dimensions or weights specified in Section 385 of the NYS Vehicle and Traffic Law **(transmission cables, converter station)**			The required forms depend on the type of activity: installation of a driveway, utility work, drainage features, etc. PERM 32 application form, including work plans, a traffic maintenance plan, and supporting documents (e.g., insurance certificates). PERM 39 application form, including carrier information, vehicle information (i.e., vehicle dimensions and load information), and trip information (i.e., start date, permit type, routes).	NYSDOT reviews applications for impacts to safety, traffic, maintenance of state roads, drainage structures (including culverts) and waterbodies within the DOT ROW, and that the project incorporates appropriate site restoration. The Highway Work Permit Application should be returned to the Regional Office. The Regional Office will outline any additional requirements of applications depending on the nature of work and issue the Highway Work Permit after all application requirements are met.	Josh Rousseau Deputy Chief of Staff 50 Wolf Road, 6th Floor Albany, NY 12232 (518) 417-6612 c: (518) 898-6212 NYSDOT Region 11 (New York City) Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101 Craig Ruyle, Regional Director (718) 482-4526
	Approval of Longitudinal Installation along State ROW and Use and Occupancy Agreement (with the Federal Highway Administration 17 NYCRR Part 131, 23 CFR §§ 645.209, .211, .213, and .215	Longitudinal cable installation in a State ROW or is a controlled access roadway **(TBD transmission cables)**			Application for an exception to the NYSDOT Utility Accommodation Plan and components necessary for completion of National Environmental Policy Act process, including alternative alignment analyses (for installations along Interstate Rights of Way).	Because a transmission cable is a non-transportation use of the ROW, the exception to the NYSDOT Utility Accommodation Plan is a process that includes FHWA review and approval prior to the NYSDOT issuance of a Use and Occupancy Agreement and Highway Work permit. NYSDOT and FHWA will review applications for use of controlled access parkways and highway.	
[redacted]							

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
[redacted]							

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

Federal, state and local permitting

Agency	Permit, approval, or consultation and regulatory basis	Regulated activity/ (potential applicability)	Status	Anticipated completion	Data requirements	Approval process	Contact
Local							
[redacted]							

Table 10-3 (continued). Federal, state, and local agency consultation and permits anticipated for the Leading Light Wind lease area and transmission interconnection.

11
Engineering and technology

11 Engineering and technology plan

11.1 Project overview

Lease area description

The Leading Light Wind project will be located in Lease Area OCS-A 0542 in the New York Bight, approximately 80 miles from New York City and approximately 40 miles off the nearest shore in the New Jersey coast. The lease area was one of six leases awarded by BOEM through the February 2022 New York Bight lease auction. Additional information on the site plan for the lease area is provided in Section 4.

[redacted]

Capacity options

[redacted]

Preliminary wind farm layouts

[redacted]

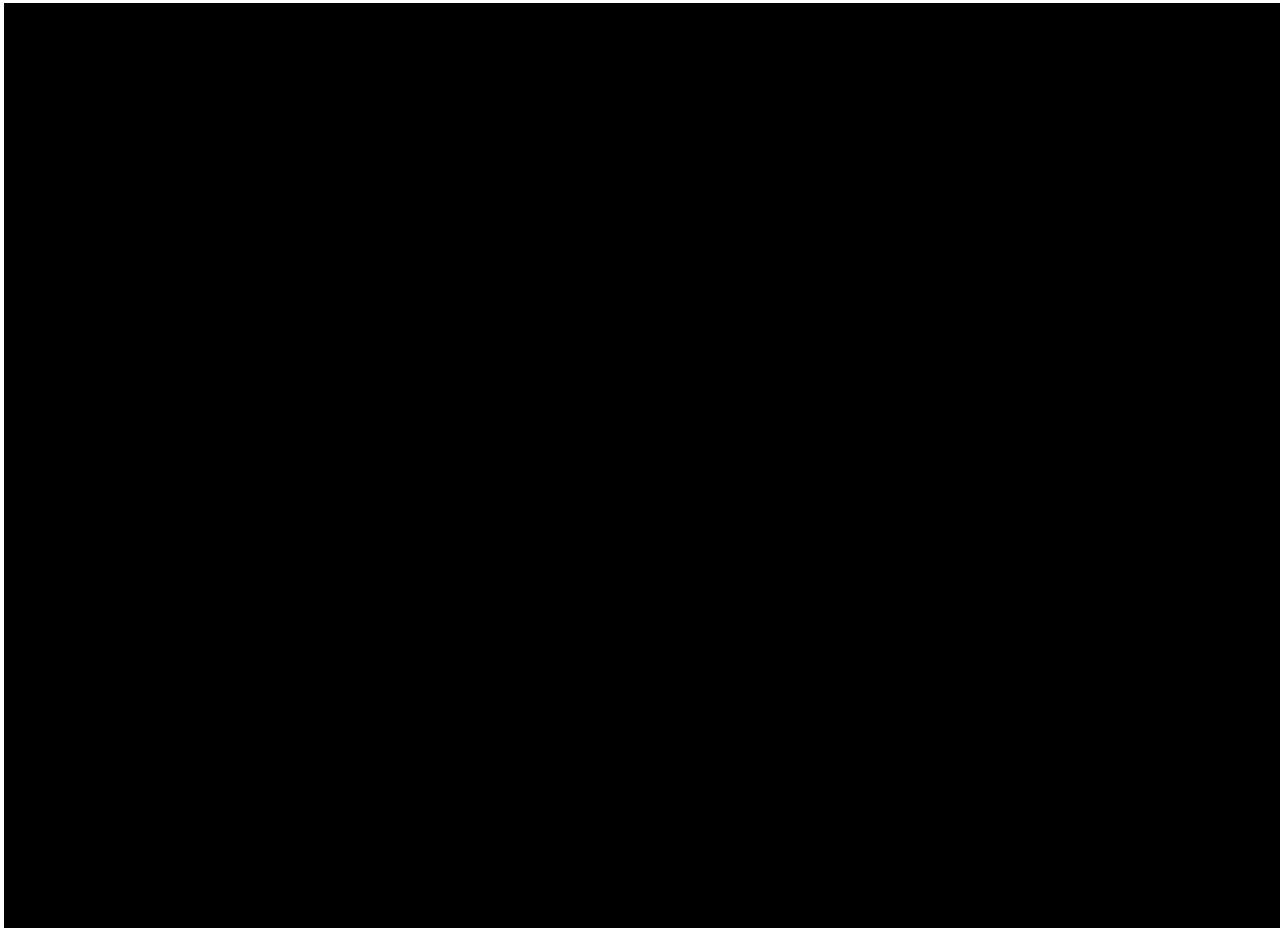
Primary components

Each proposed project option consists of the following primary components:

- WTGs
- Foundations
- HVDC transmission system (OFCS and ONCS)
- HVAC inter-array cables
- HVDC export cables
- Landfall site(s)

Project summary

All project options generally follow a similar configuration. A series of WTGs will be mounted on their foundations and connected to the OFCS by a system of inter-array cables.



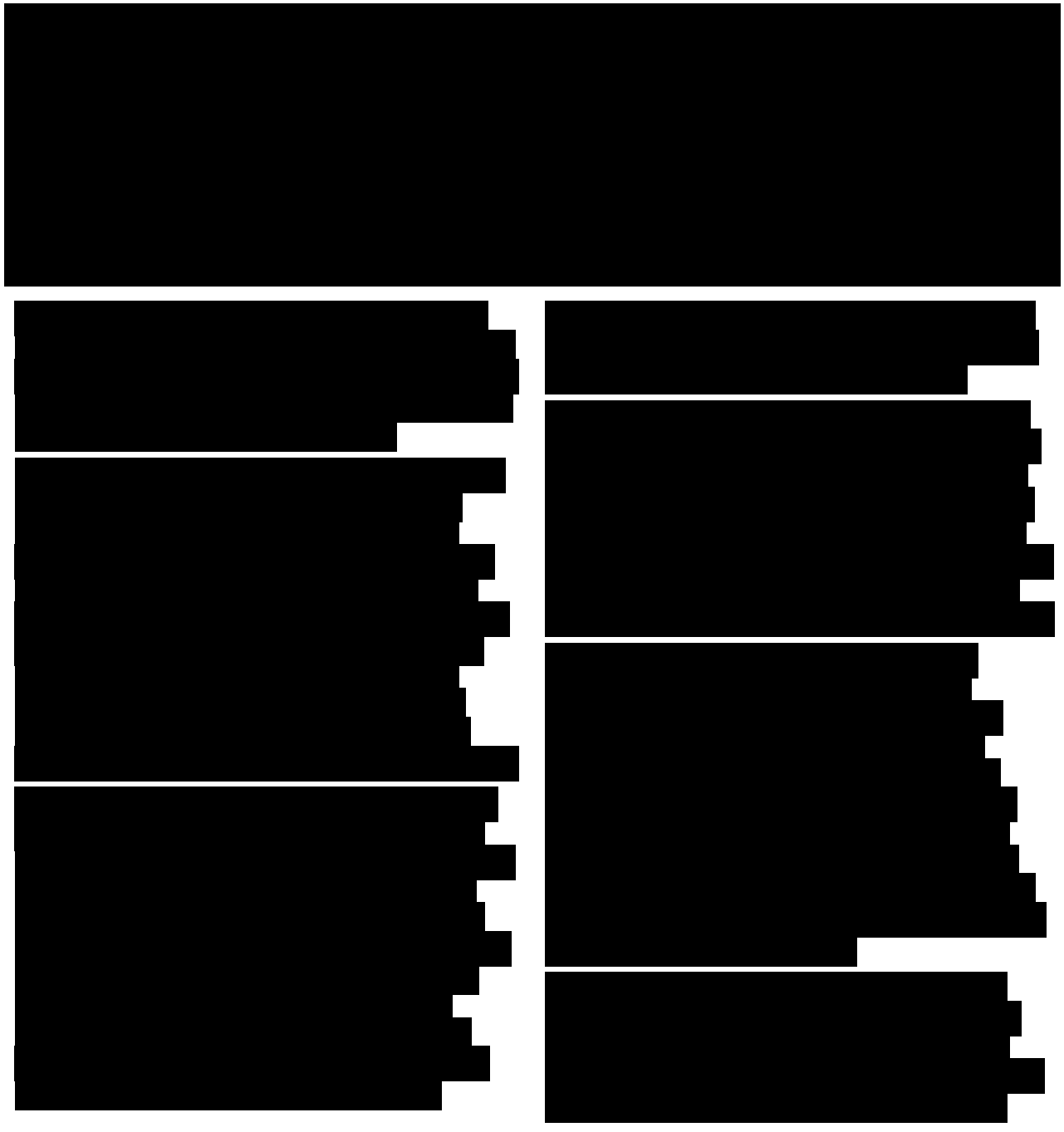
11.2 Wind turbine generators and offer capacity

WTG description and offer capacity

Leading Light Wind will use the next generation of WTG technology in the project, allowing for the most efficient use of the lease area and lowest cost of energy.

WTG technology

The WTG is the central element of the wind farm design, touching all elements of the project. It is typically the largest single contract and capital expenditure. The WTG selection also heavily influences the wind farm power generation, foundation design, electrical design, and installation strategy. It is also the principal component that needs to be maintained during the operations phase of the project. Due to the scale of the WTG contract, it is also a key opportunity to use local suppliers and deliver local content.



[redacted]

[redacted]

Procurement strategy for WTGs

[redacted] The primary factors shown in Figure 11-1 will be considered in the selection of the preferred WTG equipment.

Cost and schedule

- Fabrication, transport, and installation costs
- Ability to deliver product on required project schedule
- Cost impact on adjacent packages
- Tax incentive eligibility (Inflation Reduction Act, and other federal, state, and local incentives)
- Tariffs, duties, and import costs for internationally sourced product

Local and domestic content, economic benefits

- SCIP proposal
- US iron and steel
- Existing footprint within New York and the US
- Breadth and viability of plans to expand in New York and the US
- Jobs and workforce development commitments

Quality, health, safety, and environmental (QHSE)

- Track record of quality project delivery
- Health and safety track record
- QHSE management system

Technical

- Impact on energy yield
- Required maintenance schedules
- Recyclability

Reliability and operability

- Supplier maintenance know-how and support during operations period
- Operation and maintenance requirements
- Certified component lifetime
- Durability related to a changing climate

Commercial and legal

- Compliance with applicable laws, including the Jones Act and Dredging Act
- Strength of warranties
- Performance incentives
- Financeability of supplier and contract terms

Figure 11-1. WTG supplier evaluation and selection criteria.

[redacted]

11.3 Foundations

Foundation type

Leading Light Wind has completed a comprehensive conceptual foundation design and review process for the lease area. Different types of foundations were considered as part of this initial step to evaluate their feasibility,

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Procurement strategy for foundations

[redacted]

[redacted]

Commercial

- Fabrication, transport, and installation costs

Product availability

- Fabrication slot availability
- Production rate

Reliability and operability

- Track record (total number and weights of delivered foundations

Quality, health, safety, and environmental (QHSE)

- Track record of quality project delivery
- Health and safety track record
- QHSE management system
- Minimization of chemical use and overall implementation of safety data sheets

Technical

- Fabrication quality: Any quality issues in welding and coating from previous projects
- Pool of certification welders (in-house and/or outsourced)
- Recyclability

Figure 11-5. Foundation supplier evaluation and selection criteria.

[redacted]

Foundation scour protection

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Procurement strategy for scour protection

[redacted]

A number of factors will be considered in the procurement of scour protection material, as depicted in Figure 11-6.

Commercial

- Cost per ton of material

Technical

- Location of loadout
- Location of quarry
- Material availability
- Sufficient material processing capacity
- Suitability of proposed vessels and equipment
- Recyclability

Quality, health, safety, and environmental (QHSE)

- Track record of quality project delivery
- Health and safety track record
- QHSE management system
- Minimization of chemical use and overall implementation of safety data sheets
- Type of rock
- Contaminants
- Testing regime for grading
- Ability to install material to the required tolerances

Figure 11-6. Scour protection supplier evaluation and selection criteria.

11.4 HVDC transmission system

Overview

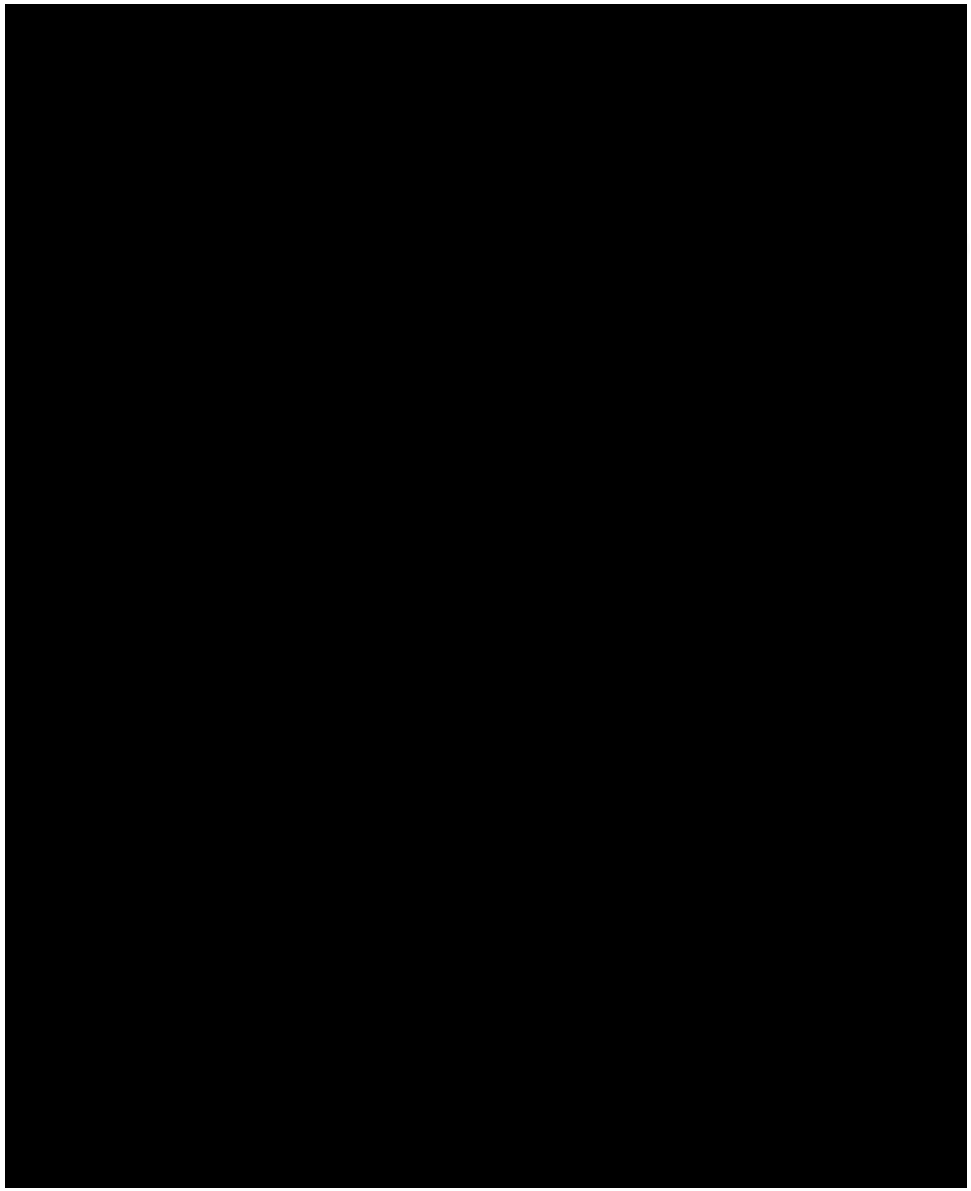
The HVDC transmission system will comprise a point-to-point connection of an OFCS installed on a platform foundation and an ONCS. The OFCS will collect the AC power generated by the WTGs through an inter-array cable system and convert it to DC for transmission through the subsea export cable to the ONCS.

Transmission system concepts

[redacted]

[redacted]

[redacted]



[redacted]

Procurement strategy for HVDC transmission system

[redacted]

Commercial

- Vendor has demonstrated history of offshore wind farm HVDC transmission technology project delivery.
- Vendor has robust equipment manufacturing capabilities
- Vendor has direct experience with production of specification(s) of interest.
- US sourced (preferably local)

Quality, health, safety, and environmental (QHSE)

- Track record of quality project delivery
- Health and safety track record
- Health and safety management system
- Minimization of chemical use and overall implementation of safety data sheets

Technical

- HVDC transmission system capable of supporting the power generated by WTGs
- Vessel availability to complete T&I works
- Equipment transportation risks
- Required O&M
  - Frequency of maintenance cycles
  - Consumables used
  - Offshore man-hours required for maintenance
  - Storage constraints and/or flexibility
- Certified to certified verification agency standards
- Lifespan/reliability
- Recyclability

Figure 11-13. HVDC OFCS/ONCS supplier evaluation and selection criteria.

[redacted]

11.5 Submarine cables

Potential POIs and landfall sites

[redacted]

[redacted]landfall locations are under consideration to route the HVDC cables to the ONCS. The optimal landfall methods for each location will be developed, considering cost and constructability as well as environmental and stakeholder impact (see Section 11.6).

[redacted]

[redacted]

Export cables

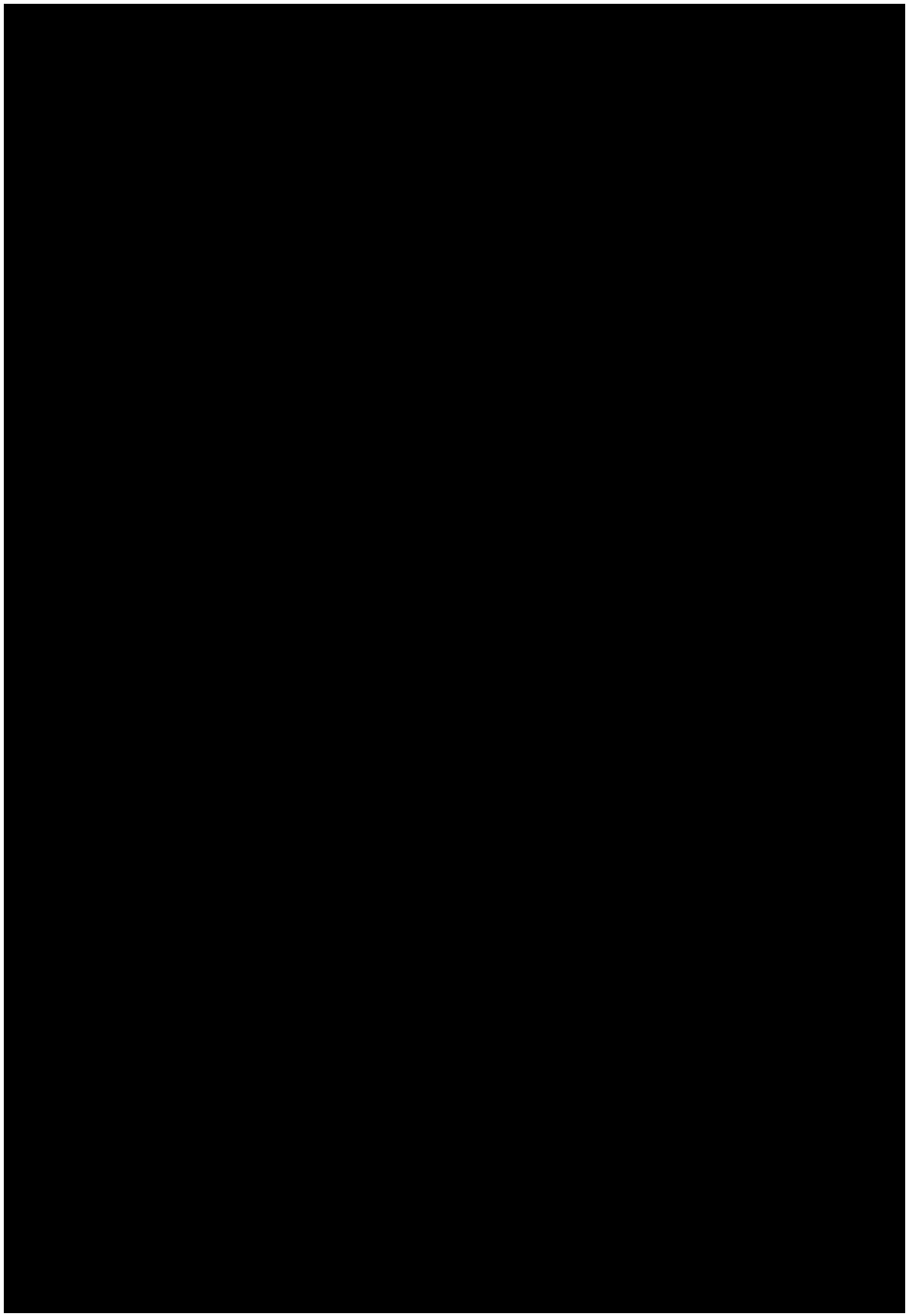
The OFCS will be connected to the ONCS via export cables, with a majority of the route being submarine [redacted] the project will utilize [redacted] submarine export cables. The export cables will be installed within the export cable corridor, which will connect the OFCS to the ONCS.

[redacted]

[redacted]

Inter-array cables

The inter-array cabling system connects the WTGs to the OFCS. Inter-array cables are arranged in strings and connect multiple WTGs to the OFCS.



[redacted]

Procurement strategy for submarine cables

[redacted]

Commercial

- Vendor has demonstrated history of offshore wind farm project delivery (primarily in the US)
- Vendor has robust manufacturing capabilities (i.e., power cores and layup at the same facility)
- Vendor has direct experience with production of cable specification(s) of interest
- US sourced (preferably local)

Quality, health, safety, and environmental (QHSE)

- Track record of quality project delivery
- Health and safety track record
- Health and safety management system
- Minimization of chemical use and overall implementation of safety data sheets

Technical

- Cable capable of supporting the power generated by WTGs (project nameplate capacity)
- Required O&M (cost) of cable components:
  - Frequency of maintenance cycles
  - Consumables used
  - Offshore man-hours required for maintenance
  - Storage constraints and/or flexibility
  - Recyclability
- CPS
  - CPS interface to scour protection
  - CPS stabilization optionality (i.e., rock berm, rock bags, articulated concrete mattresses, other solutions, etc).
- Compliance with certified verification agency requirements per 30-CFR-585
- Certified to certified verification agency standards
- Cable lifespan/reliability

Figure 11-19. Cable supplier evaluation and selection criteria.

[redacted]

11.6 Landfall site [redacted]

The transition between submarine export cables and terrestrial export cables will occur at [redacted] landfall sites (see Section 8):

[redacted]

[redacted]

11.7 Lighting controls

Overview

The project will utilize lighting aids in the construction and the O&M phases. Lighting will be used alert pilots and mariners to potential hazards, to guide search and rescue operations to the right location, to illuminate safe vessel transfers and workspaces, and to create a safe environment in and around the offshore wind farm.

During the construction phase, Leading Light Wind will demarcate the area of the construction site through cardinal and parameter buoys to ensure vessels can avoid the offshore wind farm. During the O&M phase, lighting and markers will be arranged on/around the primary components for working activities, aviation, and marine navigation.

[redacted]

[redacted]

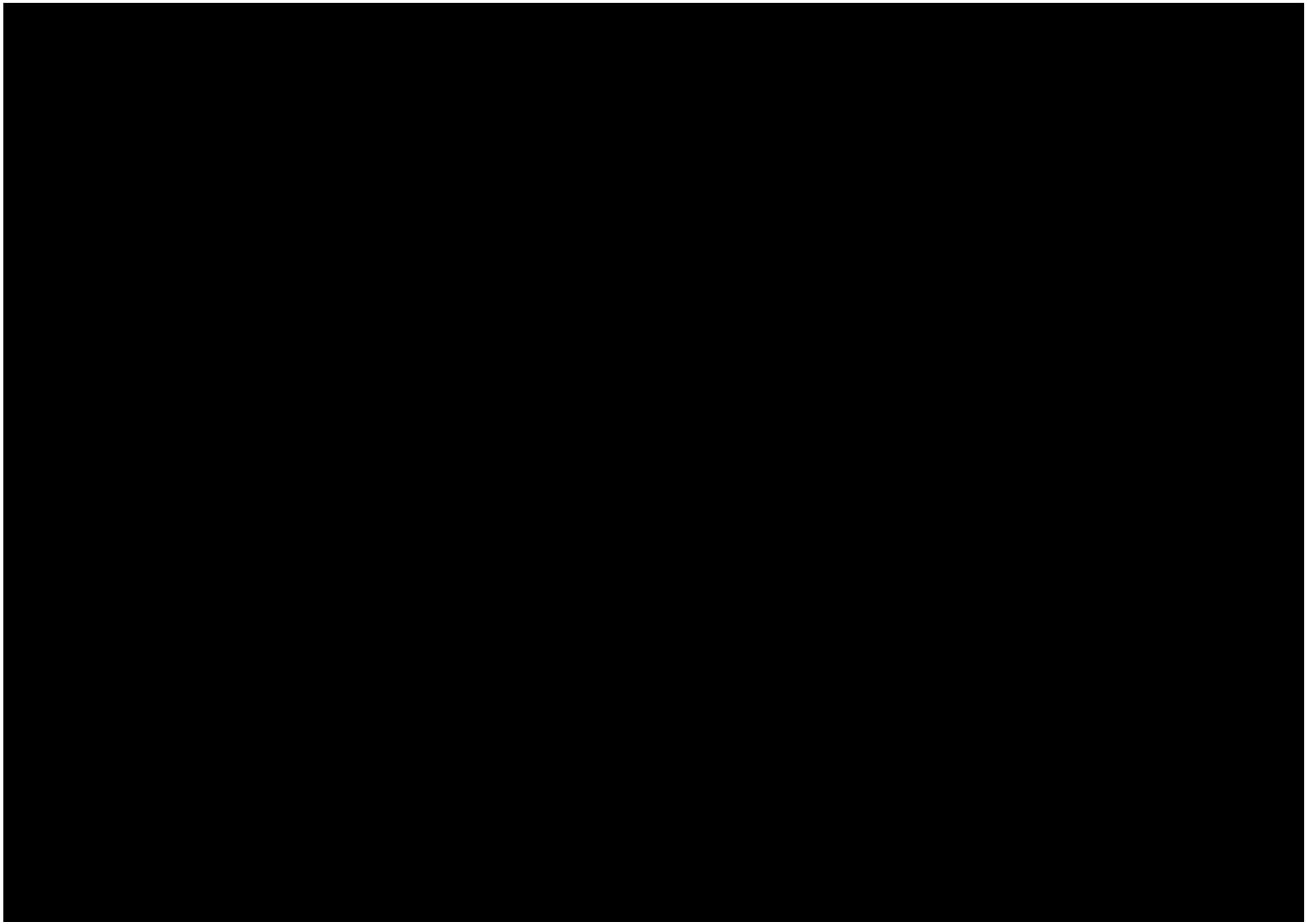
[redacted]

[redacted]

11.8 Advanced marine mammal observation and survey technology

Endangered large whale species such as the North Atlantic Right Whale, and other protected marine mammals, are present on the US East Coast. These species could be harmed by noise produced during construction, operations, and maintenance activities. Human-made underwater noise produced during construction, operations, and maintenance of an offshore wind facility can impede marine mammal communications.

As a result, Leading Light Wind is committed to protecting wildlife and the natural ecosystems in its areas of development. Leading Light Wind will use Passive Acoustic Monitoring Systems (PAMS) as required by NOAA and



BOEM to conduct analyses on species presence and behavior. Leading Light Wind will work and coordinate with NOAA and BOEM to obtain project-related permits and approvals for the use of PAMS. Those agencies generally require information on PAMS capabilities and techniques needed to promote efficient and helpful data collection.

PAMS refers to the use of underwater microphones to detect sounds in the presence of species and native environmental sounds, thereby mitigating risk and evaluating potential behavioral changes resulting from offshore wind farm activities. PAMS will be used for real-time decisions like delaying construction activities or warning vessels to reduce their speed to protect various aquatic mammals.

PAMS are generally used for offshore wind activities such as:

- Development phase monitoring to gather information on mammals' movements and migratory patterns
- Pre-vessel transit to limit potential mammal collisions
- Preconstruction monitoring (e.g., prior to pile-driving activities)

11.9 Climate-related risks and design considerations

Physical risks

In the process of identifying feasible technology for the Leading Light Wind project, we have considered climate-related risks to the proposed infrastructure and design considerations to mitigate these risks. Sea level rise and impacts from increased frequency and severity of storms are particularly relevant to landfall sites and the ONCS.

Landfall site: In selecting the landfall site, we will investigate the impact of sea level rise and increased storm events to identify a safe cable burial depth below the seabed.

ONCS and POI sites: Potential ONCS and POI sites will be sited so they are not within a designated floodplain or other flood hazard area, and do not contain wetland resources considering sea level rise and dynamic flooding events. In case of flood hazard in selected landfall/ONCS sites, mitigation methods such as flood barriers, elevated platforms, and other methods of raising critical flood elevations will be considered.

Design considerations

Design considerations for climate adaptation and resiliency have been considered in the feasibility stages of the project:

WTG certification for specific climate: The WTGs will be designed according to site-specific conditions, including winter storms, hurricanes, and tropical storms, based on industry standards such as American Clean Power Association, International Electrotechnical Commission, American Petroleum Institute, and International Organization for Standardization standards. These site conditions and standards will be detailed in the design basis and verified by the independent certified verification agent.

Foundation design considerations for seismic activity: The foundations will be designed according to site-specific conditions, including WTG loads, metocean data, and geological and geotechnical data information, based on industry standards such as International Electrotechnical Commission, Det Norske Veritas, International Organization for Standardization, and American Petroleum Institute standards and recommended practice.

Recycling of primary components

WTG blades

Recyclability of project components can reduce carbon emissions as well as promote a more circular economy, foster a secondary market for recycled materials, and generate incentive for technological innovation.

A variety of materials suitable for WTG blade manufacturing are either fully or partially recyclable.

Leading Light Wind will work with the supplier to understand feasible recycling options for blades.

Invenergy has experience working with Carbon Rivers for blade recycling. This provider utilizes a unique thermal process to recover the fiberglass from decommissioned wind turbine blades. As part of the process, the composite is heated without oxygen to prevent degradation of the fiberglass. The recycled glass fiber is clean and mechanically intact for next generation blade manufacturing.

12
Project schedule

12 Project schedule

12.1 Overview

The Leading Light Wind Team has developed a detailed project execution plan that integrates the critical development, procurement, and construction activities of the project. The project schedule has been developed to optimize permitting activities and minimize execution risks to delivering the proposed generation capacity and infrastructure by incorporating the following:

1. Achievable Commercial Operation Date (COD)
2. Minimized interface risks tied to critical development and procurement activities
3. Strategic planning to minimize and mitigate risk to critical path work activities
4. Effective resource management in a constrained environment for labor, equipment, and materials

The overall project schedule was developed around discrete and integrated work packages and incorporates contracting and procurement strategies to maximize productivity and optimize project delivery. The project schedule has been informed by these factors:

- Invenergy's extensive experience with onshore renewable and transmission development in New York and deep knowledge of New York Independent System Operator (NYISO) processes.
- Consultations and bid proposals from technology providers, manufacturers, contractors, and other companies throughout the supply chain.

[redacted]

The main drivers behind Leading Light Wind's critical path and target COD include these:

- Project permitting and approvals (e.g., NYSDPS Article VII permitting and BOEM Construction and Operations Plan (COP) approval and the associated National Environmental Policy Act (NEPA) review)
- Execution of detailed survey and project engineering work in support of project design and investment decisions
- Financing efforts and existing relationships with the lending community
- Construction and mechanical completion of the project high-voltage direct current (HVDC) transmission system
- Supply of wind turbine generator (WTG) foundations and identification of appropriate staging and marshaling locations to support the offshore execution campaign

- Offshore installation and commissioning of the WTGs

To manage the risk of delay in the schedule, Leading Light Wind has developed several schedule-driven risk management strategies.

For example, the intended contracting structure of the project minimizes interface and schedule risks between critical path contractors to ensure continuity and the ability to accelerate execution of scopes as needed to deliver generation on time. Conservative and appropriate estimation of schedule activities will allow the project to maintain the project's critical path.

Early submittal of permit applications will enable the project to move through the state and federal reviews ahead of competing projects, resulting in permit acquisition within the baseline schedule. This schedule reflects the historical federal and state agency review timelines and has not incorporated recent commitments to accelerate such review processes.

A detailed project schedule is provided in an Excel file attachment to this proposal. The schedule is focused on the development, siting, permitting, engineering, and financing efforts, leading into the procurement, manufacturing, installation, and commissioning of the primary project components. As discussed below, primary project components include WTGs, foundations, an HVDC transmission system that includes an offshore converter station (OFCS) and onshore converter station (ONCS), HVDC export cables, HVAC inter-array cables (IAC), and one or more points of interconnection (POIs).

[redacted]

To inform and refine this schedule, Leading Light Wind has initiated key development efforts and conducted extensive outreach and engagement with lenders, permitting agencies, potential suppliers/vendors, and construction contractors. To date, key actions have included the following:

This schedule reflects the historical federal and state agency review timelines and has not incorporated recent commitments to accelerate such review processes.

- Engaging BOEM and incorporating overall lead times for COP sufficiency review and Federal NEPA process required for COP approval
- Commencing critical path environmental data collection with seasonality restrictions that drive the overall sufficiency of the COP
- Applying historical lessons learned about the Article VII permitting process for onshore renewable projects and offshore projects currently within the Article VII process
- Engaging contractors and leveraging partnership(s) to establish a realistic view of critical path procurement and construction durations and interdependencies, with a particular focus on ongoing HVDC contracting for onshore generation projects and incorporating schedule lessons learned

[redacted]

- Consulting with NYISO on initial project concepts, with confirmed queue positions for class year evaluation
- Initiating front-end engineering electrical studies to determine project transmission capability and rating
- Performing engineering feasibility studies to validate proposed project concept and export cable routing
- Establishing minimum-risk HVDC and HVAC terrestrial transmission solutions to the ONCS and POI(s) with contingency routing options available for critical landfall and interconnection positions

[redacted]

- Assessing public road right-of-way (ROW) siting, including public road ROW widths and existing utility information

- Reviewing environmental impacts of route options, utilizing publicly available such as the National Wetlands Inventory (NWI) and National Hydrography Datasets
- Hosting an introductory meeting with the Native American Tribes with interest in the New York Bight and awaiting further direction from BOEM on next steps for Tribal consultation

[redacted]

- Consulting with state and federal agencies regarding a wide range of pertinent topics including landfalls, terrestrial routing, resource considerations. Agencies consulted include:[1]

[redacted]

Development, permitting, and construction

[redacted]

The project schedule has been developed in conjunction with a procurement strategy for major materials required for the project. We have incorporated challenges such as allowable construction windows due to environmental constraints and the availability of resources for parallel activities, while accounting for overall permitting timelines that constrain the start of construction of specific work packages. Leading Light Wind conducted the following key activities to validate the targeted COD date:

- Consulted with BOEM on anticipated COP and NEPA interdisciplinary agency reviews and associated timelines

[redacted]

- Engaged our legal team to review applicable permit timeframes and durations for the “Hearings and Decisions” phase of the NYSDPS Article VII permitting process
- Developed environmental and cultural field survey strategies and reviewed resource requirements and protocols to achieve desired project durations
- Developed field investigation and data collection strategy and execution plan
- Engaged an engineering and civil survey consultant to review durations and requirements for associated activities
- Engaged a land/ROW consultant to provide applicable activities and associated durations
- Reviewed past project precedent to assess typical permitting agency lead times, including approval of the project environmental management and construction plan
- Reviewed lead times for major material vendors with particular focus on packages that are considered critical path for the project including manufacturers (OEMs) for the HVDC land cables, submarine cables, and HVDC converter stations
- Evaluated logistics for material deliveries and staging along public road ROW

[1] Date represents initial engagement in instances where multiple engagements were made.

- Evaluated logistics for material deliveries and staging for converter stations and substation work
- Solicited construction execution methodologies from experienced construction contractors
- Benchmarked the project schedule against other, similar, complex infrastructure projects developed by Invenergy and energyRe
- Reviewed project schedule activities with construction contractors, including the following:
  - Mobilization/demobilization
  - Port and harbor upgrade permitting and construction durations
  - Duct bank production and installation rates
  - Required civil and remediation scope for ONCS
  - Cable pulling, splicing, and terminating
  - Environmental restoration and reclamation rates for construction and installation activities proposed (land and submarine)
  - Manufacturing, fabrication, and commissioning durations for HVDC export and HVAC IAC cables
  - Logistics and site erection production rates for onshore and offshore converter stations
  - Manufacturing, production, and installation rates for foundations
  - Onshore marshaling land utilization and staging to support overall installation campaign
  - WTG production and installation rates

12.2 Critical path

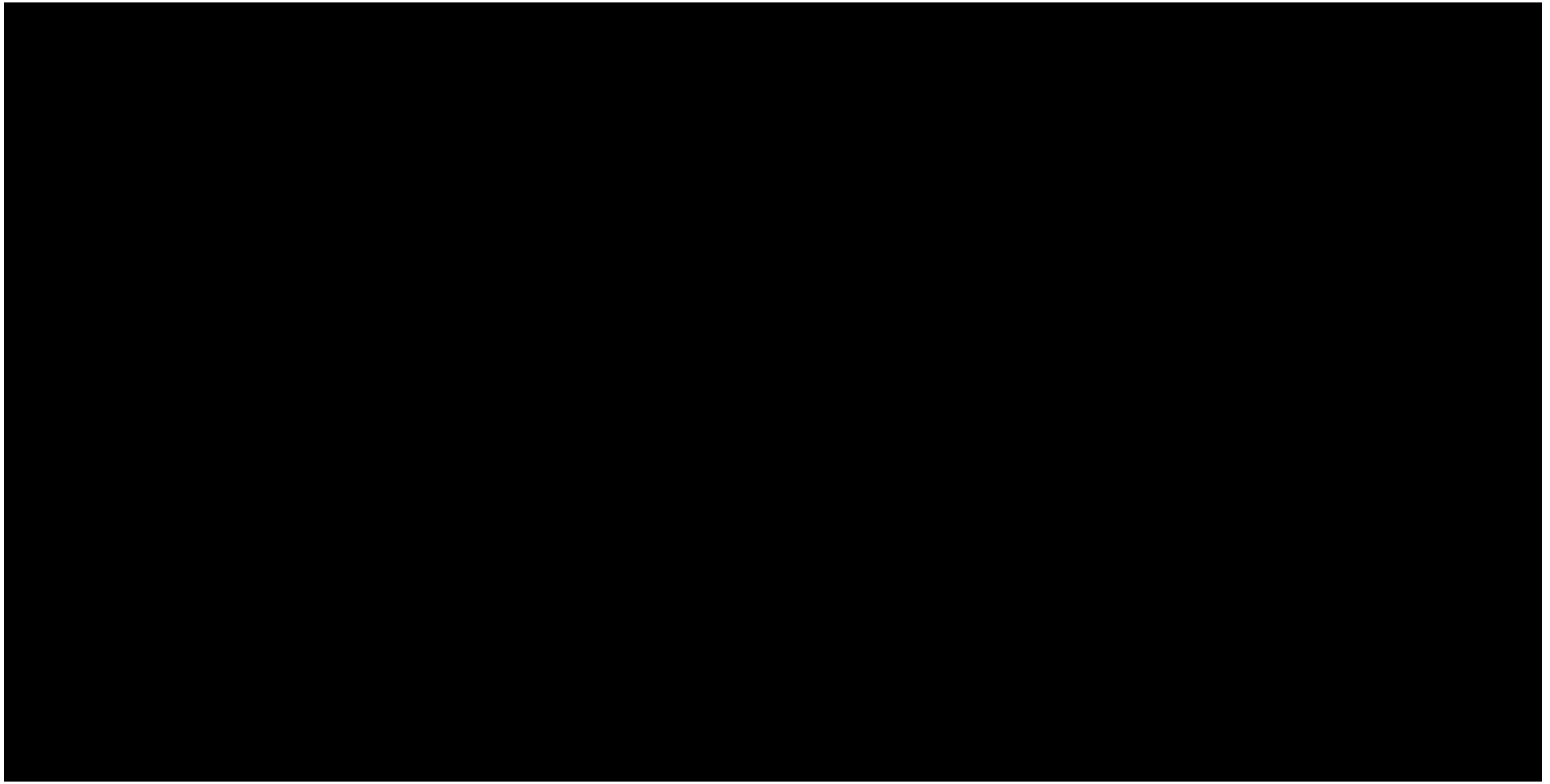
The critical path schedule for all bid options is provided in Figure 12-1 on the next page. The key schedule drivers for Leading Light Wind are the NYSDPS Article VII process, BOEM COP/NEPA process, and the construction/commissioning phase of the project, including HVDC transmission energization, foundation installation, WTG installation, and commissioning.

Leading Light Wind intends to manage risk to the project schedule by establishing float around key interface activities on the project critical path. Overall market supply constraints have necessitated early capacity commitments to secure production availability for [redacted] offshore installation, and ports and marshaling infrastructure to ensure the deliverability of the project COD. Additional detail for each of these items is provided in this section.

NYSDPS Article VII process

[redacted] The schedule plans for an Article VII Certificate of Environmental Compatibility and Public Need (Certificate) issuance by [redacted] along with all Environmental Management and Construction Plans approved by [redacted]. These approvals are the key drivers to allow for New York State field construction to begin on this project. Below are additional details related to more specific tasks for achieving these milestone dates:

- **Environmental/cultural surveys.** [redacted] Leading Light Wind has already initiated data collection. Further detail regarding these surveys can be found in the following sections and in the Preliminary Field Investigation Report provided in Appendix J.
- **Article VII application submittal and review.** Leading Light Wind will develop the Article VII application in parallel to the environmental and cultural surveys in anticipation of filing an application with the NYSDPS in [redacted]. We will process, review, and develop the application material on a real-time basis as the environmental/cultural survey work is completed. In addition to engaging specialized consultants, Leading Light Wind will leverage the experience and success of Invenergy in the Article VII process (e.g., Clean Path New York). This is a valuable resource to advantage the internal review and application of lessons learned. The schedule allows for an eight-month review period for the NYSDPS to assess and deem the Article VII application complete by [redacted].
- **Hearings and decisions phase.** Following the submittal, addressing application deficiencies, and determination of completeness by NYSDPS, a legal process will commence. Leading Light Wind has allowed for an [redacted] for the hearing and decisions phase of the Article



VII process. We understand that this phase will include a pre-hearing conference, public statement hearings, and other evidentiary hearings toward the issuance of an Article VII Certificate. We are targeting the issuance of the Article VII Certificate on or before [redacted]. Preparation of Environmental Management and Construction Plan documents will also begin during this phase.

- **Environmental Management and Construction Plan.** In close coordination with the issuance of the Article VII Certificate, Leading Light Wind will file the Environmental Management and Construction Plan. We will proactively compile comments as received during the project's hearings and decisions phase to accelerate approval of the plan. Environmental Management and Construction Plans can be submitted, reviewed, and approved in segments and the project schedule anticipates that all project segments under Article VII will be completed and approved by [redacted].

Federal COP and NEPA

The COP approval process is primarily managed and governed by BOEM in conjunction with cooperating agencies. BOEM will review the COP and conduct the National Environmental Policy Act (NEPA) environmental review

of the COP through an Environmental Impact Statement (EIS). BOEM will coordinate the EIS development with cooperating agencies, including tribal, federal, state, and local government entities with jurisdiction, special expertise, or related decision-making capacity. BOEM and cooperating agencies will issue a joint Record of Decision (i.e., One Federal Decision) that will support all related agency decisions.

As the COP is being prepared, Leading Light Wind will support BOEM's coordination and consultation with cooperating agencies such as the USCG, US Environmental Protection Agency (USEPA), USACE, NOAA, US Fish and Wildlife Service (USFWS), and US Department of Defense (DoD). Early engagement with cooperating agencies is critical to ensure that the joint NEPA analysis meets all agency requirements or standards, considers all connected and cumulative actions of cooperating agencies, and specifically addresses the agency action under consideration to effectively support cooperating agency decision making.

Project site assessment and environmental/cultural reviews

Leading Light Wind's COP will describe all proposed onshore and offshore construction, operation, and decommissioning activities. It will describe the existing environmental conditions, provide information on impact-producing factors, and propose measures for avoiding, minimizing, mitigating, and monitoring environmental impacts. The COP will contain information on the following topics:

- Geophysical and geotechnical
- Oceanography and metocean
- Benthic environment
- Essential fish habitat
- Sea floor habitat
- Fisheries
- Marine mammals
- Sea turtles
- Birds and bats
- Wildlife
- Wetland delineation and identification
- Floodplain limits
- Sensitive biological resources and habitat specific to New York and New Jersey jurisdictions
- Underwater acoustics
- Navigation safety risks
- Electronic magnetic fields
- Air quality
- Water quality
- Hazardous materials
- Socioeconomic and environmental justice
- Department of Defense and other national security uses
- Aviation radar
- Munitions and explosives of concern and unexploded ordnance
- Marine archaeological resources
- Cultural and historic and other resources of tribal concern
- Existing coastal use and socioeconomic use

Leading Light Wind is well positioned to contract for the necessary data collection and subsequent reporting on the various topics above. As detailed in the Permitting Plan, in August 2022, Leading Light Wind met with BOEM to discuss its comprehensive data collection strategy and timeline to characterize the lease area and potential cable routes. Importantly, Leading Light Wind will leverage existing data and science to the extent practicable, focusing on purposeful data collection that is useful in filling data gaps and evaluating potential project impacts.

New York Bight Programmatic Environmental Impact Statement (PEIS)

BOEM is preparing a Programmatic EIS (PEIS) for future wind energy development in the New York Bight (2022). The PEIS will analyze the potential impacts of wind energy development activities in the New York Bight, as well as identify programmatic avoidance, minimization, mitigation, and monitoring measures that would apply to future offshore wind projects in the New York Bight. The stated purpose of the PEIS is to help BOEM make timely decisions on COPs submitted for the NY Bight. Leading Light Wind has supported this assessment and will incorporate necessary findings into the COP in conjunction with project-specific site assessment activities as well as public input. Leading Light Wind will adapt project data collection and analysis needs

to reflect the framework established by BOEM through the PEIS to capitalize on intended efficiencies.

BOEM COP submittal

Leading Light Wind expects to have sufficiently characterized the lease area, cable routes, and onshore project components by [redacted], leading to a COP submittal of [redacted]. BOEM, in consultation with cooperating agencies, will deem the COP sufficient and publish Leading Light Wind's Notice of Intent approximately six months after the initial COP submittal. The Notice of Intent will start the public scoping period and project-specific NEPA review.

Target deliverable: Leading Light Wind anticipates submitting the COP by [redacted].

Federal permitting dashboard

Following COP submission, Leading Light Wind will apply to the Federal Permitting Improvement Steering Council to be a Covered Project under Title 41 of the Fixing America's Surface Transportation Act and placed on the Permitting Dashboard. The Permitting Dashboard is an online tool for Federal agencies, project developers, and interested members of the public to track the Federal government's environmental review and authorization processes for large or complex infrastructure projects aimed at improving coordination, transparency, and accountability. A Coordinated Project Plan (CPP) will be developed by Federal agencies in partnership with Leading Light Wind. The CPP will serve as the foundation for interagency coordination and early identification of anticipated issues that could delay completion of the permitting process. Throughout the permitting process, BOEM will refer to this document, bringing together all cooperating agencies to proactively address issues as they arise and if needed, to adjust timelines ensuring new responsibilities and requirements are understood by all.

Notice of Intent/public scoping period: [redacted]

During the public scoping period initiated through the Notice of Intent, Leading Light Wind will work to directly engage BOEM, cooperating agencies, and other stakeholders to understand concerns and make informed project decisions that allow the project to move efficiently through to the publication of a Draft EIS. Leading Light Wind will work to de-risk the project and minimize overall community impact where feasible.

Draft Environmental Impact Statement (Draft EIS): [redacted]

Leading Light Wind will work closely with BOEM's third-party NEPA consultant as permitted to satisfy the criteria around project design envelope, environmental impact assessment, and alternatives. Through a robust site assessment campaign, we will prioritize the quality of the deliverables that will support the overall Draft EIS. Early engagement on environmental assessment plans in the bid will support the efficiency of the NEPA process.

Public comment period: [redacted]

Leading Light Wind understands that BOEM will manage engagement with cooperating agencies and the public comment process for the Draft EIS. To the extent practicable, we will ensure that the Draft EIS contains comprehensive, factual, and unambiguous information and data to allow informed public analysis around its content, facilitating constructive feedback loops leading to fair and balanced outcomes for BOEM's subsequent review. This includes identification of measures that will be taken to avoid, minimize, mitigate, or monitor potential impacts from the project.

Federal Permit Applications: Concurrent or Post Draft EIS

Leading Light Wind will submit all Federal permit applications needed for construction in conjunction with the Draft EIS or soon after publication of the Draft EIS in order to ensure timely review and issuance by agency with jurisdiction such as USCG, USEPA, USACE, NOAA, USFWS, and DoD. Leading Light Wind's Permitting Plan is described in Section 10, and the full list of permits required for construction are identified in Table 10-3.

Final Environmental Impacts Statement (Final EIS): [redacted]

Leading Light Wind will work with BOEM, cooperating agencies and the appointed third-party NEPA consultant to efficiently respond to comments raised on the Draft EIS and prepare a comprehensive and defensible Final EIS. We will coordinate with BOEM to confirm that recommendations from Final EIS are scoped into the project execution plan where applicable.

Target deliverable: [redacted]

One Federal Decision and Permit Issuance: [redacted]

Leading Light Wind will work closely with BOEM to address all final concerns in order to reach collective agreement for the project's transition from

development into construction. It is anticipated that BOEM and cooperating agencies will issue a joint Record of Decision (i.e., One Federal Decision) at the conclusion of the NEPA process. If there are discrepancies with federal agency mandates or timelines however, multiple Records of Decision may be developed. The NEPA Record of Decision will allow all cooperating agencies to issue final permits authorizing construction of the Leading Light Wind project.

[redacted]

Facility Design Report and Fabrication and Installation Report

In parallel with the COP process, Leading Light Wind will develop, review, and finalize, with its suppliers, consultants, and project team, all technical documentation required by BOEM (i.e., Facility Design Report and Fabrication and Installation Report) relating to the design, fabrication, and installation of the project with its suppliers, consultants, and project team. We will then present a robust, credible, and validated set of technical assumptions to achieve project certification through an appointed Certification Verification Agency (CVA).

We expect this outcome to be approved shortly after Record of Decision is reached and accept any financial commitment prior to approval (e.g., long lead manufacturing is at its own project risk). [redacted]

Major material procurement

Leading Light Wind is advanced in is it's positioning and discussions with the marketplace to secure reservation slots for Tier 1 project materials and equipment. Based on current market conditions and engagement with suppliers, lead times are expected to be [redacted] from contract execution and securing reservation slots to initial receipt of materials on-site.

The procurement scope driving the overall scheduled are tied to the HVDC system through the necessity to ensure the project has early backfeed. Upon successful offtake through the Offshore Wind Renewable Energy Certificate (OREC) solicitation the project will finalize preferred supply agreement contracts with HVDC suppliers.

Securing reservation slots of these major materials in the early stages of the project will help de-risk procurement and ensure backfeed generation is

[redacted]

available to support wind turbine commissioning offshore. Early reservation commitments early in the development period removes the procurement from the critical path and allows the project adequate time to respond with mitigation measures in the unlikely event of major delays in sourcing as the project develops detailed design packages.

In addition to working towards an early reservation agreement to support the HVDC scope, we have executed capacity reservations [redacted] to derisk the overall supply chain growth concerns. This will assist in mitigating the potential gap between projected growth and manufacturing capacity in the European/US offshore wind markets, where sufficient capability does not exist to support both markets at installed capacity targets.

Onshore construction

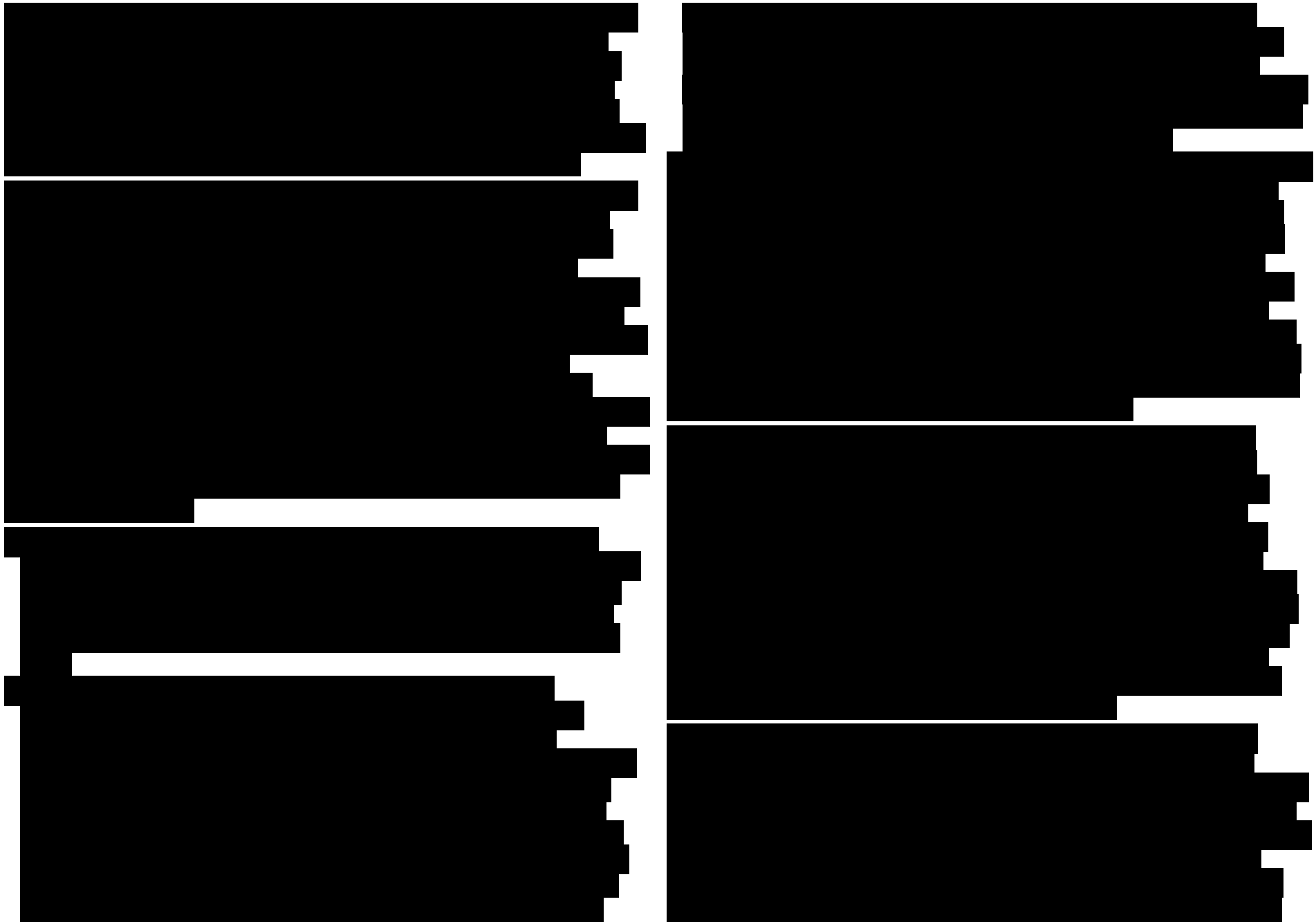
Following approval of the Environmental Management and Construction Plan from the NYSDPS and a Record of Decision from the Bureau of Ocean Energy Management, Leading Light Wind expects to start construction of the ONCS with a start date of [redacted]

To support this overall construction schedule, certain long-lead manufacturing and procurement will commence prior to this date to ensure the critical path for COD is maintained. Below are additional details related to onshore construction activities included in the critical path:

- **Mobilization.** The project anticipates mobilizing equipment in the final [redacted] of the final review of the Environmental Management and Construction Plan. This early mobilization will allow for construction field offices to be installed, material to be received and unloaded at designated material storage yards, and construction management staff to be prepared for immediate start of construction following approval of the Environmental Management and Construction Plan. We anticipate that construction management and administrative personnel will mobilize to the project site in [redacted].
- [redacted]

[redacted]

- **Converter station installation.** In addition to the transmission line components, we anticipate commencing the converter station construction following receipt of the Environmental Management and Construction Plan. Each converter station location will require a two-phase construction process. The first phase will be composed of the site/civil works and the second phase for the erection of the converter station. A target completion date of [redacted] has been validated with several OEM vendors.
- **Project synchronization.** Following the completion of the construction activities previously described above, the project schedule allows for a [redacted] to commission and test the integrated transmission system components, including the HVDC transmission system (ONCS/OFCS). [redacted]



[redacted]

12.3 Critical path progress and status

The proposed schedule provides details with regards to preliminary engineering, financing, property acquisition, permits, environmental assessments, interconnection studies, procurement, and Final Investment Decisions (FID). The project work plan is progressing to support the overall critical path of the project upon a successful award from NYSERDA.

Engineering

Preliminary engineering. The overall engineering plan has been structured to maximize synergies across procurement, state, and federal permitting efforts in the early stages of development. Preliminary engineering for the project commenced immediately following lease acquisition and has progressed based on assessments, evaluations, field visits, and engagement of various subject matter experts to develop the proposed solutions. [redacted] with a special focus in geotechnical and geophysical investigations. In parallel, preliminary designs for foundations, OFCS, ONCS, export cable route, landfall and electrical engineering studies,

[redacted]

amongst others, progressed while the project planned the mobilization for the initial geotechnical campaign.

After the proposal award, the engineering activities will continue to advance into FEED packages per work scope, which will eventually continue to a detail design stage. This includes expanding the field investigation program and data collection to support further project development, permitting and detailed design. The Preliminary Field Investigation Report is attached as Appendix J to this document and includes the following activities:

- Land-based preliminary civil survey
- Water-based geophysical surveys
- Field route reconnaissance and constructability reviews
- Geotechnical investigation and soil boring program (onshore and offshore)
- Thermal resistivity/conductivity
- Environmental/cultural surveys
- Right-of-way support for field investigation program
- Article VII routing and preliminary engineering studies
- FEED HVDC design
- FEED foundation design

Financing

Financing. Leading Light Wind's existing investment parties and distinct project partnerships offer a unique differentiator, allowing early access capital to support the critical path procurement activities and engage local stakeholders through critical permitting efforts. Financing activities are included in the project schedule as milestones. They include activities, durations, and completion dates for the following:

[redacted]

Permitting

Federal permits and approvals. Leading Light Wind will, as stated in previous sections, continue to leverage early action throughout the federal decision process. Leading Light Wind has initiated data collection efforts both onshore and offshore. Leading Light Wind has commenced consultation with federal agencies to develop a site characterization plan along a schedule that is realistic to ensure early deliverability of the COP. We have depicted the processes, durations, and anticipated target dates for receipt of the major project permits in the provided project schedule. Information regarding our permitting approach is provided in Section 10 of this proposal. Leading Light Wind has initiated data collection efforts both onshore and offshore. Monthly meetings with BOEM, engagement with regional stakeholders, and use of lessons-learned/past-project precedent will streamline authorization processes. Use of the Federal Permitting Dashboard will yield scheduling and oversight advantages through access to a transparent and coordinated administrative system. The associated CPP will provide a comprehensive view of project milestones and schedule agreed to by all parties and help ensure accountability. Leading Light Wind will continue to work with agencies, industry groups and other leaseholders in the New York Bight to advocate for policy and guidance that further streamlines the permit and approval process for offshore wind projects.

State permits and approvals. Leading Light Wind will leverage the experience and success of Invenergy in the Article VII process (e.g., Clean Path New York). Leading Light Wind will, as stated in previous sections, continue to leverage early action throughout the state decision process. Leading Light Wind has initiated data collection efforts both onshore and offshore. [redacted]

We have depicted the processes, durations, and anticipated target dates for receipt of the major project permits in the provided project schedule. Additional information regarding the permitting approach is provided in Section 10 of this proposal.

[redacted]

[redacted]

Leading Light Wind has developed a comprehensive Preliminary Contracting Strategies and

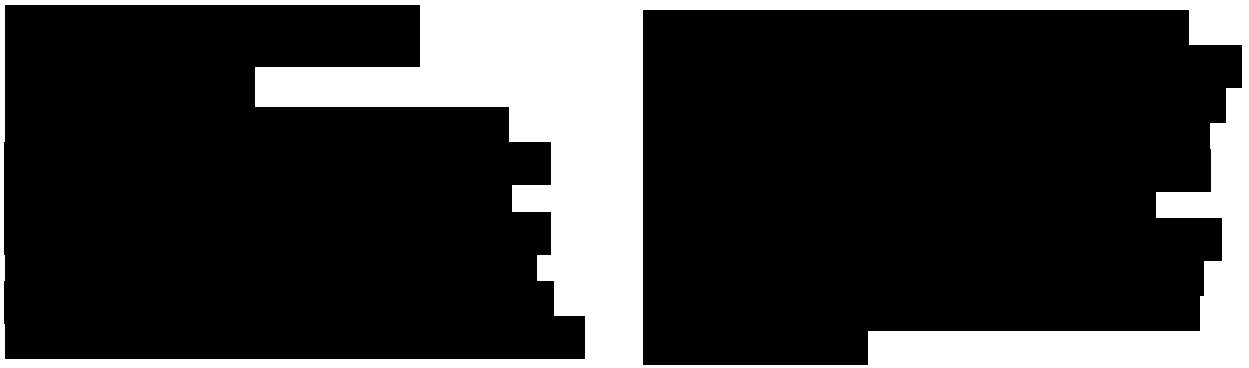
Execution Overview Plan. A summary of this matrix is shown in Figure 12-5 and additional details on procurement strategy are provided in Section 13.

Leading Light Wind will coordinate early contractor involvement for the selected packages in the pre-construction design/planning phase. The construction contractors involved in this phase will contract directly with Leading Light Wind. The program manager will perform pre-qualification, scoping and bidding, and contract conformance of the construction contractors on our behalf. The construction contractors will typically support the following activities during the early contractor involvement phase:

- Constructability and construction methodology
- Construction workspace, access, and work area selection
- Construction cost estimating
- Construction schedule development
- Construction risk management/mitigation
- Early construction planning
- Construction scope of work development
- Logistics and planning
- Environmental permit application review and input
- Construction execution plan development
- Execution plan
- Cost
- Schedule
- Organization and staffing
- Construction contractor selection
- Project-specific HSE framework to govern development and construction activities

Construction contracting strategies	Constructor pre-qualification process	Construction bid packages	Bid processes and awards
Cost estimating breakdowns	Safety	Instructions to bidders	Bid meetings/coordination
Detailed scheduling	Environmental compliance	Contract T&Cs	Bid tabulations/evaluations
Segment/spread breakdowns	Experience/qualifications	Construction scope/ schedule	Contractor shortlist interviews
Market/industry research and conditions	Availability/competitiveness	Pricing schedule	Selection
Contracting and procurement mechanisms	Client references	Specifications	Execution plan
Contract pricing structure	Manpower and equipment	Permits/commitments	Awards/negotiations
Contractor availability evaluations	Proposed teams	ROW stipulations	
Execution plan	Recommendations		

Figure 12-5. Summary of key activities involved in selecting construction and EPC contractors.



WTG supplier. For bid alternatives that include localized manufacturing of turbine components, progress will need to be vigilantly monitored to confirm that components become available as scheduled. Likewise, the domestication of the turbine component supply to the degree proposed will mitigate global supply chain risks. Proximity of turbine component supply, if domestic, will be a consideration. The type certificates for the turbine have been projected based on turbine OEM feedback against planned deployment of next phase turbine capacity.

[redacted]

HVAC (transmission). Leading Light Wind will look to engage with local contractors and vendors when routing HVAC cable from the ONCS to POI locations. This specialized expertise has already proven to be highly effective during suitability and feasibility assessments of the initial cable route. Constructability reviews have been performed to reduce routing risk and overall execution risk. [redacted]

[redacted]

HVAC IAC supply and installation. A rigorous design review and approval will be important to mitigate against any serial defects, which has been observed in the European market. Selection of a cable protection system is important. Careful appraisal of the subcontractor's installation schedule will enable us to de-risk potential delay impacts from foundations and WTG installation.

Export cable supply and installation. Routing the shortest line is financially advantageous due to the rising price of metal commodities. Thorough cable type testing and minimal cable handling before laydown will prove to de-risk cable damage. Installation at the landfall presents permitting hurdles with respect to time-of-year restrictions at both the landfall and inshore waters. Hence, proper float has been provided to not materially affect the critical path of the project with respect to energization. [redacted]

Testing, terminations, and commissioning. This project presents many complexities in an offshore environment with respect to interface between foundations, cables, and the WTG contractor. A well-considered commissioning process, which is also reviewed by experienced third-party commissioning specialists, will prevent delays and allow the project to adapt to unforeseen events. Arguably, this is the most complicated package to manage with all the uncertainties at play, including: weather, vessel workability, skilled resource availability, HSE requirements with respect to electrical safety rules, and WTG cold and hot commissioning demands. To mitigate these concerns, we will maximize/optimize production as early as possible.

Ports and marshaling. The construction port facilities will be as close to the lease as possible. Leading Light Wind will maintain a strong management on-site to ensure contractor adherence to HSE and bringing a community driven focus in this area of large local impact. The project will evaluate the advantages the fabrication of an operations and maintenance base early, to act as a construction base. [redacted]

13
Construction and logistics

13 Construction and logistics

13.1 Introduction

Leading Light Wind's construction and logistics plan for the manufacture, transport, storage, and installation of the project aligns with our priorities of bringing family sustaining jobs and new investment to New York, minimizing power cost, delivering a timely and reliable project, and prioritizing the environment and safety of all workers involved in the project.

Leading Light Wind has engaged and will continue to engage with a broad spectrum of industry leading organizations including installation contractors, organized labor leaders, and maritime stakeholders to ensure the project is executed in line with our guiding principals.

[redacted]

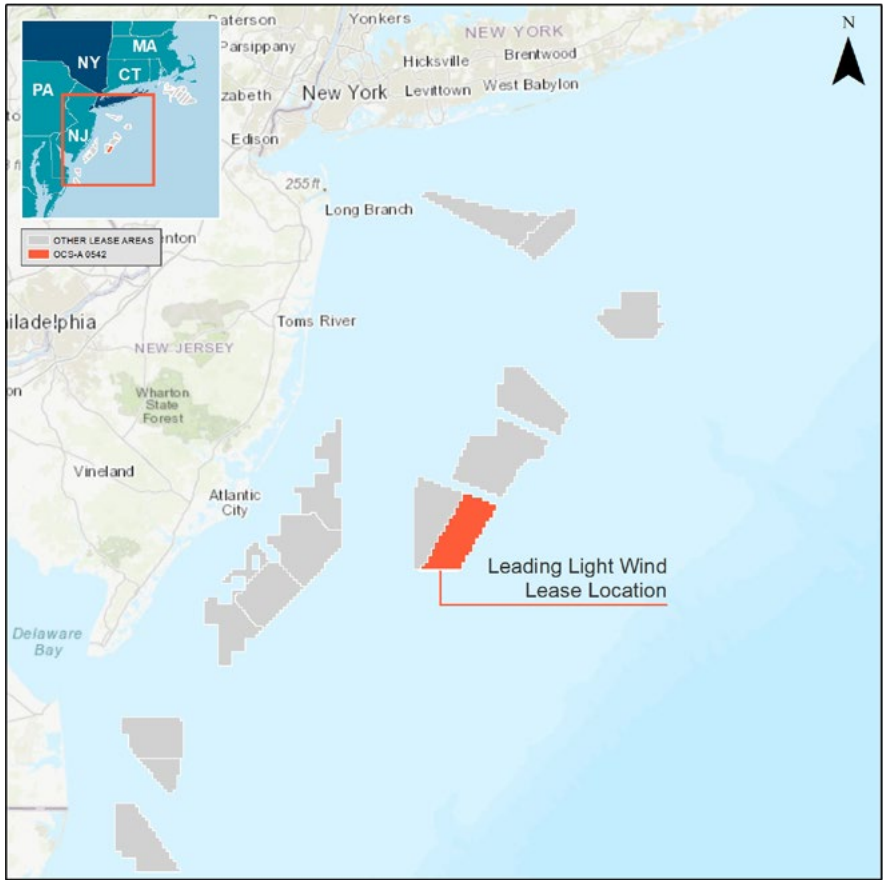
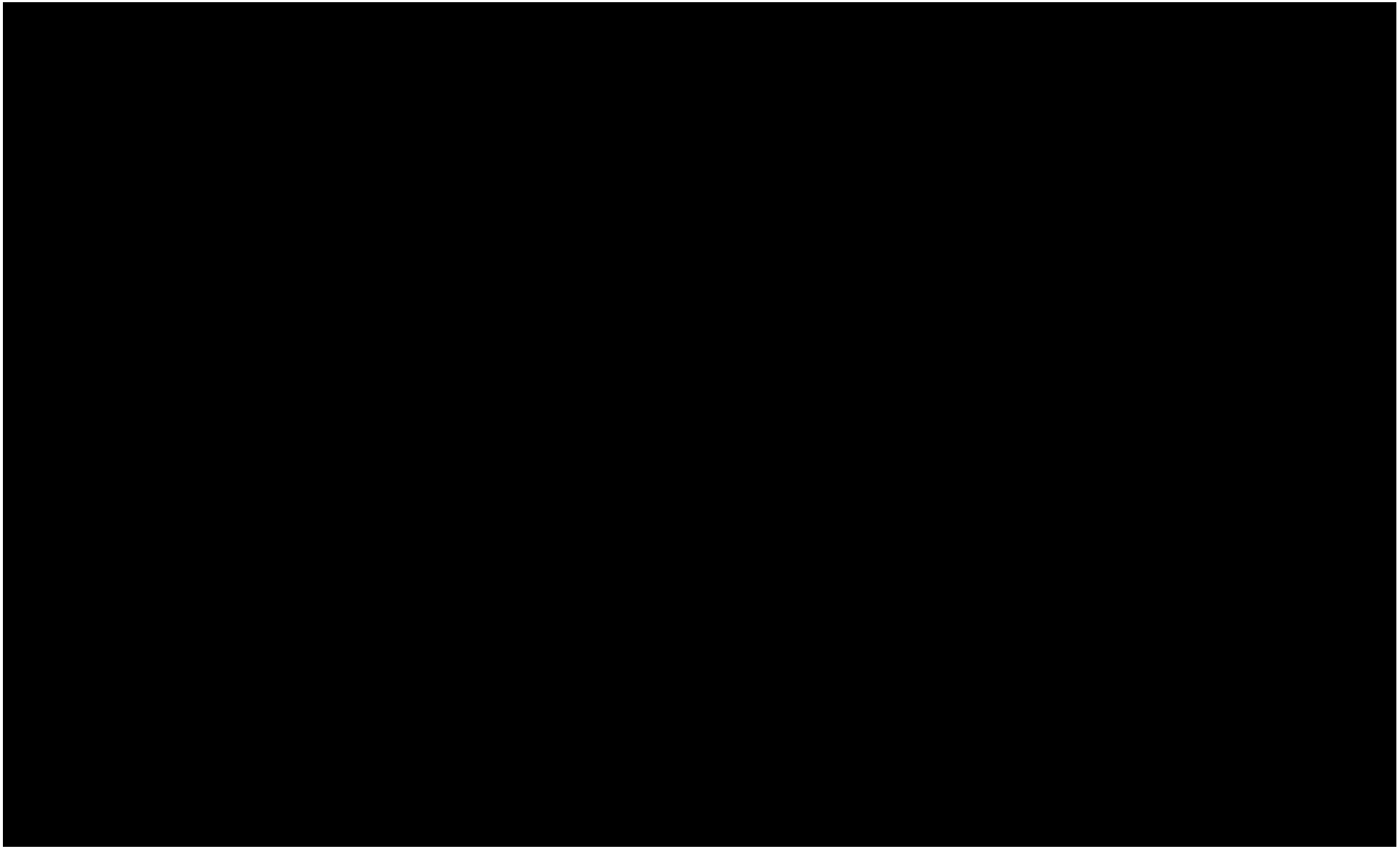


Figure 13-1. Lease area location.

13.2 Marshaling harbors

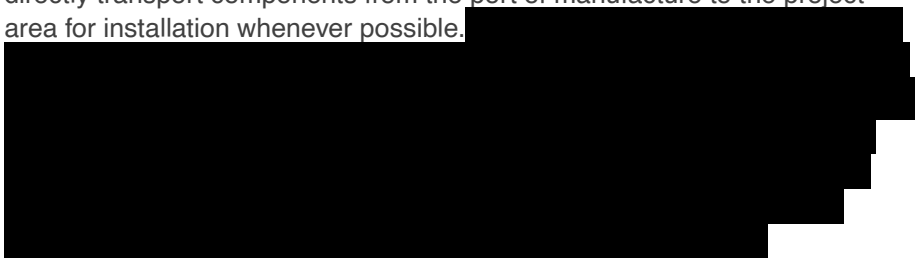
Marshaling harbors are required to support the activities performed during the construction of the offshore wind farm. They are used as coordination and logistics hubs for the vessels, equipment, and personnel involved in the construction. The primary and secondary structures that will be installed offshore are loaded-in, handled, stored, partially or fully assembled, pre-commissioned, and ultimately loaded-out for offshore installation at the marshaling harbor.

Given the strategic importance of the marshaling harbors, they need to be carefully selected to satisfy a series of criteria which make them suitable for their intended purpose. One or more marshaling harbors can be used for a single offshore wind farm construction project. The terminal that is ultimately used for a specific package will depend on the location of manufacture of the component, the amount of pre-assembly work required, the characteristics of the vessels that will handle the component, the cost of the facility and its availability on the timeline required for our project.



Parts and features of marshaling harbors

The typical layout of a marshaling harbor consists of an open sea access area, quayside/loading area, storage yard, and terminal. This section goes on to describe the features and specialized equipment required for the efficient operation of a marshaling harbor. To improve operational efficiency, we will directly transport components from the port of manufacture to the project area for installation whenever possible.



Open sea access area

The open sea access area is typically used for vessel standby and maneuvering and is typically where the pilot station is located. The port will be serviceable by harbor pilots and assist tugs. The key consideration when evaluating the open sea access area is weather sheltered with no restrictions on vessel anchoring or docking.

Quayside and loading area

This area is where all vessels approach and moor to the onshore facility and execute the load-in/load-out activities and where other operations might take place such as crew change, resupply, bunkering, vessel maintenance, and repair. The quayside may also be used for vessel standby or preparation before or after the actual load-in or load-out. Optionally, the quay could be used to receive operations and maintenance (O&M) vessels and coordinate related O&M activities in parallel with or following the completion of the offshore wind farm installation activities.

The key considerations when evaluating the quayside and loading area of a terminal include:

- Appropriate quayside height and water depth for vessel maneuvering and component load-in and load-out operations, in which deep drafts might be required
- Quayside length sufficient for required mooring operations
- Presence of high-capacity mooring bollards and winches
- Sufficient extension of load-in/load-out area to temporarily store primary and secondary components on quayside
- Ground-bearing capacity of quayside area meets requirements for heaviest loads that will be experienced

Storage yard and terminal

All primary and secondary structures will be marshalled here between load-in and load-out from the quayside and loading area. If required, assembly, completion, and pre-commissioning activities are executed in this area in order to simplify offshore installation operations. The office facilities, warehouse, and workshop will also be located in this area.

The key considerations when evaluating the storage yard and terminal are:

- Sufficient space to load-in, store, and load-out the components that will be marshalled at the facility
- Ground-bearing capacity of storage area meets requirements for heaviest loads that will be experienced
- Clear and permanent transportation routes to and from the quayside
- Office facilities with sufficient space for the required personnel
- Warehouse and workshop space sufficient for the contemplated activities

Equipment for marshaling harbor and terminal operations

The following specialized equipment is anticipated for all activities to be performed at the marshaling harbor and terminal:

- Mooring equipment on the quayside and in the basin
- Ringer crane and lifting spread for load-in/load-out of components
- Self-propelled modular transports (SPMTs) and spread for load-in/load-out and transfer of components between the quayside and storage yard.
- Crawler or fixed cranes, including lifting tools, rigging and spreader bars
- Lifting aids at quay and storage area such as forklifts, cherry pickers, mobile cranes, and mobile elevating work platforms
- High-capacity supports and load spreaders to support primary structures.

13.3 WTG foundations

[redacted]

Major activity list and equipment

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Supply chain

[redacted]

13.4 Wind turbine generators

Leading Light Wind is considering WTGs with nameplate capacities [redacted] From the manufacturing location the turbine components will be transported to the [redacted] marshaling harbor where they will be prepared for offshore installation during processes called pre-assembly and pre-commissioning.

[redacted]

This section goes on to describe in further detail the key activities and equipment required for transportation and installation of the WTG components.

Major activity list and equipment

Fabrication

The principal wind turbine components are blades, nacelles, and towers. These components are made via unique manufacturing processes that occur at distinct facilities. Each manufacturer utilizes proprietary designs and manufacturing processes, but they all follow the same general principals. The process of manufacturing towers includes rolling steel plate into circular cans, welding these cans together into sections, securing flanges to the top and bottom of each section, installing a door in the bottom tower section, and painting and coating the tower sections. A typical offshore wind turbine would have four to six tower sections, but there are many factors that can influence the final design. Towers also contain a variety of internal components, including platforms, stairs, ladders, cable guides, and other components that facilitate the proper function of the turbine and the ability to maintain it.

Blades are typically manufactured out of fiberglass, carbon fiber, and epoxy resin. The fiberglass is molded into two shells which are bonded to a rigid girder and then sealed together to form a single piece blade. A flange at the root end connects the blade to the nacelle. Lightning caps and grounding wires that run along the inside of the blade protect the blades from lightning strikes.

As discussed in Section 11, the nacelle contains much of the equipment critical to the wind turbines core function, including the drivetrain, electric generator, yaw system, pitch system, control system, cooling system, and power electronics. Each of these systems is comprised of its own subcomponents, such that the nacelle is ultimately made up of hundreds of individual distinct elements that all have their own unique manufacturing process. Nacelle manufacturing refers to the final marriage of all of these sub-assemblies into a single encased container that is ready for offshore installation.

Transportation

Transportation refers to the process of moving the WTG components from the location where they are manufactured to the marshaling harbor (Figure 13-5).

After fabrication, SPMTs will move individual WTG components to the load-out quayside. There, they are rigged into specialized frames that facilitate safe handling and shipping of the components.

Multiple components are staged quayside and then loaded onboard a long-haul transportation vessel. [redacted]

Onboard the transportation vessel, seafastening equipment will be attached to the components to keep them safe and secure during the voyage.

Marshaling

Upon arrival at the marshaling harbor, large ring or crawler cranes will lift components off the transport vessel and onto the marshaling harbor quayside. Similar specialized lifting tools will be used as were used at the manufacturing facility. SPMTs will move the equipment from the quayside to the storage area after load in and, ultimately, back to the quayside for load out. Tower sections, which likely arrived laid on their side, will be upended, stacked, and bolted together. [redacted]

Figure 13-5: WTG blades being transported to marshaling harbor.

[redacted] The tower internals will be outfitted inside the towers. Electrical equipment located inside the nacelle and tower base will be pre-commissioned. [redacted]

[redacted]

The ultimate decision around installation concept will be made following definition of the awarded project configuration.

[redacted]

[redacted]

[redacted]

The WTG erection process will follow typical industry procedures: lifting of tower sections, followed by the nacelle and then three individual blades (Figure 13-7). Lifting will be performed using the same specialized lifting tools as described for transfer plus a specialized blade installation tool that assists in handling individual blades.

Installation teams will transfer via gangway from WTIV to WTG to perform final assembly activities. Commissioning activities immediately follow erection and may be executed by teams based on the WTIV or by teams based on a separate service operation vessel. Utilizing teams based on a separate vessel allows the WTIV to move on and begin installation at the next location by removing all personnel and tools from the WTG, retracting the gangway, jacking down, and transiting to the next location.

Commissioning

Commissioning and energization of the turbine and related activities involve mechanical and electrical completions followed by hot commissioning.

[redacted]

[redacted] Commissioning is expected to be performed from the service operation vessel with support from crew transfer vessel and/or daughter craft for crew transfer to various work sites.

Numerous hand tools will be required for commissioning as well as lifting apparatuses, rigging and handling tools for equipment transfer, either by crane or motion compensated gangway from service operation vessel or man-handled winches from crew transfer vessel.

Supply chain

The responsible parties, respective roles, and anticipated contractual arrangements for the WTG major activities are detailed in Table 13-3.

13.5 Offshore converter station

[redacted]

Regardless of the project configuration, the OFCS will consist of a topside, which contains all of the electrical and auxiliary equipment, and a jacket type foundation. The topside and jacket will be assembled at a shipyard, where they will be separately transported to the project site and installed. The definitive installation strategy will be dictated by the final weight and dimensions of the OFCS, but Leading Light Wind has undertaken a market survey to understand the

[redacted]

breadth of potential transport and installation solutions available to support each of our potential project configurations. [redacted]

Major activity list and equipment

Fabrication

Fabrication of the complete OFCS relies on a global supply chain to get all of the subcomponents, components, and materials in place to perform the final assembly of the topside and jacket. [redacted] The equipment will be sent to the shipyard responsible for the final assembly of the topside so it can be integrated into the topside and the auxiliary equipment systems built around it. It is likely, although not required, that the jacket foundation be built at this same shipyard. [redacted]

Transportation

After assembly is complete, the jacket and topside will be loaded onto a barge or HTV via SPMTs or a skidded solution. [redacted]

The jacket and topside will be transported by means of cargo barge towed by seagoing tugs or via self-propelled HTV from the manufacturer, after which the Offshore Installation Vessel will execute the installation. The jacket piles, which are also provided by the topside and jacket fabricator, will be shipped at the same time as the jacket, although the size of the jacket and piles may require a separate transport vessel for the piles. Once the components have been loaded onto the transportation vessel, seafastening equipment appropriate for the voyage will be installed.

Installation

After loading out onto the transportation vessel, there are several ways for installation to proceed. The ultimate installation strategy will be dictated by factors such as the weight and dimensions of the topside and jacket, the manufacturing location, and vessel availability. [redacted]

Jacket installation

The jacket and its piles are brought to the installation site aboard a barge or HTV. Seafastening is removed from the jacket and piles. The HLV, also at the installation site, uses its crane to lift the jacket off the transport vessel and, with the aid of precise positioning equipment, lower it to the seafloor. The jacket piles are upended, guided into the jacket sleeves, and driven to design depth or refusal. A support vessel will deploy a noise mitigation solution to reduce impact to local marine life. After piles are driven and jacket is in position, personnel and equipment will be transferred to the jacket to perform final preparatory and survey work in advance of the topside installation.

[redacted]

Topside installation with an HLV

The long-haul transport carrying the topside will be brought alongside the HLV at the installation site, proximal to the already installed jacket. The HLV cranes will be connected to the topside and the seafastening will be removed. The topside can then be lifted, and the transport vessel can be moved away from the HLV. Alignment interfaces called stabbing cones and jacket cans are used to set the topside down in the right location on top of the jacket. Once the topside has been fully landed on the jacket, the lift rigging is disconnected and welders are dispatched to secure the jacket/topside interface (see Figure 13-9).

[redacted]

Commissioning

After the installation is complete, completion and commissioning teams will begin putting the topside in service. [redacted] Piping and electrical connections will be completed and instrumentation will be hooked up. Then all the auxiliary equipment will be commissioned. [redacted] After critical control and protection systems are verified to be functioning properly, the platform will be ready for its first energization. Testing will continue from first energization until the OFCS successfully exports the full nameplate capacity of the wind farm. Throughout the commissioning process, personnel will live in an accommodation vessel with reliable access means to the topside.

Supply chain

The responsible parties, respective roles, and anticipated contractual arrangements for the OFCS major activities are detailed in Table 13-4.

13.6 Offshore cables

The submarine electrical cables to be installed for Leading Light Wind come in two general categories: high voltage export cables and medium voltage inter-array cables. The export cables are used to connect the OFCS to land, while the inter-array cables are used to connect the turbines to the OFCS.

Regardless of the project size, the cables will be laid with Cable Lay Vessels (CLVs) and then buried to the target depth

The export cable runs from the high voltage side of the offshore substation via a submarine route to the landfall site.

Inter-array cables link WTGs together in 'strings' that ultimately connect to the low voltage side of the OFCS.

Major activity list and equipment

Fabrication

Each cable manufacturer uses its own proprietary processes to produce its cable, but the basic steps of drawing the conductor into thin strands, wiring the strands into thicker conductors, and then extruding the insulation onto the conductor core are consistent across manufacturers. Additional steps are undertaken depending on the specific design of the cable.

Additional layers may be added to the cable for both physical and electrical protection. The cables undergo significant factory acceptance testing before they are ready for load out. Fabrication may occur in the US at one of several submarine power cable factories that have been announced or are under construction. There are also several cost competitive options for international cable fabrication if US production is unavailable.

Transportation

The transportation process for inter-array cable and export cable is the same. After fabrication, the cable will be loaded out for transport to the project site or a storage site.

Installation

Preparation

Prior to cable installation, the cable route needs to be cleared of obstructions such as boulders, abandoned fishing gear, vessel equipment, or unexploded ordnances.

This work can be performed from a variety of construction-type vessels. If unexploded ordnances are encountered, specialized equipment and personnel will be required to safely remove the hazard.

All locations where the project cables are expected to cross existing submarine assets (i.e., electrical cables, telecommunication cables, pipelines, etc.) will also need to be prepared prior to installation commencement.

Once the cable routes have been confirmed to be clear of obstructions and all the crossings are prepared, the cable installation work can commence.

Export cable

[redacted]

[redacted]

[redacted]

Cable jointing will be necessary to complete the full length of the export cable installation. This jointing work is likely to be performed on the CLV although additional support vessels may be necessary.

[redacted]

At the end of the route, the cable will be pulled into the OFCS. This may be done by either a first end installation (i.e., cable pulled into OFCS and the cable is laid away) or second end installation (i.e., cable is laid toward the OFCS and then the end is pulled in).

[redacted]

[redacted]

[redacted]

Upon completion of the pull-in operation, the cable will be mechanically and electrically attached to the OFCS.

Inter-array cables

The installation activities for the inter-array cables are similar to those required for export cables, with a few notable differences. Most cable ends are pulled-in to wind turbines instead of the transition

bay or the OFCS. The exceptions to this are the cables at the end of the strings, which will connect to a wind turbine on one side and the OFCS on the other. [redacted]

Commissioning

Completed cables will require testing and commissioning before they are energized. These tasks are typically performed by teams mobilized from the cable installation support vessel, a commissioning service operation vessel, or crew transfer vessel. [redacted] The primary purpose of the cable commissioning is to ensure that current can flow safely between the end points and that no defects were introduced during installation that could lead to a fault or early failure during project operation.

Supply chain

The responsible parties, respective roles and anticipated contractual arrangements for the submarine cables major activities are detailed in Table 13-5.

[redacted]

13.7 Terrestrial cable and onshore converter station

[redacted]

[redacted]

Major activity list and equipment

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Supply chain

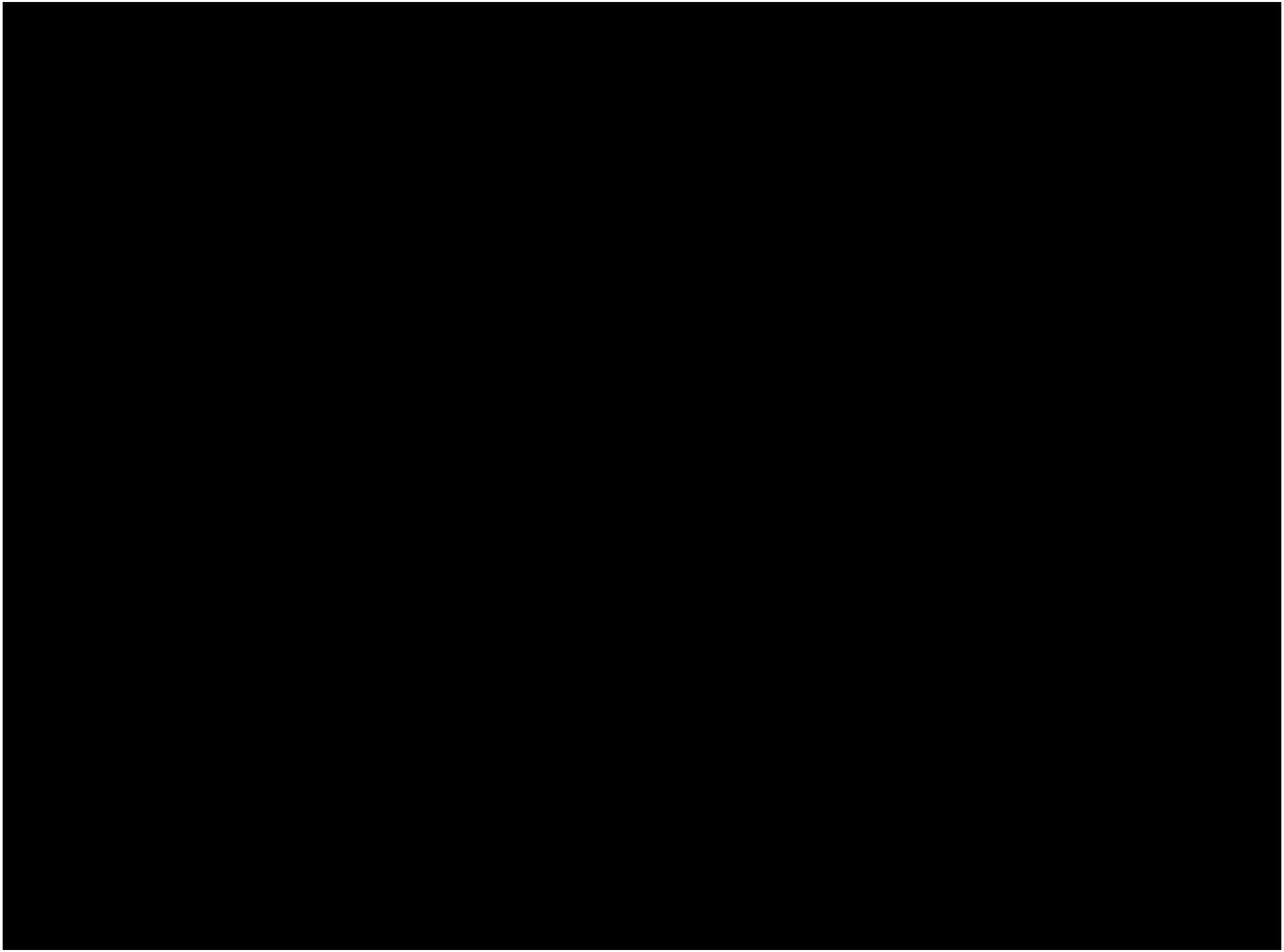
[redacted]

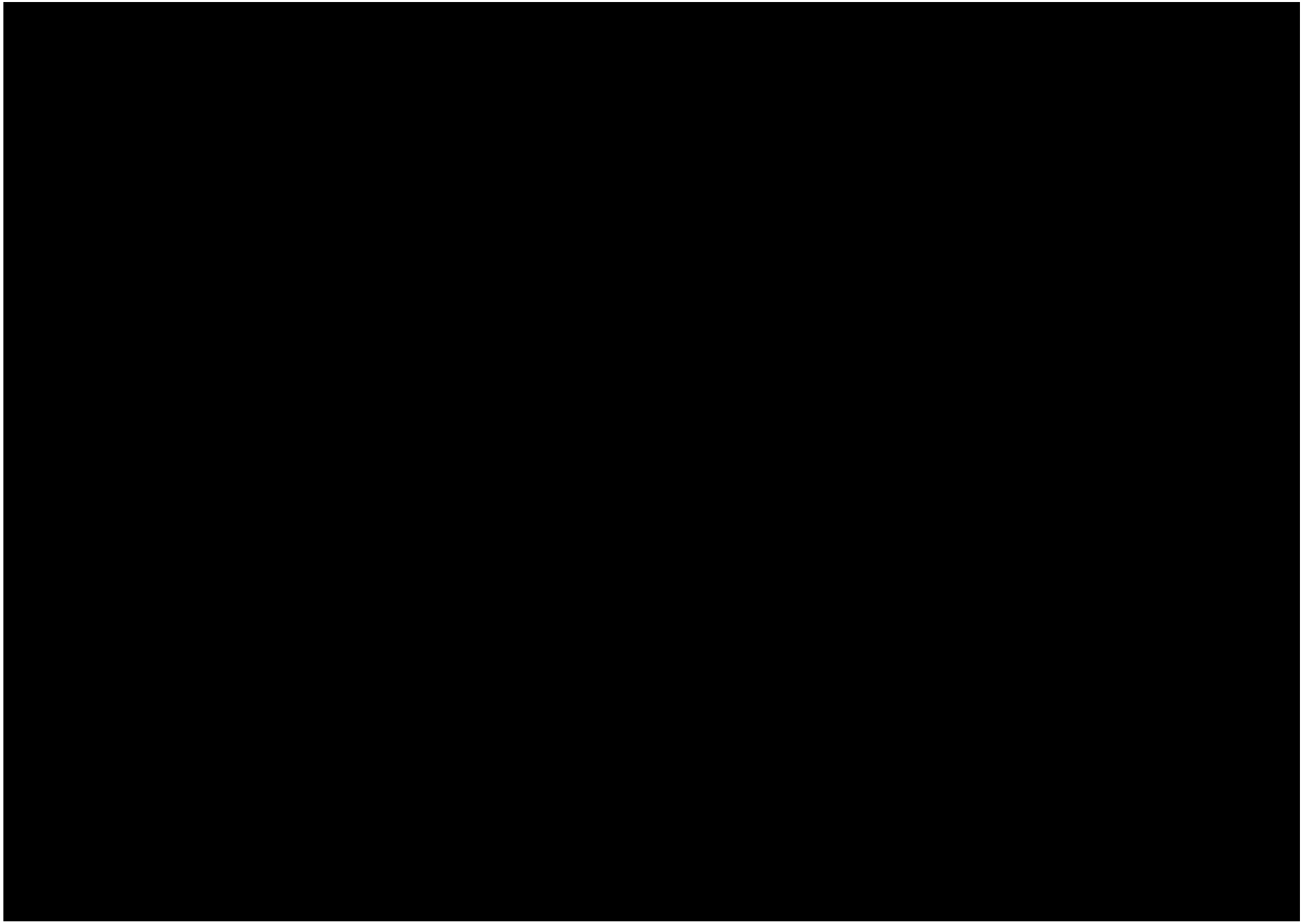
[redacted]

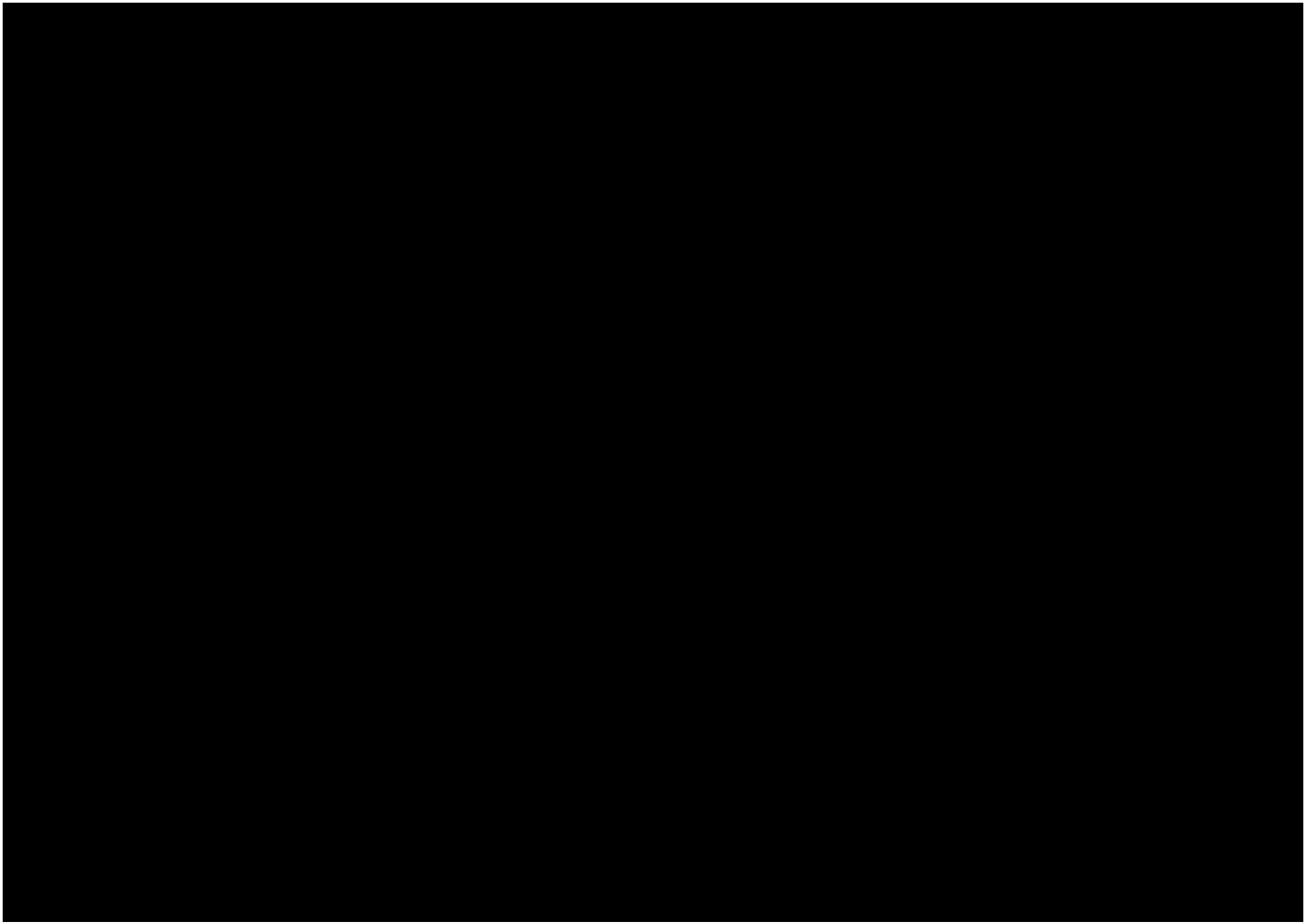
13.8 Integrated vessel summary

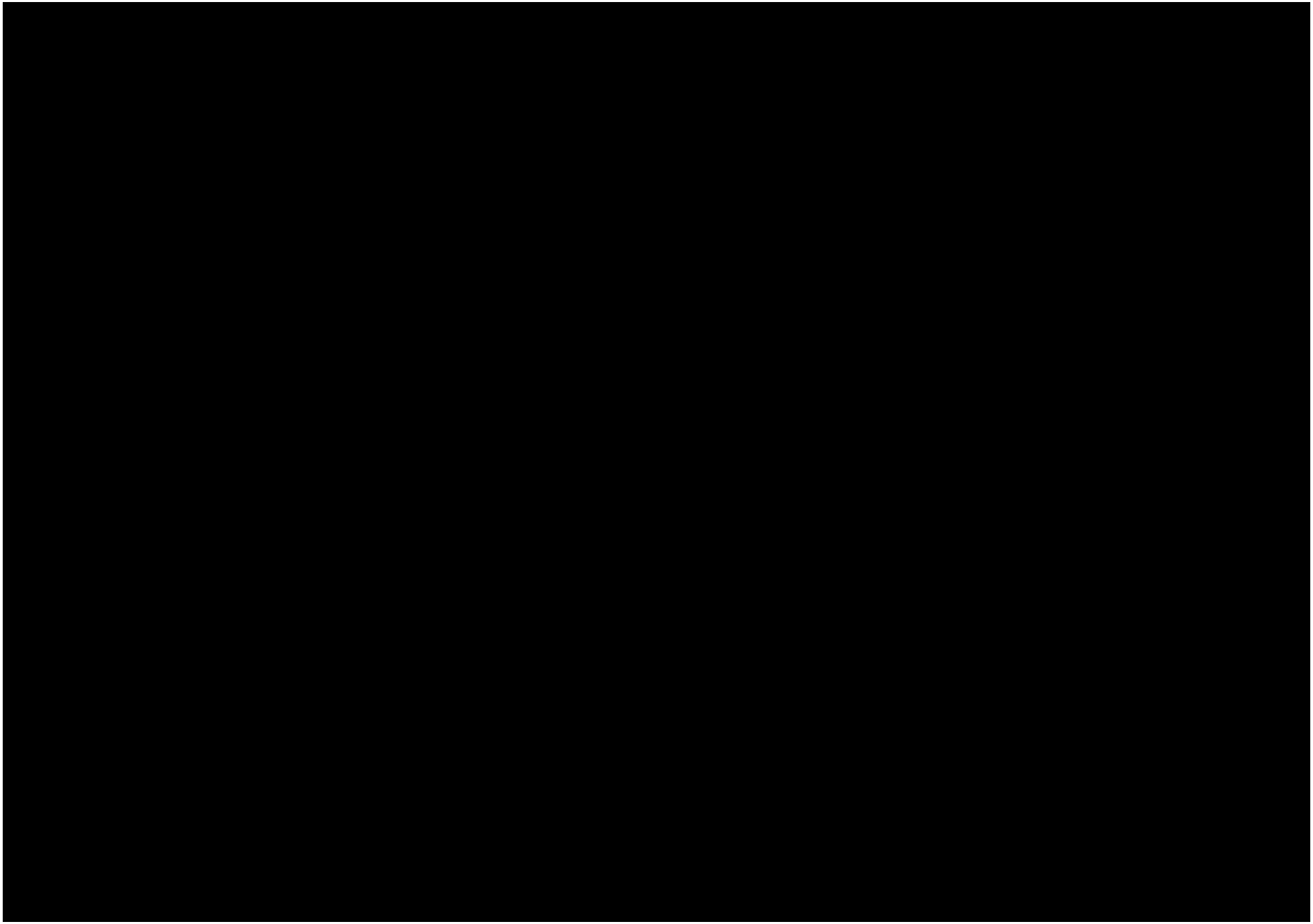
[redacted]

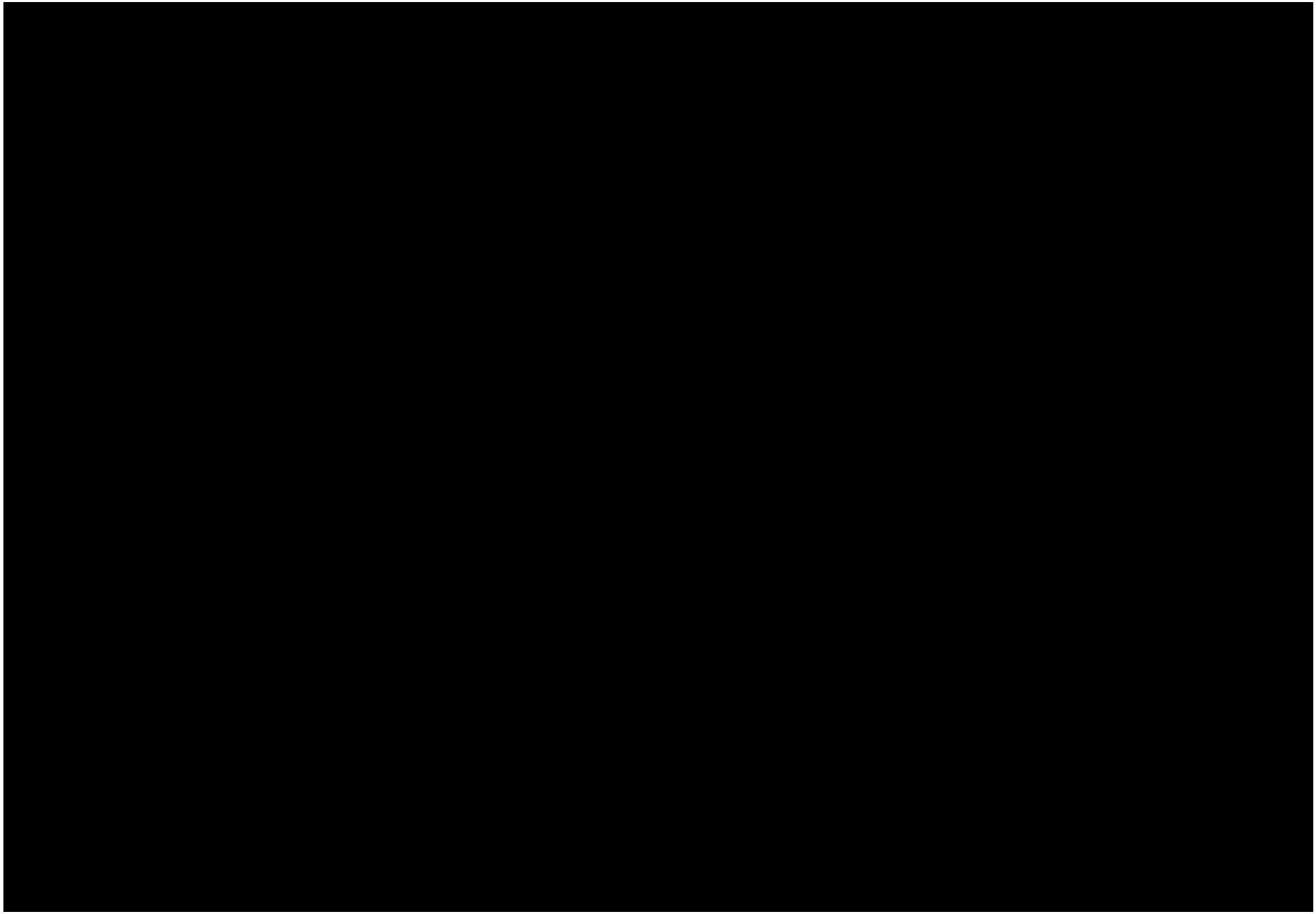
[redacted]











14 Fisheries mitigation plan

14 Fisheries mitigation plan

14.1 Summary

Leading Light Wind's overall approach and philosophy to offshore wind development is based on the belief that fishing communities and offshore wind energy development can mutually coexist and thrive. This can be achieved by carefully evaluating existing uses in the lease area and waters adjacent to the lease area and offshore export cable routes (the project area), avoiding impacts to the extent practicable, minimizing impacts, and where necessary mitigating unavoidable impacts. Interactive participation from the fishing industry will help Leading Light Wind reduce and avoid stakeholder conflict, create positive relationships, and hopefully serve as an "industry standard" for offshore wind developments in the future. To achieve this goal, Leading Light Wind's Fisheries Mitigation Plan (FMP) focuses on a set of core principles:

Apply transparency and accountability. Facilitate open, efficient, timely, and transparent communications to promote awareness and safety.

Incorporate diverse experiences. Seek out and apply the diverse expertise and knowledge of the commercial and recreational fishing communities in the shared project area.

Conduct respectful communication. Acknowledge and respect the concerns and interests of the fishing industry and their supporting businesses.

This FMP was developed as guidance for Leading Light Wind to avoid, minimize, restore, and offset potentially adverse construction and operating impacts of offshore wind energy on fish and fisheries within the project area. The FMP further establishes routes of communication and information sharing with fisheries stakeholders, including regulatory agencies, marine users, research organizations (e.g., universities, regional consortiums, NYSERDA Technical Working Groups), leading subject matter experts, and Environmental NGOs, on clear means of receiving and responding to feedback. Leading Light Wind will continuously evaluate and evolve this FMP so that all its components are current, complete, and sufficient for ongoing communication and collaboration with fisheries stakeholders.

14.2 Communications and collaboration

Leading Light Wind recognizes that meaningful stakeholder engagement is central to every area of NYSERDA's offshore wind program. Leading Light Wind recognizes that implementing a communication plan is important to fisheries mitigation. As a committed industry partner, Leading Light Wind will build upon NYSERDA's efforts and integrate multifaceted stakeholder engagement strategies throughout every stage of the project. Key stakeholders for Leading Light Wind include regulatory agencies, marine users, research organizations (e.g., universities, regional consortiums, NYSERDA Technical Working Groups), leading subject matter experts, and E-NGOs. A comprehensive description of Leading Light Wind's stakeholder engagement strategy is described in the Stakeholder Engagement Plan (Section 16). In terms of communication and participation on stakeholder and working groups, Leading Light Wind shall continue to actively engage as participating members and sponsors of regional collaborative efforts including the F-TWG, E-TWG, M-TWG, ROSA, RWSC, ACP Fisheries Subcommittee, and the New York Habitat and Fisheries Working Groups.

Leading Light Wind is committed to active participation on the F-TWG as a means to collaborate on best practices and research for offshore wind energy development, balancing environmental concerns with responsible technically and commercially feasible offshore wind development. Primary and secondary core members have been identified for the F-TWG who will participate in F-TWG meetings and to serve as liaisons for communication between the F-TWG and the Leading Light Wind project team.

Leading Light Wind is committed to authentically involving impacted communities, including fishing communities, in project development and decision-making. Successful stakeholder engagement will support equitable access to the new opportunities the project will create. Stakeholders contribute valuable local and expert knowledge to project development and will be treated with fairness and respect by our team. This includes clearly communicating how stakeholder input will influence project decision-making and how stakeholder engagement will be continuously supported over the long term. By engaging early and often, Leading Light Wind is building accountability and trust to deliver a project that maximizes potential benefits. The Fisheries Communication Plan is available on the Leading Light Wind web page. It outlines engagement strategies for coordinating with fisheries stakeholders throughout project development. To inform the Fisheries Communications Plan, we identified and met with key fisheries stakeholders,

Table 14-1. Leading Light Wind communication team members.

Name	Roles/responsibilities	Contact information
Wes Jacobs	Project Director, Primary F-TWG Representative, Primary ACP Fisheries Subcommittee Representative	wjacobs@invenergy.com
Annette Ehrhorn	BOEM Project Coordinator	annette.ehrhorn@boem.gov
Adam Tate	Primary M-TWG Representative	atate@invenergy.com
Bill Smith	Secondary M-TWG Representative	wsmith@invenergy.com
Sarah Hudak	Fisheries Liaison Officer, Secondary F-TWG Representative, Primary ACP Fisheries Subcommittee Representative	shudak@leadinglightwind.com
Michael Porto	External Engagement Director	mporto@invenergy.com
Kirsten Barnstead	Point of Contact, Wildlife Assessment and Impacts	kbarnstead@invenergy.com
Brian Kerkhoven	Labor Liaison Officer	bkerkhoven@invenergy.com
Shannon Stewart	Agency Liaison Officer	sstewart@invenergy.com
Carmen Bernett	Federal Permitting Manager, Primary E-TWG Representative	cbernett@invenergy.com
Ross Diamond	State Permitting Manager, Secondary E-TWG Representative	rdiamond@invenergy.com
Hope Luhman	Tribal Liaison Officer	hope.luhman@wsp.com

such as the F-TWG. We have also conducted informal communications with Northeast and Southeast Fisheries observers who have good connections with commercial and recreational fishers in the region.

Leading Light Wind is committed to working with communities and stakeholders at every stage of development to ensure local voices are sought and heard, for the well-being of communities and the project's surrounding ecosystem. Leading Light Wind will engage with the general public through web postings, social media notifications, project newsletters, open houses and public hearings to share project information and address comments and questions. The robust and comprehensive planning process is led by our external affairs team and liaison officers. Table 14-1 on the previous page provides contact information for key members of our team. As team members are added to support these efforts, contact information and roles/ responsibilities will be updated and posted to reflect changes throughout the project life cycle.

Leading Light Wind will engage with fisheries stakeholders, including but not limited to the F-TWG, recreational and commercial fishers and associated organizations, partnered organizations, and regulatory agencies (Mid-Atlantic Fishery Management Council, New England Fishery Management Council, Atlantic States Marine Fisheries Commission) to address concerns related to benthic and fisheries resources. Leading Light Wind will:

- Provide opportunities for stakeholders to subscribe to project update emails.
- Maintain a messaging portal on the Leading Light Wind website for users to easily send questions or comments to the Leading Light Wind team.
- Post important project updates, outreach initiatives, and research opportunities on social media platforms and the Leading Light Wind News webpage.
- Regularly distribute a newsletter to stakeholders and subscribers describing project development activities, major past and upcoming outreach events, including port hours, and opportunities for providing input on specific project activities.
- Maintain updated contact information for the fisheries engagement team on the Leading Light Wind Mariners webpage to provide fisheries stakeholders a direct point of contact for fisheries-related questions and concerns.
- Coordinate port hours with other regional offshore wind energy developers to reduce strain on fishing communities.
- Consider timing of construction activities, working with the fishing industry and fisheries agencies on sensitive spawning and fishing periods to actively avoid or reduce interactions, as practicable.
- Engage with regulatory agencies, including but not limited to the MAFMC, NEFMC, and ASMFC, to solicit input on planned project development activities and fisheries-related concerns.
- Share results from sediment transport modeling with E-TWG and F-TWG.
- Evaluate and calculate extent of potential benthic habitat alteration/ loss prior to cable laying as part of future COP assessments and share results with F-TWG and other working groups.
- Consult with F-TWG, ROSA, and other relevant working groups to discuss export cable routing, turbine layout/orientation, operational timing to de-conflict with fishing, etc.
- Actively participate within the F-TWG and ROSA to ensure coordination with stakeholders across fisheries.

Additionally, Leading Light Wind will continue its ongoing communication with other developers and seek to maximize the impact of research and monitoring efforts by collaborating with them, particularly those in adjacent lease areas taking on similar initiatives. Leading Light Wind is coordinating with other lease holders through meetings coordinated by BOEM, ACP, the Special Initiative for Offshore Wind (SIOW), and NYSERDA technical working groups. Coordination efforts include discussions on innovative avoidance, minimization, mitigation, and monitoring measures, relevant data collection and research means and methods, reducing strain on agencies, and coordinating port hours and developer presence at fishing community events.

14.3 Monitoring and research pre-, during-, and post-construction

Establishing baseline data

Leading Light Wind is currently conducting a thorough desktop analysis of available and relevant fisheries data to analyze historical fisheries uses along proposed export cable corridors and to understand the spatial and temporal presence of fish and invertebrates. A fisheries assessment was conducted to determine historical fisheries uses in the offshore lease area over a 12-year period from 2008-2019. Many of the fisheries within the project area are subject to tracking via a vessel monitoring system (VMS), which creates a spatial data record of their activities. Other vessels have permits for regulated species that require effort and landings to be reported via vessel trip reporting. These fisheries-dependent data,[1] in addition to information from vessel trip reports (VTR), the Mid-Atlantic Ocean Data Portal (MARCO) and Northeast Ocean Data Portal, will be used as a proxy to assess the historical fishing activity inside the project area and help direct project engagement needs.

The fisheries analysis included the following data sources:

- **2019 database:** National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science and Bureau of Ocean Energy Management (BOEM) Comprehensive Seafloor Substrate Mapping and Model Validation in the Atlantic
- **2000 database:** NOAA Estuarine Living Marine Resource
- **Commercial and recreational fisheries** effort data

These databases provide key information on the presence of sensitive habitats, as well as spatial and temporal distribution of species found within the lease area.

Table 14-2 on the next page lists the existing fisheries and environmental data used to develop baseline characterization. **This robust data provides us the opportunity to characterize resources and to develop appropriate avoidance, minimization, and mitigation measures.**

In addition to the information listed, Leading Light Wind is conducting multiple surveys for benthic, geophysical, and geotechnical analysis. These analyses will provide project area-specific information to further characterize fish and benthic macroinvertebrate communities.

[1] https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/WIND/WIND_AREA_REPORTS/OCS_A_0542.html#Species_Dependence

Data source	Accessible at:
NOAA data (fish stock assessments, population and ecosystems monitoring and analysis division, fishery monitoring and research)	https://www.fisheries.noaa.gov/national/population-assessments/fish-stock-assessment-report https://www.fisheries.noaa.gov/about/population-and-ecosystem-monitoring https://www.fisheries.noaa.gov/about/fisheries-monitoring-and-analysis
Atlantic Coast Fishery Management Plans and Amendments	https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-management-plans-and-amendments
Atlantic States Marine Fisheries Commission (ASMFC)	https://www.asmfc.org
NOAA Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-level Assessment	https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/WIND/WIND_AREA_REPORTS/OCS_A_0542.html#Species_Dependence
National Marine Fisheries Service (NMFS) Species Information System	https://www.st.nmfs.noaa.gov/sisPortal/sisPortalMain.jsp
NOAA Fisheries Office of Science and Technology, NMFS Fishery Independent Survey Data and Fisheries Statistics	https://www.st.nmfs.noaa.gov/st1/index.html
Atlantic Coastal Cooperative Statistics Program	https://www.accsp.org
NMFS Atlantic Highly Migratory Species database	https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species
Renewable Energy Research completed studies	https://www.boem.gov/renewable-energy-research-completed-studies
Essential Fish Habitat Mapper	https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper
Invenergy Wind Offshore LLC Fisheries Assessment; Lease OCS-A 0542: Leading Light Wind Offshore Lease Area	[redacted]
Invenergy Wind Offshore LLC Fisheries Assessment; Lease OCS-A 0542: Leading Light Wind Export Cable Routes	[redacted]

Table 14-2. Data used in baseline characterization.

[redacted]

Monitoring for impacts

Leading Light Wind commits to establishing partnerships with local and regional experts from institutions and stakeholder groups — driven by stakeholder interests and built upon the existing data discussed above — to facilitate preparation of pre- and post-construction monitoring plans.

Monitoring efforts will meet two main objectives:

1. Supporting regional monitoring of key commercial fish stocks within the project area to better understand if or how offshore wind energy development may potentially alter biomass and/or distribution of commercially important fish stocks.
2. Supporting regional monitoring of wildlife to better understand the impacts of offshore wind energy development on the distribution and abundance of sensitive species.

These monitoring efforts may be led by academic institutions in coordination with developers, regional monitoring organizations with Leading Light Wind support, or independently led by Leading Light Wind. Regional monitoring organizations may include ROSA or similar.

Leading Light Wind shall continue to actively engage as participating members and sponsors of regional collaborative efforts including the F-TWG, E-TWG, M-TWG, ROSA, RWSC, and the New

York Habitat and Fisheries Working Groups. Leading Light Wind shall seek to collaborate with other regulatory agencies and stakeholder groups (e.g., E-TWG, F-TWG, and ROSA) to identify research needs and opportunities.

Assessing changes attributable to project activities

Changes in ocean usage can occur as a result of changes in distribution and abundance of fisheries resources. Leading Light Wind will use fisheries-dependent data to assess and quantify changes attributable to project activities. Data will be derived from landings and revenue information coupled with fisheries-independent data from opportunistic sampling of fisheries resources. These data sources will assist in evaluating potential changes in fisheries resource availability, including both abundance and distribution, compared with the baseline information listed in the section. Sound statistical methodology will be coupled with historical fisheries data to investigate attributes of population variations.

While mitigation measures and adaptive management will address changes related to the project, collaboration with the fisheries community (e.g., F-TWG and E-TWG) may reveal that through collaboration, we can help identify natural variation, fluctuations, and range shifts that could occur for commercially important species. Although changes to fisheries based on project-related activities are difficult to predict, we will continue to coordinate with the fishing community to monitor fisheries. We will work with relevant stakeholders to identify and define monitoring objectives and then determine appropriate methods for monitoring, which may include a combination of extractive and non-extractive techniques; and, where applicable, assess and quantify any changes that are attributable to project activities.

Fisheries uses of the project area

Leading Light Wind commissioned a Fisheries Assessment Report.

Figure 14-2. The Fisheries Assessment Report characterizes current patterns and trends in fisheries across the greater New York Bight region.

[redacted]

Identifying post-construction changes in commercial and recreational fishing patterns will incorporate consultations on monitoring and research with the fishing industry as previously described. For example, commercial fisheries data, including reported landings and revenue, vessel trip report data, and vessel monitoring system data, can identify patterns in lease area usage.

Changes in commercial fisheries usage will be assessed using existing commercial fisheries reporting methods (e.g., VTR and VMS data) and supplemented with direct observations made during wind farm operations. These data will be compared with historical usage to identify any significant changes in usage.

Further, Leading Light Wind is committed to exploring relevant monitoring protocols during the project life cycle. [redacted] Leading Light Wind will consider surveys of recreational fishing activity (e.g., creel surveys) to supplement the limited data available. The additional data will contribute to understanding of current conditions, as well as the changes in usage of the area.

Collaborative research efforts for fisheries

Over the last 20 years, Leading Light Wind's lead developer, Invenergy, has made community partnerships a core principle of our business and this continues to guide the role we want to play in a changing world. Invenergy also sponsors environmental research programs that advance the state of practices for environmentally responsible energy infrastructure development, as well as sponsors conservation initiatives that contribute to improving the natural world around Invenergy projects. Through these partnerships and activities, we have amplified our impact in the communities where we live, work, and operate. The details of this important company work is detailed annually in the *Invenergy Impact Report* (https://invenergy.com/our-people/invenergy-impact). We will extend these guiding principles to our offshore wind portfolio and Leading Light Wind.

Leading Light Wind is a committed member and financial sponsor of the RWSC and ROSA. Leading Light Wind will rely heavily on these organizations as we make decisions regarding data collection, data standards, data sharing, research commitments, and sponsorship of rigorous scientific research. Leading Light Wind will seek to collaborate with ROSA on their recently completed Fish FORWRD database (Fish & Fisheries Offshore Wind Research Database) which provides strategic insight into future research needs and criteria, research sponsorship opportunities, and assignment of prioritization criteria to help developers and agencies disperse mitigation funds. NYSERDA, ROSA, and RWSC are developing such criteria per the July 13, 2022 meeting on Criteria for Prioritization of Offshore Wind-Related

Environmental and Fisheries Research hosted by ROSA and the Regional Synthesis Workgroup of the E-TWG. At the meeting on July 13, 2022, ROSA indicated that it has identified over 200 research priorities and will continue to develop criteria for ranking priorities. In addition, Leading Light Wind will continue to engage with RWSC on their developing Science Plan which will provide strategic insight into future research needs and help facilitate the development of appropriate collaborative regional research initiatives.

Leading Light Wind has begun establishing relationships and is contemplating partnerships with institutions and science organizations that focus on fisheries relevant to the lease area [redacted]. Leading Light Wind will conduct all project related data collection and monitoring in alignment with larger research efforts and to further knowledge of species of concern, when appropriate, going beyond regulatory minimum monitoring protocols. [redacted]. Leading Light Wind will continue to establish working relationships with professional and educational institutions to fill research gaps and provide scientific data for better understanding the potential impacts of offshore wind energy development on fisheries and fisheries habitat. Leading Light Wind will make available, as practicable, vessels, buoys, and structures to host research projects that are compatible with the respective missions. Additionally, Leading Light Wind will seek out and support underfunded organizations that provide valuable contributions to scientific knowledge and/or species protection [redacted].

Leading Light Wind is committed to collaborating with the marine science community, relevant stakeholders, fisheries communities, TWGs, environmental NGOs, other offshore wind energy developers and third-party groups to facilitate and standardize research related to fisheries and offshore wind development. As US-focused research priorities are still being organized and coordinated, it is important for Leading Light Wind to engage with regional science organizations to ensure investment in research is strategic and advances gaining knowledge in the right areas and as quickly as possible. Collaboration with the F-TWG ensures communication with the fishing community, timely dissemination of information, and regular feedback and input on research opportunities to protect the state and region's valuable fisheries and fishing communities.

In addition, Leading Light Wind, through collaboration with the fisheries community and other New York Bight developers, will conduct fisheries monitoring surveys to supplement existing data and assess potential changes to fisheries. [redacted]

New York Bight leaseholders are engaging in collaborative meetings coordinated by BOEM and the ACP, agreeing to the shared objectives below. Through collaboration, Leading Light Wind will seek to maximize the impact of research efforts such as data collection, methodology, analysis, and dissemination by working with other developers, particularly those in adjacent lease areas, taking on similar initiatives.

- Work together to identify innovative avoidance, minimization, mitigation, and monitoring measures based on lessons learned in the industry both domestically and globally.
- Develop data collection and research means and methods that provide maximum benefit.
- Seek opportunities to meet as a group on select topics to reduce the need for individual meetings with agencies.
- Seek to meet jointly in other forums and/or request joint New York Bight presentations/agenda items at various working group and stakeholder meetings to reduce the need for individual presentations.
- Work together to coordinate port hours so that fishers have consolidated, rather than dispersed, times to discuss issues with New York Bight leaseholders.
- Participate in BOEM convenings of Native American Tribes/Indigenous Nations.

Specific activities undertaken to date include participation on a regular New York Bight leaseholder forum, leaseholder meeting specific to the BOEM PEIS, and engagement with neighboring lease OCS-A 0541 on turbine layout and spacing and data collection strategies.

Monitoring is essential to assessing potential changes and impacts of offshore wind energy development. Leading Light Wind will prepare pre- and post-construction monitoring plans, driven by the stakeholders' interests and built from existing data. Developing monitoring and research opportunities throughout the life of the project will provide key insights into advancing knowledge of the specific impacts of offshore wind energy development on fish and fisheries. To ensure that monitoring is accurate and informative, monitoring methods and scientific designs will intend to meet the highest scientific standards. Leading Light Wind will consult NYSERDA's Mitigation and Monitoring Practices Tool (MMP Tool) and will consider guidance mentioned in the *Offshore Wind Project Monitoring Framework and Guidelines* developed by ROSA. Leading Light Wind will establish a process for collaborators to contact and meet with project representatives to discuss prospective research opportunities.

Data gaps and data availability

Leading Light Wind believes that a cornerstone of mitigation planning is research and monitoring that addresses data gaps in fisheries resources, how those resources are harvested, and stress factors that drive impacts on those resources. To establish baseline conditions for the presence of fish and fisheries in the project area, Leading Light Wind will consult existing databases and studies as mentioned above (Table 14-2) and conduct pre- and post-construction surveys in accordance with the BOEM FMP guidelines.[4]

Leading Light Wind will employ existing tools and data to understand data gaps. In doing so, we will more meaningfully, efficiently, and strategically allocate research resources toward efforts that address data gaps. Data gaps will be identified throughout the project development process and during consultation with relevant stakeholders to maximize the impact of research and monitoring efforts. As described in the Leading Light Wind Permitting Plan (Section 10), Invenergy met with BOEM in August 2022 to discuss its comprehensive data collection strategy to characterize the lease area and potential cable routes. Key data collection principles include but are not limited to leveraging existing data and science where applicable; consulting past-project precedent; conducting purposeful data collection that is useful in evaluating potential project impacts and data gaps; and engaging with relevant stakeholders. These principles will be applied throughout the project life cycle.

Leading Light Wind is committed to make publicly available, as practicable, relevant data and supporting metadata that is developed across our portfolio of projects to enhance the understanding of environmental characteristics, or use by fisheries, of any offshore, nearshore or onshore areas, so long as it is not considered proprietary in nature or confidential business information. Leading Light Wind will seek to collect and report data consistent with standards established by regional organizations and share data through established multi-sector data and information sharing platforms related to offshore wind planning and development such as the Northeast Ocean Data Portal and Mid-Atlantic Ocean Data Portal, as well as ROSA's Fish FORWRD. Prior to any disclosure, data made available by Leading Light Wind will undergo rigorous quality assurance/quality control (QA/QC) and version control.

To organize this effort, we will establish a data sharing plan and design activities and monitoring efforts to collect data compatible with BOEM guidelines, databases suggested below, and other relevant agencies. All data

[4] Guidelines for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR Part 585 (https://www.boem.gov/sites/default/files/documents/renewable-energy/DRAFT%20Fisheries%20Mitigation%20Guidance%2006232022_0.pdf).

will undergo QA/QC prior to database submission(s) and will include pertinent metadata to maximize the utility of data by third parties. Databases for siting and positional data where Leading Light Wind may publish data may include OBIS-SEAMAP, Motus Database, Seabird Tracking Network, and the Atlantic Cooperative Telemetry Network.

We will provide photo identification data to appropriate networks for large whales such as humpback, fin, and North Atlantic Right Whale. Leading Light Wind will also ensure that meta-databases—such as Tethys Knowledge Base and the pending ROSA database—receive metadata information to include in their collection. Sharing fisheries data will allow comparison against identified data gap analyses and to serve as another vector for disseminating data to third parties.

14.4 Supporting other research

Leading Light Wind commits to engaging in collaborations that further knowledge of potential impacts of offshore wind energy development on fisheries resources. We also sponsor environmental research programs that advance the state of practices for environmentally responsible energy infrastructure development, as well as sponsors conservation initiatives that contribute to improving the natural world. Additionally, in evaluating potential research projects, we will consider attention to the unique geologic, geographic, and environmental conditions of the lease area (e.g., proximity to unique features like the Hudson Canyon, distance from shore, water depth, and species composition). Potential collaborative partnerships include the scientific community, F-TWG, ROSA, relevant stakeholders within the fisheries industry, other developers of offshore wind energy, third-party groups, regional academic institutions that focus on fisheries issues related to offshore wind development. [redacted]

Leading Light Wind will seek and consider collaborations for robust and relevant research that relates to marine sciences and offshore wind energy development. We consider sharing project data and providing access to the project area for independent scientists. [redacted] Leading Light Wind commits to establishing partnerships with local and regional experts from academic institutions and stakeholder groups to facilitate the preparation of pre- and post-construction monitoring that is driven by stakeholder interests and built upon existing regional data.

Leading Light Wind will collaborate with ROSA to add related studies to their database. This database seeks to provide insight into future research needs and to build the framework necessary for successful collaborative research programs. Leading Light Wind will also consult the ROSA database to identify data gaps pertinent to the New York Bight for research consideration.

Leading Light Wind will meet with interested parties to discuss facilitation of prospective research opportunities including investigating potential impacts of offshore wind energy development on fish, invertebrates, fisheries, and other potential ecological resources present in the project area and site or

Figure 14-3. Leading Light Wind commits to engaging in collaborations that further knowledge of potential impacts of offshore wind energy development on fisheries resources.

equipment access. Leading Light Wind is a strong supporter of collaborative research and has set aside funds specifically for third-party research. In evaluating proposals not being considered through one of the regional research collaborations such as RWSC, Leading Light Wind will establish a committee of expert technical advisors to assess and comment on proposals, as well as seek input from regional organizations such as ROSA, RWSC and TWGs to ensure proposal are not only scientifically valid but effectively address overall data and science gaps identified by these coordinating bodies. Should there be sufficient volume of independent research interest, Leading Light Wind may create and publish targeted requests for proposals in a manner similar to that used by other funding entities such as US Department of Energy, to maximize creativity in research approaches and questions, as well as offer equal opportunity for new or underrepresented groups to seek funding and participate in research.

To enhance the understanding of environmental characteristics, or use by fisheries, of any offshore, nearshore or onshore areas, Leading Light Wind is committed to making public relevant data and supporting metadata so long as it is not considered proprietary in nature, considered confidential business information, or discloses information that may compromise sensitive environmental resources. Generally, Leading Light Wind will seek to develop collaborative efforts that do not restrict data distribution based on withholding until publication or other academic presentation and would include clear end dates for data withholding for such purposes. Some data may need to be withheld if Tribes or commercial fisheries determine data to be culturally or commercially sensitive. For example, specific locations of fishing areas or cultural practices may need to be withheld or data may need to be aggregated in some cases.

Leading Light Wind will seek to collect and report data consistent with standards established by regional organizations and share data through established multi-sector data and information sharing platforms related to offshore wind planning and development such as the Northeast Ocean Data Portal and Mid-Atlantic Ocean Data Portal. Prior to any disclosure, data made available by Leading Light Wind will undergo rigorous QA/QC and version control.

Leading Light Wind will make every reasonable effort to support access to the project area and installed infrastructure for scientific and technological research. We will approve such requests considering security and safety of primary importance during certain phases of construction or operational activities considering security and safety of personnel, operational marine assets, and installed infrastructure to be of primary importance. Based on requested activities, timing, etc., we will coordinate with the requestor to accommodate access to the greatest extent practicable.

Leading Light Wind, contingent upon a winning bid under this Request for Proposals ORECFRP22-1, is committed to supporting regional monitoring of wildlife and key commercial fish stocks and third-party research, by leveraging its $300 million community benefits program aligned with the principles outlined above. As referenced in Leading Light Wind's Stakeholder Engagement Plan, the community benefits program includes budgeted funding categories that will ensure follow-through in this critical area. Leading Light Wind anticipates pursuing third-party research partnerships through its Partnerships category, and likewise looks forward to engaging with relevant communities and stakeholder groups to identify third-party research opportunities that will be funded through the Community Investment Fund.

Leading Light Wind commits $5,000 per MW of Offer Capacity [redacted] to support regional monitoring of fish and invertebrates that support economically important fisheries and to better understand how offshore wind energy development is potentially altering the biomass and/or distribution of these stocks. In addition, we commit $5,000 per MW of Offer Capacity [redacted] to provide financial and technical support to ongoing regional wildlife monitoring efforts and toward emerging research on potential alterations in behavior, populations, or distribution of sensitive wildlife as deemed necessary to better understand the effects of offshore wind development. This allocation is separate from any regional fisheries mitigation fund that may be established based on BOEM guidance. Leading Light Wind will provide within one year of award, a Monitoring Plan detailing the commitment of the funding. The Monitoring Plan will describe the commitment of fifty percent of the funding within two years of the award, and the remaining fifty percent within three years of the award.

In developing the required Monitoring Plan, Leading Light Wind will adhere to the objectives outlined in Section 14.3 above. The financial support for monitoring may be provided by any combination of disbursement to regional organizations and direct expenditure to finance the monitoring work. Leading

[redacted]

Light Wind will report specific spending activity, including amount, purpose and result of investment, in their quarterly progress reports to NYSERDA. Leading Light Wind will consult NYSERDA's Mitigation and Monitoring Practices Tool (MMP Tool) and will consider guidance mentioned in the Offshore Wind Project Monitoring Framework and Guidelines developed by ROSA.

In developing priorities for research funding, Leading Light Wind will adhere to the objectives outlined in Section 14.3. In evaluating third-party proposals, Leading Light Wind will establish a committee of technical advisors to assess and comment on proposals, as well as seek input from regional organization such as ROSA, RWSC and TWGs to ensure proposal are not only scientifically valid but address overall data and science gaps identified by these coordinating bodies. Funds will be directed toward areas of fundamental need as identified in Invenergy's engagement with regional technical experts (TWGs, ROSA, RWSC, etc.) and in alignment with recognized research priorities at the state and federal level, as described above. Consideration in funding will be aimed at providing resources to historically underfunded entities and programs in effort to promote equitable access to research opportunities. As themes emerge in research need, Invenergy may, as noted above, develop RFPs focused on broad objectives to promote creativity in approach, methodology, and application of emerging technologies as applicable to effectively address questions that advance understanding of sensitive resources and responses to development, and offer solutions for optimization of data collection, analyses, and dissemination.

14.5 Site design considerations

Leading Light Wind's site design will consider multiple factors in the site layout, including stakeholder concerns and baseline fisheries resource data. Pre-construction site design for fisheries includes considering traditional fishing grounds, commercial fishing methods, and important and/or sensitive marine habitats and resources to locate foundations and cable routes in the least impactful manner that is practicable. [redacted]

Leading Light Wind will create project-specific layout parameters through engagement with regulatory agencies and maritime stakeholders. We are committed to collaborating with the F-TWG, and with other regional fishermen and shipping and navigation, to develop the project in a manner that proactively addresses stakeholder concerns. Specifically, layout parameters[6] will inform wind farm layouts, wind turbine spacing, lines of orientation, and subsea cables within the array that facilitate continued access to traditional fishing grounds, as well as navigation safety. Turbines will be oriented and spaced appropriately to reduce conflicts with existing ocean uses, such as commercial fishing and marine navigation.

To minimize adverse ecological impacts to commercially and recreationally harvested aquatic species, Leading Light Wind will collaborate with regulatory agencies and fisheries stakeholders to identify and avoid, minimize, and mitigate impacts during development to the extent feasible.

14.6 Construction and operation

Leading Light Wind will avoid and minimize potential impacts to fisheries, fish and benthic macroinvertebrate resources, and sensitive habitats during construction and operation to the extent practicable. Sources of impacts during the construction and operations phase include the following:

[redacted]

1. Vessel collisions
2. Siting impacts on sensitive habitats
3. Installation methodology across sensitive habitats
4. Pile driving
5. Lighting systems and resultant exposure
6. Noise-emitting survey equipment

Leading Light Wind will implement best management practices and mitigation measures as appropriate and feasible to minimize impacts on fisheries (e.g., implementing lighting systems to minimize exposure, limiting pile driving to seasons with lower marine life population), as described in the *Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585*.[7] The following sections summarize the mitigation measures that we will use during construction and operation.

Construction

Construction generally requires that recreational fishermen, commercial fishermen, or other mariners temporarily avoid a defined construction area for safety reasons (safety zone). Construction could disturb fishing activities as well as ecological resources that fisheries rely upon. Leading Light Wind will use best management practices and mitigation measures to minimize construction impacts on fish and macroinvertebrates, as well as to minimize impacts to the commercial and recreational fisheries in the project area. In order to ensure the best practices and mitigation measures are used, we plan to continually review improvements in technology, with a willingness to consider the use of new advancements.

Notices to mariners and information about near and offshore project activities will be posted to the project website. Safety vessels will be used to alert mariners to the presence of safety zones and/or active construction areas where appropriate to minimize the risk of collisions or conflict. We will use best management practices to mitigate physical impacts to benthic and marine habitats to the extent practicable. Leading Light Wind will engage with other lease holders, fisheries, USCG, and BOEM to inform transit routes and turbine spacing and orientation to minimize impacts to fisheries to the extent practicable, logistically reasonable, and safe.

Examples of potential mitigative measures during construction include the use of mid-line buoys, if feasible and safe. The mid-line design employs a flotation device between the anchor and vessel that prevents the anchor line from dragging on the sea floor and helps to minimize negative effects on aquatic habitats. To minimize the impacts of noise from pile driving activities, we will use noise attenuation technologies. To minimize sediment resuspension and dispersal, especially in areas of known historically contaminated sediments, Leading Light Wind will consider appropriate mitigation measures such as silt curtains, closed bucket removal, reduced dredge speeds, no scow overflow, or upland disposal.

Leading Light Wind will continue the implementation and adaptation of the FMP throughout construction. We will maintain collaboration and communication with the fishing industry and fisheries regulators. We will consider the timing of construction activities — working with the fishing industry and fisheries agencies on sensitive spawning and fishing periods to actively avoid or reduce interaction during construction, where feasible. We will communicate construction activities and locations with local fisheries stakeholders through in-person and virtual communications, social media, website communications, and local notices to mariners. Should a situation arise when mitigation strategies are insufficient, Leading Light Wind will coordinate with the fishing industry and fisheries regulators to identify appropriate approaches to address the insufficiency.

Operation

During operation, one of the most important tools to avoid, minimize or mitigate impacts to fish and fisheries is continued post-construction monitoring. Leading Light Wind will document habitat disturbance and recovery, allowing for adaptation and adoption of mitigation measures to minimize adverse impacts of operation. Many of the potential impacts of operation relate to the presence of structures, including wind turbines, OFCS, and submarine cables. To minimize navigational hazards, we will disseminate information to fishers on locations of structures and cables and will include structure locations on navigational charts.

[7] Bureau of Ocean Energy Management (BOEM). 2015.

Further, Leading Light Wind will develop a Navigational Enhancement Plan in consultation with regulatory authorities and fisheries stakeholders. This plan may include contributions to regional funds through some yet-to-be-defined mechanism that enables the acquisition of navigation equipment, the development of appropriate training for use of navigation equipment or other navigational aids, or the creation of other programs to enable fishermen to safely continue effective navigation and fishing activities to encourage project and fisheries coexistence. Physical navigation aids will also assist in minimizing impacts to navigation. To enhance navigational visibility, wind turbine generators, and electrical service platforms will be lighted, painted, and marked with high-visibility paint and unique identification lettering and numbering. They will be maintained as private aids to navigations.

As described above, facility design and materials used will consider input from stakeholders to minimize the potential for loss of fishing gear. Turbine placement, burial depth of cables, size and location of scour protection, and keeping plow cables/umbilicals under constant tension are all parameters that will be designed to minimize, to the greatest extent practicable, the potential loss of fishing gear due to entanglement. Should loss of gear occur, Leading Light Wind has developed a method for processing claims for fishing gear that is lost or damaged, based on BOEM's *Guidelines for Mitigating Impacts to Commercial and Recreational Fisheries* (2022). We have included a Gear Loss and Damage Claim Form in our Fisheries Communication Plan and website. This form was based on a general template created across joint developers and may be updated subject to feedback from the fishing community and associated stakeholders.

Project personnel will be trained in accordance with relevant laws, regulations, and project policies, as described in the Off-Site Source Recovery Program. During scheduled, periodic maintenance activities, we will maintain ongoing communication with fishermen and implementation of best management practices. We will seek collaboration with state and federal regulatory authorities and key stakeholders to assess the use of ecological enhancements for turbine scour protection to provide offsets from potential adverse impacts. In addition, we will consider the timing of project activities and work with the fishing industry and fisheries agencies on sensitive spawning and fishing periods to actively avoid or reduce interaction during construction, where feasible. Mitigation related to physical impacts of operation will focus on maintaining water quality and minimizing impacts of operation and maintenance activities. Leading Light Wind will implement mitigation and avoidance measures to protect water quality, such as spill prevention. Specifically, we will use appropriate measures for operating vessels and implementing an Off-Site Source Recovery Program, which will include measures to prevent, detect, and contain accidental release of oil and other hazardous materials. Should a situation arise when mitigation strategies are insufficient, Leading Light Wind will coordinate with the fishing industry and fisheries regulators to identify appropriate approaches to address the insufficiency.

As noted above, the Fisheries Assessment Report for the lease area characterized current patterns and identified trends in fisheries activities across the region. [redacted] If mitigation strategies do not sufficiently address impacts to commercial and recreational fishing patterns, Leading Light Wind will consider the following:

- Exploring whether further mitigation can be applied to reduce impacts
- Using adaptive management by applying mitigation in the spatial planning and layouts of later phases of the lease development
- Sharing the results so that they can be used in adaptive management on a wider scale, for development of future lease areas in the Northeast and Mid-Atlantic Ocean and in the wider offshore wind energy space.

14.7 Considerations for subsea cables

Subsea cables from offshore wind farms can have a variety of direct or indirect fisheries impacts. Indirect, short-term impacts to fisheries resulting from the construction and installation of cables include displacement of target species due to noise, benthic disturbance, potential disruption of sensitive life

cycles or fishing periods, and increased turbidity. Direct, short-term impacts to fisheries include exclusion from an area due to the presence of construction or maintenance vessels. Subsea cable installation can also include indirect, long-term impacts to fisheries by displacing target species through habitat modification if burial to an appropriate depth cannot be achieved and cables must be armored. Direct, long-term impacts to fisheries from subsea cables include potential risk of gear loss from snags on cable armoring and risk of cable damage from an anchor or gear strike if appropriate burial depth cannot be achieved.

Leading Light Wind reviewed NYSERDA's *Draft Offshore Wind Cable Constraints Assessment*[8] and is incorporating concepts for avoidance, minimization, and mitigation of impacts in our FMP and Environmental Mitigation Plan. Mitigation measures for construction and operation of subsea cables will minimize adverse impacts to commercial and recreational fisheries within the lease area and along any transmission line routes within state and federal waters. In addition to those mitigative measures listed below, cable burial, routing, and armoring considerations from the Cable Burial Risk Assessment will be utilized.

Mitigation measures for pre-construction site design include considering appropriate timing for cable installation activities, determining specific locations for subsea cables that will minimize ecological impacts, and accounting for potential impacts on diverse stakeholder concerns. Reducing the overall footprint of subsea cables can decrease interactions between infrastructure and fisheries. **Leading Light Wind will avoid, to the extent practicable, siting structures (wind turbines, offshore converter stations, and submarine cables) in areas of sensitive habitat.** Micro-siting of the submarine export cable route will further reduce potential impacts on sensitive habitats and minimize use of areas where appropriate cable burial is challenging. The specific locations of subsea cables will be included in future navigational charts as required.

[redacted]

Burial of cables will be conducted in accordance with recommendations and requirements from USACE and USCG. Effort will be made to coordinate with other wind developers to allow for appropriate corridors or other coordination of layouts as practicable.

During operation, Leading Light Wind will monitor subsea cables at regular intervals. Following installation of the submarine export and inter-array cables, we will conduct routine surveys or inspections of subsea cables to correct for exposure following hurricanes and other major events causing seabed disturbance.

14.8 Project decommissioning

Leading Light Wind will adhere to BOEM's current decommissioning guidance, which includes submitting a decommissioning application, and receiving BOEM approval as early as two years before expiration of the lease or as late as 90 days after expiration. BOEM defines decommissioning as "the removal of all facilities, installations, and other devices permanently or temporarily attached to the seabed on the OCS to a depth of 15 feet below the mudline within two years following the termination of a lease or grant" (30 CFR Section 585.433, Section 585.910).

Leading Light Wind's decommissioning plan will build on experience with onshore wind, coordination with fisheries stakeholders, and compliance with regulatory requirements, with the purpose of returning the site to its environmental and visual character to prior to construction. The decommissioning plan will consider potential impacts on protected and sensitive species and habitats in terms of deciding what to leave in place or remove. Although current BOEM guidelines denote of all facilities, installations, and other devices permanently or temporarily attached to the seabed on the OCS to a depth of 15 feet below the mudline there is evidence that leaving some structures such as scouring protection may contribute to a healthier, robust food chain long after decommissioning. Many options and combinations exist, and this is still an area of active research. [redacted]

[8] WSP USA. 2022. Offshore Wind Cable Corridor Constraints. Prepared for New York State Energy Research and Development Authority. Albany, New York.

Wind turbines are composed primarily of steel, iron, copper, and aluminum, all of which are easily and fully recycled. The main exception to that has been the blades, which are composed primarily of fiberglass. As the owner of several thousand operating wind turbines, in 2017 Invenergy began researching and implementing a blade recycling process that turns unusable wind turbine blades into fiberglass pellets that can be used in other manufacturing end uses, including as aggregate in new wind turbine foundations. This process has been used on several Invenergy sites where blades have been replaced, including its New York State projects.

Although this recycling effort is limited in scope due to the small number of blades needing recycling in the US currently, recycling is expected to expand as the US turbine fleet ages.

Invenergy will continue to lead the industry in recycling turbine components, which will reduce the carbon intensity of the turbines Leading Light Wind owns and operates.

Leading Light Wind will collaborate with fisheries, marine stakeholders, and local communities to better understand specific outcomes of decommissioning activities. The process for developing a decommissioning plan will be discussed further with E-TWG and F-TWG and relevant regulators and stakeholders. The Leading Light Wind Fisheries Communication Team will facilitate ongoing communication and engagement with the fishing community consistent with the core principles of transparency, diversity, and respect prior to, during, and after the decommissioning.

14.9 Fisheries Compensation Plan

Leading Light Wind developed a method for processing claims for fishing gear that is lost or damaged as a result of project activities. This includes a Gear Loss and Damage Claim Form in the Fisheries Communication Plan submitted to BOEM. The Gear Loss and Damage Claim Form is based on a template created across joint developers with inputs from fishermen. This form may be updated subject to feedback from the fishing community and associated stakeholders.

At this early stage, Leading Light Wind is pursuing efforts to characterize the type and extent of potential impacts and will implement an iterative approach for mitigation — prioritizing reasonable measures for avoidance first — followed by minimization, and where applicable, mitigation. These impacts will be identified and addressed in Leading Light Wind's Construction and Operations Plan. Where these measures are not feasible, or development will result in demonstratable lost income to commercial fisheries, compensatory mitigation may be warranted.

We fully support and are participating in the efforts well underway to develop optimal plans for identification and facilitation of appropriate fisheries compensation.

14.10 Additional considerations

Leading Light Wind's development approach and philosophy is based on the desire for the mutual success of the fishing industry and offshore wind energy development

Leading Light Wind is committed to active stakeholder engagement to foster goodwill and collaboration.

Leading Light Wind will continuously evaluate and evolve this FMP so that all the components are adaptive and responsive to stakeholder needs and concerns. As such, we will update the FMP to reflect the results of iterative exchanges with members of the F-TWG, E-TWG, and other relevant stakeholders. We will continue working with the F-TWG to establish a process for updating the Leading Light Wind FMP, where formal updates will likely occur after major project milestones. Any updates to the FMP will occur in a timely manner that reflects changes made based on key regulatory project deliverable dates.

The Leading Light Wind approach to fisheries mitigation will also incorporate a funding component as part of the project's overall $300 million community benefits program (see Section 16.4 of the proposal), within its Community Investment Fund, in which funding opportunities would be evaluated using criteria in support of various initiatives to help fisheries. Such funding could be for projects supporting fisheries innovations, fishing gear conversions, vessel/mariner safety improvements, and shoreside facility/infrastructure improvements.

The process, as currently contemplated, would be separate from any regional fisheries mitigation fund that may be established based on BOEM guidance, and would be administered directly by Leading Light Wind. This fund would evaluate and administer grants in support of initiatives such as fisheries innovations, fishing gear conversions, vessel/mariner safety improvements, and shoreside facility/infrastructure improvements.

Leading Light Wind will notify stakeholders of any changes made to the FMP on its “For Mariners” web page at https://leadinglightwind.com/mariners. We expect that additional guidance and information will become available throughout the planning and regulatory process and will continue to consider its relevance to the FMP at the appropriate intervals.

15 Environmental mitigation plan

15 Environmental mitigation plan

15.1 Summary

Leading Light Wind believes that the natural environment and offshore wind energy development can mutually coexist and thrive. Our approach and philosophy to development is based on the concept that coexistence is achievable by carefully evaluating existing uses in the lease area and waters adjacent to the lease area and offshore cable routes (the project area), avoiding impacts where feasible, and where needed, reducing impacts through mitigation. Leading Light Wind developed this Environmental Mitigation Plan (EMP) to guide it in avoidance, minimization, restoration, and offsetting potential adverse construction and operating impacts of offshore wind energy on environmental resources within the project area. Leading Light Wind believes that to develop the most comprehensive EMP that avoids or minimizes adverse environmental impacts during the various stages of project execution should be:

- Identified and developed in early and frequent consultation and coordination with relevant stakeholders.
- Based on robust baseline characterization that has been developed in consultation with relevant stakeholders.
- Evidenced-based and founded on the latest science.
- Incorporated into spatial planning (e.g., project siting and design).
- Applied throughout the project design and implementation processes (e.g., survey strategies, construction methods, and operations and maintenance activities).

More importantly, Leading Light Wind recognizes the importance of adaptive management and will continue to evolve its procedures for evaluating and mitigating impacts to environmental resources through the full project lifecycle. Demonstrating adaptive management, Leading Light Wind will continue to evaluate and evolve this EMP to support decision-making with respect to site design, construction, operations, and decommissioning.

Leading Light Wind is actively engaging agencies and stakeholders to address their requirements, concerns, and questions and will do so throughout the project lifecycle. These engagements are and will continue to be based on the principles of:

Transparency and accountability. Coordinating, collaborating, and consulting with agencies, communities, and other stakeholders at every stage of development, starting early to identify key issues and resolve challenges.

Responsible development. Minimizing environmental and community impacts with input from agency experts and other stakeholders on resource impacts and means to avoid, minimize, and mitigate such impacts.

Of note, the Bureau of Ocean Energy Management (BOEM) is preparing a Programmatic Environmental Impact Statement (PEIS) to analyze the potential impacts of wind energy development activities in the New York Bight. BOEM through the PEIS will analyze changes in potential impacts that could result from adopting programmatic avoidance, minimization, mitigation, and monitoring measures for the New York Bight. Leading Light Wind is actively engaged in the PEIS process, including attendance at public meetings and sharing its views. Invenergy submitted comments to BOEM during the scoping period; provided recommendations for BOEM to coordinate with the lessees and agencies with jurisdiction by law or special expertise in the New York Bight; and encouraged BOEM to adopt guiding principles in developing and analyzing avoidance, minimization, mitigation, and monitoring measures. Leading Light Wind accepted BOEM's invitation to participate as a consulting party under the National Historic Preservation Act. Invenergy is also working collaboratively with the other lessees in the New York Bight through coordination with the American Clean Power Association.

15.2 Communications and collaboration

Leading Light Wind recognizes that meaningful stakeholder engagement is central to every area of NYSERDA's offshore wind program. Leading Light Wind recognizes that implementing a communication plan and objectives is important to environmental mitigation. As a committed industry partner, Leading Light Wind will build upon NYSERDA's efforts and integrate multifaceted stakeholder engagement strategies throughout every stage of the project. Openness is a core value and cornerstone of Leading Light Wind's approach to engaging with and sharing data with relevant stakeholders. Relevant stakeholders include regulatory agencies, marine users, research organizations (e.g., universities, regional consortiums, NYSERDA Technical Working Groups), leading subject matter experts, and Environmental NGOs. A comprehensive description of Leading Light Wind's stakeholder engagement strategy is described in the Stakeholder Engagement Plan (Section 16).

Leading Light Wind will collaborate with other developers in the offshore space, and particularly with adjacent leaseholders such as ASOW and Community Offshore Wind. Leading Light Wind acknowledges other developers as stakeholders and plans to work together to identify innovative avoidance, minimization, mitigation, and monitoring measures based on lessons learned in the industry both domestically and globally. Additionally, data collection and research means and methods will be coordinated as with neighboring developers to maximize benefits. Specific activities undertaken to date include participation on a regular New York Bight leaseholder forum, leaseholder meeting specific to the BOEM PEIS, and engagement with neighboring lease OCS-A 0541 on turbine layout and spacing and data collection strategies.

Leading Light Wind is committed to active participation as members on the Environmental Technical Working Group (E-TWG) as a means to collaborate on best practices and research for offshore wind energy development, balancing environmental concerns with responsible technically and commercially feasible offshore wind development. Leading Light Wind considers the participation of the Environmental NGOs on E-TWG as an additional opportunity to engage with this key stakeholder group on responsible development and insights on additional outreach that may be valuable.

Over the last 20 years, Invenergy has made community partnerships a core principle of our business and this continues to guide the role we want to play in a changing world. We maintain relationships with a variety of local and national organizations such as KidWind, Chicago Scholars Foundation, and Women in Renewable Industries and Sustainable Energy, to name a few.

Invenergy also sponsors environmental research programs that advance practices for environmentally responsible energy infrastructure development, construction, and operations, as well as sponsors conservation initiatives that improve the natural world around Invenergy projects. Through these partnerships and activities, we have amplified our impact in the communities where we live, work, and operate. Information on this important company work is detailed annually in the *Invenergy Impact Report* (https://invenergy.com/our-people/invenergy-impact). We will extend these positive impacts to our offshore wind portfolio and Leading Light Wind.

Leading Light Wind is committed to authentically involving affected communities in project development and decision-making.

Successful stakeholder engagement will support equitable access to new opportunities the project will create. Stakeholders contribute valuable local and expert knowledge to project development and will be treated with fairness and respect by the Leading Light Wind Team. This includes clearly communicating how stakeholder input will influence project decision-making and how stakeholder engagement will be continuously supported over the long-term. By engaging early and often, Leading Light Wind is building accountability and trust to deliver a project that maximizes potential benefits. **Leading Light Wind is committed to working with communities and stakeholders at every stage of development to ensure local voices are sought and heard, for the wellbeing of communities and the project's surrounding ecosystem.** The robust and comprehensive planning process is led by our team of communication directors and liaison officers. Leading Light Wind will continue to engage with the general public through web postings, social media notifications, project newsletter, open houses and public hearings to share project information and address comments and questions.

15.3 Environmental monitoring and research pre-, during-, and post-construction

Establishing baseline data

As described in the Leading Light Wind Permitting Plan (Section 10), Invenergy met with BOEM in August 2022 to discuss its comprehensive data collection strategy to characterize the lease area and potential cable routes. Key data collection principles include but are not limited to leveraging existing data and science where applicable; consulting past-project precedent; conducting purposeful data collection that is useful in evaluating potential project impacts and data gaps; and engaging with relevant stakeholders.

These principles will be applied throughout the project life cycle. Leading Light Wind conducted an in-depth desktop analysis of available and relevant environmental data to understand the baseline spatial and temporal presence of wildlife within the project area. Table 15-1 on the following pages lists the existing environmental data used to develop baseline characterization for marine resources. Leading Light Wind used these datasets to characterize resources and to develop appropriate avoidance, minimization, and mitigation measures. These databases provided key, baseline, information on the presence of sensitive habitats, as well as spatial and temporal distribution of species found within the lease area.

In addition to currently available information, Leading Light Wind has begun planning for multiple benthic, geophysical, and geotechnical surveys. These surveys will provide additional and site-specific information that will characterize fish and benthic macroinvertebrate communities in the project area. [redacted]

Assess and quantify changes

Monitoring provides an excellent platform for bolstering our shared understanding of the New York Bight and the larger Atlantic Ocean ecosystems but will require deliberate collaboration and coordination. Leading Light Wind will use data from project surveys and monitoring—combined with independent data—to evaluate potential changes in environmental resources, including both abundance and distribution. Sound statistical methodology will be coupled with historical data to investigate trends in species composition and richness. Leading Light Wind anticipates the lease area will experience a range of impacts outside of those associated with the project. For example, natural environmental variation attributable to climate cycles or species' biological variation may alter conditions such that some species migrate to a different area for one year. Impacts from climate change, construction of other nearby projects, and changes in surrounding fishing pressure may also

Study	Year
Marine Mammals and Sea Turtles	
Atlantic Marine Assessment Program for Protected Species (AMAPPS) I: Marine Mammal Model Viewer	2010-2014
Roberts et al. 2022 Mid-Atlantic Marine-Life Data Analysis Team Habitat-Based Cetacean Density Models	2016-2022
New York State Energy Research and Development Authority (NYSERDA) Master Plan: Appendix L Marine Mammals and Sea Turtles	2017
Woods Hole Oceanographic Institute Autonomous Real-Time Marine Mammal Detections – New York Bight Buoy	2018
Atlantic Marine Assessment Program for Protected Species (AMAPPS) II: Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in U.S. Waters of the Western North Atlantic Ocean	2015-2019
NYSERDA Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy Final Report 2021	2016-2019
Tetra Tech and LGL Final Comprehensive New York Bight Whale Monitoring Aerial Surveys Years 1-3 Survey	2017-2020
AMAPPS III: Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in U.S. Waters of the Western North Atlantic Ocean	2020-2024
Zoidis et al. 2022 Distribution and density of six large whale species in the New York Bight from monthly aerial surveys	2017-2022
Hayes et al. 2022 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2021	2021
Murray et al. 2022 Acoustic presence and vocal activity of North Atlantic right whales in the New York Bight	2022
Birds and Bats	
U.S. Fish and Wildlife Service Information for Planning and Consulting (IPaC) Threatened and Endangered Species and Habitat Information	n.d.
New York State Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper	n.d.
New Jersey Department of Environmental Protection Ecological Baseline Surveys	2008-2009
New York State Energy Research and Development Authority (NYSERDA) Pre-development of avian species for the proposed Long Island – New York City Offshore Wind Project Area	2010
Kinlan et al.'s Predictive Modeling of Seabird Distribution Patterns in the New York Bight	2012
Williams et al. Mid-Atlantic Wildlife Studies: Distribution and Abundance of Wildlife along the Eastern Seaboard	2012-2014
Hatch et al. 2013 Offshore observations of eastern red bats (Lasiurus borealis) in the Mid-Atlantic United States	2013
U.S. Geological Survey Atlantic Offshore Seabird Dataset Catalog	2013
U.S. Fish and Wildlife Service Bird Migratory Routes	2013
NYSDEC List of Endangered, Threatened, and Special Concern Fish and Wildlife Species of New York State	2015
AMAPPS II: Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in U.S. Waters of the Western North Atlantic Ocean	2015-2019
Sjollema et al. Offshore activity of bats along the Mid- Atlantic Coast	2016
Kinlan et al.'s Modeling At-Sea Occurrence and Abundance of Marine Birds to Support Atlantic Marine Renewable Energy Planning	2016
ESRI Audubon Important Bird Areas	2016
Stantec Long-term Bat Monitoring on Islands, Offshore Structures, and Coastal Sites in the Gulf of Maine, mid-Atlantic, and Great Lakes	2016
NYSERDA Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy Final Report 2021	2016-2019
NYSERDA New York State Offshore Wind Master Plan: Appendix D Birds and Bats Study	2017
Loring et al. 2019 Tracking offshore occurrence of common terns, roseate terns, and threatened piping plovers with VHF arrays	2019

Table 15-1. Data sources for baseline characterization.

Study	Year
AMAPPS III: Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in U.S. Waters of the Western North Atlantic Ocean	2020-2024
Solick and Newman Oceanic Records of North American Bats and Implications for Offshore Wind Energy Development in the United States	2021
Fish, Invertebrates, and their Habitats	
USFWS IPaC Threatened and Endangered Species and Habitat Information	n.d.
NOAA Essential Fish Habitat (EFH) Mapper	n.d.
Commercial and recreational fisheries data	n.d.
NOAA Estuarine Living Marine Resource Database	2000
Environmental Protection Agency (EPA) National Coastal Assessment	2015
NYSERDA Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy Final Report 2021	2016-2019
New York State Energy Research and Development Authority Master Plan: Appendix J Fish and Fisheries Study	2017
NOAA National Centers for Coastal Ocean Science and BOEM Comprehensive Seafloor Substrate Mapping and Model Validation in the New York Bight	2019
Leading Light Wind Fisheries Assessment Reports for the Lease Area and Export Cable Route	n/a

Table 15-1 (continued). Data sources for baseline characterization.

alter interannual species distribution of marine mammals, sea turtles, avian species, fish, or benthic invertebrates. Therefore, it is imperative that surveys are comparable to regional surveys conducted over long time scales for comparison.

In some cases when statistically robust methods are not practicable for addressing a data gap or question, models or proxy systems can be applied with ongoing validation with additional data collection. In the event it is infeasible to address a question with directed research or models, effects may need to be assessed in a risk framework and mitigation applied to address potential impacts with high likelihood and severity. Methodological evaluation will be applied to question-driven science to assess data and collection methods that can provide statistically robust outcomes in collaboration with scientific experts. The proposed mitigation measures and adaptive management will address project construction but cannot account for outside impacts. Therefore, Leading Light Wind will consider designing monitoring surveys in kind with regional and neighboring surveys to allow for comparison of monitoring results and determination of the influence of outside impacts as well as project-related impacts. Leading Light Wind is also open to engagement on potential offset mitigation measures to support population health of marine mammals, sea turtles, birds, bats, fish, invertebrates, and their habitats in the event mitigation strategies initially employed are considered insufficient at some later date.

Monitoring for impacts

To identify changes in species, Leading Light Wind will monitor for offshore wind impacts on marine resources by documenting species type and abundance and comparing results over time. Monitoring efforts will occur in two main categories:

Pre-construction plans will establish results that are of the same methodology and directly comparable to post-construction surveys.

Post-construction surveys will evaluate the impact of construction on species distribution, assemblages, and habitat.

As shown in Table 15-2 on the next page survey methodology for monitoring will depend upon resource group. To the extent possible, mitigation planning for later phases of work and future projects will be informed by these monitoring efforts to reduce offshore wind impacts to wildlife resources. Leading Light Wind will consider establishing partnerships with local and regional experts from institutions and stakeholder groups—driven by the stakeholders' interests and building upon the existing data discussed above—to facilitate preparation of pre- and post-construction monitoring plans.

Addressing data gaps

Leading Light Wind believes that the cornerstones of mitigation planning are research and monitoring, which address data gaps and the understanding

Animal group	Description of monitoring by phase	
	Pre-construction/construction	Post construction
Marine Mammals	• Pre-construction surveys will provide a comprehensive baseline set of data for direct comparison against the monitoring efforts during construction. • Surveys will likely include both visual and acoustic techniques.	• Visual monitoring will occur during operational vessel transits to and from the lease area.
Sea Turtles	• Pre-construction visual monitoring surveys will provide a comprehensive baseline set of data for comparison against the monitoring efforts during construction.	• Visual monitoring will occur during operational vessel transits to and from the lease area.
Birds and Bats	• Pre-construction monitoring surveys will provide a comprehensive baseline set of data for comparison against the monitoring efforts during construction. • Surveys will include various methodologies such as visual, acoustic, and radio-tag techniques.	• Visual monitoring will occur during operational vessel transits to and from the lease area. • Periodic monitoring will occur to assess perching-related risk.
Fish, Invertebrates, and their Habitat	• Benthic monitoring surveys of foundations and the export cable route will establish existing habitat conditions and provide comparison. • Site characterization benthic surveys will also serve to categorize habitats.	• Monitoring pursuant to BOEM guidelines to address specific questions, to include identifying key species of interest, and when possible, to contribute to the understanding of long-term project-specific impacts and larger scale efforts to understand cumulative impacts.

Table 15-2. Proposed monitoring of offshore wind impacts for Leading Light Wind.

of offshore wind factors that create stressors and impacts on resources.

To establish baseline conditions for the presence of large whales, other marine mammals, sea turtles, birds, bats, fish, sturgeon, and invertebrates in the project area, Leading Light Wind will consult existing databases and studies and conduct pre-construction surveys in accordance with the BOEM guidelines (BOEM 2013[1], 2019a[2], 2019b[3], 2019c[4], 2020[5]). Leading Light Wind will employ existing tools and data to understand data gaps. In doing so, Leading Light Wind will more meaningfully, efficiently, and strategically allocate research resources towards efforts that address data gaps.

Leading Light Wind will engage stakeholders to identify data gaps and will consider proposals

[1] Bureau of Ocean Energy Management (BOEM). 2013. Guidelines for Submission of Spatial Data for Atlantic Offshore Renewable Energy Development for Site Characterization Surveys. February 2023. Washington, D.C. Available at: https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/Renewable_Energy_Program/Regulatory_Information/Spatial_Data_Guidelines.pdf.

[2] Bureau of Ocean Energy Management (BOEM). 2019a. Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019. Available at: https://www.boem.gov/sites/default/files/renewable-energy-program/BOEM-Fishery-Guidelines.pdf.

[3] Bureau of Ocean Energy Management (BOEM). 2019b. Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019. Available at: https://www.boem.gov/sites/default/files/renewable-energy-program/Regulatory-Information/BOEM-Renewable-Benthic-Habitat-Guidelines.pdf.

[4] Bureau of Ocean Energy Management (BOEM). 2019c. Guidelines for Providing Information on Marine Mammals and Sea Turtles for Renewable Energy Development on the Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019. Available at: https://www.boem.gov/sites/default/files/renewable-energy-program/Regulatory-Information/BOEM-Marine-Mammals-and-Sea-Turtles-Guidelines.pdf.

[5] Bureau of Ocean Energy Management (BOEM). 2020. Guidelines for Providing Avian Survey Information for Renewable Energy Development on the Outer Continental Shelf Pursuant to 30 CFR Part 585. May 2020. Available at: https://www.boem.gov/sites/default/files/documents/newsroom/Avian%20Survey%20Guidelines.pdf.

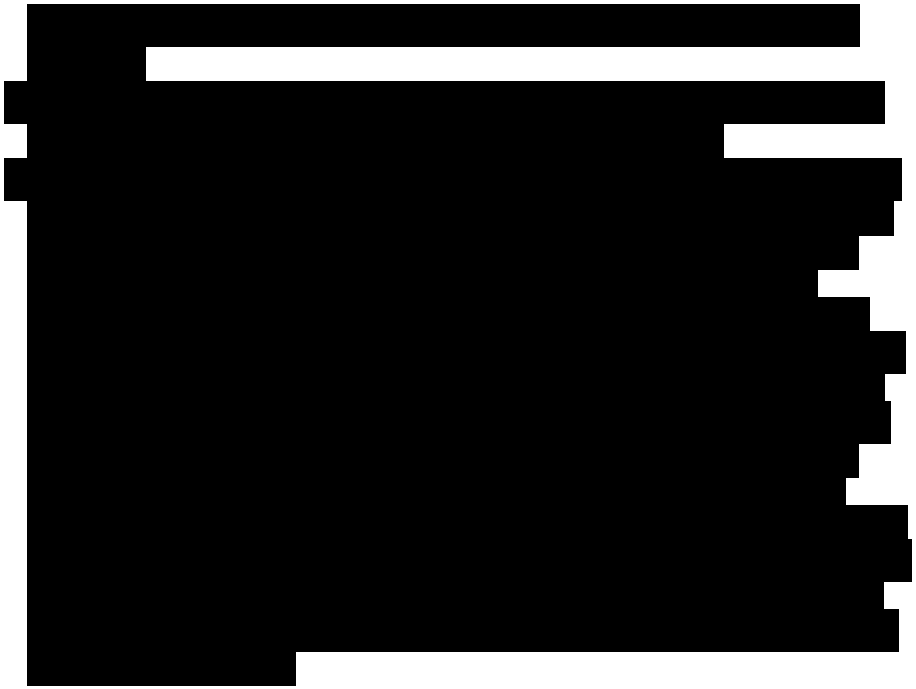
for research and monitoring on a case-by-case basis that prioritize the filling of those data gaps. Leading Light Wind will also consider priorities and criteria set by NYSERDA's working groups, RWSC, and ROSA, and work collaboratively with researchers and other developers to contribute as practicable to studies aimed at filling data gaps. Leading Light Wind will also consider priorities and criteria set by NYSERDA's working groups, RWSC, and ROSA and work collaboratively with researchers and other developers to contribute as practicable to studies aimed at filling data gaps.

Collaborative environmental efforts

As US-focused research priorities are still being organized and coordinated, it is important for Leading Light Wind to engage with regional science organizations to ensure investment in research is strategic and advances gaining knowledge in the right areas and as quickly as possible. In furtherance of regional science goals, Leading Light Wind is engaging and supporting key organizations and sponsoring and participating in scientific research for offshore wind, Leading Light Wind is a member and financial sponsor of the RWSC and ROSA and highly values the role that these organizations play in identifying research needs, and developing tools and standards for data collection, data sharing to fill those information gaps. Leading Light Wind will commit to conducting robust and relevant research on marine resources and offshore wind development.

It will do so in partnership with the scientific community, E-TWG, relevant stakeholders, other offshore wind developers, and third-parties. Collaboration with the E-TWG ensures communication with other developers, science-based environmental non-governmental organizations, and agencies; dissemination of information to stakeholders; and regular feedback and input on research opportunities to protect the state and region's environmental resources. Leading Light Wind will develop pre- and post-construction monitoring plans that are congruent with species presence and project activities to ensure compliance with BOEM guidelines and best practices. Leading Light Wind will also consider stakeholders' interests and built upon existing data in monitoring plan preparation. Monitoring and research opportunities throughout the life of the project will provide key insights into advancing knowledge of the specific impacts of offshore wind energy development. Monitoring is essential to the assessment of potential changes and impacts of offshore wind energy development. To ensure that monitoring is accurate and informative, monitoring methods and scientific designs will intend to meet the highest scientific standards and will consider guidance from third-party entities, such as the *Offshore Wind Project Monitoring Framework and Guidelines* for fisheries developed by ROSA. Leading Light Wind will establish a process for collaborators to contact and meet with representatives from Leading Light Wind to discuss and facilitate prospective research opportunities.

In addition to monitoring, Leading Light Wind will address existing research questions about impacts of offshore wind development on environmental resources by collaborating with science-based environmental organizations. For example, Leading Light Wind is engaging with ROSA to determine specific outstanding research needs in regard to wind energy development impacts on fish and fisheries. Another example of an environmental database that Leading Light Wind will consult is the Biodiversity Research Institute Wildlife Research Priorities Database, which includes research conducted on all wildlife relating to offshore wind impacts. [redacted]



Leading Light Wind will make publicly available non-proprietary information or data and supporting metadata that is developed to enhance the understanding of environmental characteristics, or use by wildlife, of any offshore, nearshore or onshore areas. For example, Leading Light Wind anticipates sharing observations and data collected by protected species observers throughout the project development. Prior to any disclosure of data, Leading Light Wind will perform QA/QC for data collected and will publish all non-proprietary data as soon after collection as is practicable. To organize this effort, Leading Light Wind will establish a data-sharing plan and design activities and monitoring efforts to collect data compatible with BOEM guidelines, databases suggested below, and other relevant agencies. Data will include pertinent metadata to maximize its utility by third parties. Leading Light Wind may publish data in databases for siting and positional data, to include OBIS-SEAMAP, Motus Database, Seabird Tracking Network, and the Atlantic Cooperative Telemetry Network. Leading Light Wind will also provide photo identification data to appropriate networks for large whales such as humpback, fin, and North Atlantic right whale. Leading Light Wind will also ensure that meta-databases—such as Tethys Knowledge Base and the pending ROSA Fish FORWRD Database—receive metadata information to include in their database as ongoing research. Shared data can be compared against existing data to identify data gaps and conduct gap analyses, and to serve as another vector for disseminating data to third parties.

Within 90 days of contract execution, Leading Light Wind will provide NYSERDA with a Data Management and Availability Plan which will follow the guidelines set forth in the *Wildlife Data Standardization and Sharing: Environmental Data Transparency for New York State Offshore Wind Energy* (Final NYSERDA Report May 2021)[6]. As required The Data Management and Availability Plan will include a list of relevant data expected to be collected with commitments to submit raw data to appropriate database(s) as soon as feasible, but not more than two years, after internal QA/QC. All data will include comprehensive metadata using Federal Geographic Data Committee standards, or others, as appropriate. Updates to the data plan will be submitted with quarterly reports.

15.4 Supporting other environmental research

Coordination with independent scientists

Leading Light Wind commits to actively engage in collaborations that will further knowledge of the impacts of offshore wind energy development on wildlife and marine resources. Potential collaborative partnerships include the scientific community, E-TWG, relevant stakeholders, other developers of offshore wind energy, and third-party groups. Leading Light Wind will seek and consider collaborations for robust and relevant research that relates to environmental and offshore wind energy development. Leading Light Wind will establish partnerships with local and regional experts from academic institutions and stakeholder groups to facilitate the preparation

[6] New York State Energy and Research Development Authority (NYSERDA). 2021. "Wildlife Data Standardization and Sharing: Environmental Data Transparency for New York State Offshore Wind Energy." NYSERDA Report 21-11. Prepared by E Jenkins and K Williams, Biodiversity Research Institute, Portland ME. NYSERDA.ny.gov/publications

of pre- and post-construction monitoring. Informing monitoring efforts will be driven by stakeholder interests and will be built upon existing regional data. These efforts can be published in peer reviewed journals or other scientifically rigorous publications.

Leading Light Wind will use the ROSA Fish FORWRD database to identify priority areas of study pertaining to marine resources and offshore wind impacts to identify any additional research needs. Additionally, Leading Light Wind will submit any related research projects to the database for inclusion in its role in addressing data gaps. As mentioned in the *Collaborative environmental efforts* section, Leading Light Wind will also consult the Biodiversity Research Institute Wildlife Research Priorities Database to identify other environmental research.

Research requests

Leading Light Wind will meet with interested parties to discuss and facilitate prospective research opportunities, including investigation of the impacts of offshore wind energy development on marine mammals, sea turtles, birds and bats, fish, invertebrates, and other potential ecological resources present in the project area. Leading Light Wind is a strong supporter of collaborative research and has set aside funds specifically for third-party research as described below. In evaluating proposals not being considered through one of the regional research collaborations such as RWSC, Leading Light Wind will establish a committee of expert technical advisors to assess and comment on proposals, as well as seek input from regional organizations such as ROSA, RWSC and TWGs to ensure proposal are not only scientifically valid but effectively address overall data and science gaps identified by these coordinating bodies. Should there be sufficient volume of independent research interest, Leading Light Wind may create and publish targeted requests for proposals in a manner similar to that used by other funding entities such as US Department of Energy, to maximize creativity in research approaches and questions, as well as offer equal opportunity for new or underrepresented groups to seek funding and participate in research.

Leading Light Wind will restrict access to commercially sensitive data (e.g., wind resource data and operational availability estimates, geological information, etc.) or some data collected as part of collaborative efforts in cases in which collaborators have restrictions to which Leading Light Wind are bound. Generally, Leading Light Wind will seek to develop collaborative efforts that do not restrict data distribution based on withholding until publication or other academic presentation and would include clear end dates for data withholding for such purposes. Some data may need to be withheld if Tribes or commercial fisheries determine data to be culturally or commercially sensitive. For example, specific locations of fishing areas or cultural practices may need to be withheld or data may need to be aggregated in some cases.

Site accessibility

Leading Light Wind will make publicly available relevant information or data and supporting metadata that is developed across its portfolio of projects to enhance the understanding of environmental characteristics—or use by wildlife of any offshore, nearshore, or onshore areas—so long as it is not considered proprietary in nature. Prior to any disclosure, data made available by Leading Light Wind will also undergo final QA/QC by Leading Light Wind. Leading Light Wind will make every reasonable effort to support access to the project area for scientific and technological research. Leading Light Wind will approve such requests considering security and safety of primary importance during certain phases of construction or operational activities requests. Leading Light Wind will ensure any requests for site access do not create health or safety risks for project vessels, facilities, and personnel, the requestor, other ocean users, or the public, or cause disruption with the overall mission of such vessels or facilities. Based on requested activities, timing, etc., Leading Light Wind will coordinate with the requestor to accommodate access to the greatest extent practicable.

Financial commitment for environmental research

Leading Light Wind, contingent upon a winning bid under this Request for Proposals ORECFRP22-1, is committed to supporting regional monitoring of wildlife and key commercial fish stocks, and third-party research, aligned with the principles outlined above by leveraging its $300 million community benefits program. As referenced in Leading Light Wind's Stakeholder Engagement Plan, the community benefits program includes budgeted funding categories that will ensure follow-through in this critical area. Leading Light Wind anticipates pursuing third-party research partnerships through its Partnerships category, and likewise looks forward to engaging with relevant communities and stakeholder groups to identify third-party research opportunities that will be funded through the Community Investment Fund.

Leading Light Wind commits $5,000 per MW of Offer Capacity [redacted] to support regional monitoring of fish and invertebrates that support economically important fisheries to better understand how offshore wind energy development is potentially altering the biomass and/or distribution of these stocks,[7] and $5,000 per MW of Offer Capacity [redacted] to provide financial and technical support to ongoing regional wildlife monitoring efforts and toward emerging research on potential alterations in behavior, populations, or distribution of sensitive wildlife as deemed necessary to better understand the effects of offshore wind development. Leading Light Wind will provide within one year of award, a Monitoring Plan detailing the commitment of the funding. The Monitoring Plan will describe the commitment of fifty percent of the funding within two years of the award, and the remaining fifty percent within three years of the award.

In developing the required Monitoring Plan, Leading Light Wind will adhere to the objectives outlined in Section 15.3 above. The financial support for monitoring may be provided by any combination of disbursement to regional organizations and direct expenditure to finance the monitoring work. Leading Light Wind will report specific spending activity, including amount, purpose and result of investment, in their quarterly progress reports to NYSERDA.

In developing priorities for research funding, Leading Light Wind will adhere to the objectives outlined in Section 15.3 above. In evaluating third-party proposals, Leading Light Wind will establish a committee of technical advisors to assess and comment on proposals, as well as seek input from regional organizations such as ROSA, RWSC and TWGs to ensure proposal are not only scientifically valid but address overall data and science gaps identified by these coordinating bodies. Funds will be directed toward areas of fundamental need as identified in Invenergy's engagement with regional technical experts (TWGs, ROSA, RWSC, etc.) and in alignment with recognized research priorities at the state and federal level, as described above. Consideration in funding will be aimed at providing resources to historically underfunded entities and programs in effort to promote equitable access to research opportunities. As themes emerge in research need, Invenergy may, as noted above, develop RFPs focused on broad objectives to promote creativity in approach, methodology, and application of emerging technologies as applicable to effectively address questions that advance understanding of sensitive resources and responses to development, and offer solutions for optimization of data collection, analyses, and dissemination.

[redacted]

15.5 Marine mammals and sea turtles

Species of interest

BOEM's Environmental Assessment (2014) reports 32 species of marine mammals in the northwest Atlantic OCS region of the mid-Atlantic Ocean protected by the Marine Mammal Protection Act, five of which are listed under the Endangered Species Act and known to be present, at least seasonally, in the Leading Light Wind lease area and potential export cable areas. These marine mammals include the blue whale, fin whale, North Atlantic right whale, sei whale, and sperm whale. A sixth species of large whale, the humpback whale, is known to occur in the Leading Light Wind lease area and is listed by the State of New York but not Federally). Four species of sea turtle are known to occur in the vicinity of the Leading Light Wind lease area, including the loggerhead sea turtle, green sea turtle, Kemp's ridley sea turtle, and leatherback sea turtle. All four are listed under the Endangered Species Act. In addition to species protected under the Act, there are species that NYSDEC has designated as High Priority of Greatest Conservation Need. These species may also warrant special consideration.

As mentioned in Sections 15.1 and 15.3, existing data provides a strong basis to characterize the species and temporal assemblages of marine mammals and sea turtles, and Leading Light Wind will be open to more targeted research if determined necessary during consultation. The marine mammal and sea turtle species of greatest concern for offshore wind development are those with the greatest population concerns, coupled with increased sensitivity to the primary offshore wind impacts of vessel strikes and underwater noise. The overall species of greatest concern for marine mammals in the Atlantic Ocean is the endangered North Atlantic right whale (*Eubalaena glacialis*),

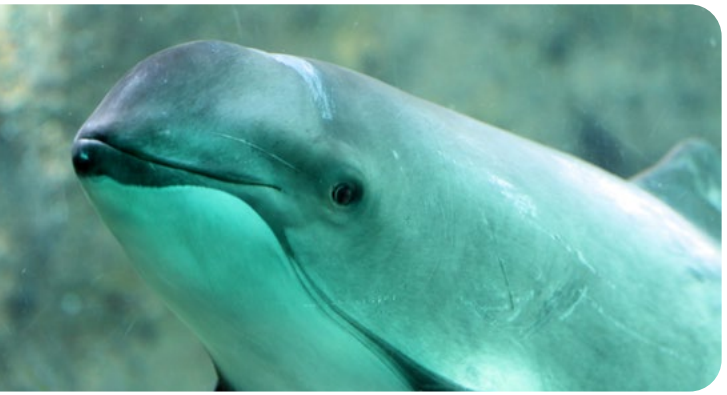


Figure 15-1. The North Atlantic right whale (top), harbor porpoise (center), and Kemp's ridley sea turtle (bottom) are some of the endangered species located around the project area.

due to its low, declining population numbers, which best estimates calculate at 368 individuals (Hayes et al. 2021)[8]. A large baleen whale, the North Atlantic right whale is particularly vulnerable to anthropogenic stressors due to its biannual coastal migration between its calving grounds in the southeastern United States and its feeding grounds from New England to the Gulf of St. Lawrence. Within the Leading Light Wind lease area, North Atlantic right whale presence is most likely in the winter and spring (Roberts et al. 2016)[9]. While human-caused mortality is greatest for entanglement in fishing gear, vessel strike mortality is on the rise (Hayes et al. 2021). For offshore wind, the greatest potential impact to North Atlantic right whales are from vessel strikes due to the prolonged exposure/risk.

Harbor porpoise (*Phocoena phocoena*) are not listed under the Endangered Species Act but are protected under the Marine Mammal Protection Act (see Figure 15-1). They are distributed from Hatteras, North Carolina, to Canada and have a best population estimate of 95,543 individuals (Hayes et al. 2021). Though harbor porpoise population numbers are much larger than those of the North Atlantic right whale, their sensitivity to noise and the degree to which their behavior is disrupted makes them a species of greater concern.

Kemp's ridley sea turtle (*Lepidochelys kempii*) is a species of greater concern for sea turtles due to its declining population numbers and small size which results in difficulty employing mitigation measures and spotting them in the ocean. Some studies state that the population is declining based on nesting counts; however, a recent study estimates the adult population at 22,341 individuals with an unknown population trend (Wibbels and Bevan 2019)[10]. Nesting habitat loss is proposed as one of the major threats to the species along with vessel strikes.

Minimizing sound impacts

Pre- and post-construction surveys will monitor species distribution using a combination of passive acoustic monitoring and visual monitoring by protected species observers to allow for comparison and observe potential offshore wind impacts, if any. For example, Leading Light Wind commits to collecting baseline data and long-term monitoring of noise in order to accurately assess and address impacts of offshore wind to species like the harbor porpoise.

Leading Light Wind will determine exclusion zones based on project design criteria and in accordance with the guidance and consultation of NMFS. [redacted]

Leading Light Wind will monitor the presence and absence of marine mammals and sea turtles during pre-construction and construction phases by using a combination of passive acoustic monitoring and

[8] Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, and J. Turek. 2021. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2020. NOAA Technical Memorandum NMFS-NE 271.

[9] Roberts JJ, Best BD, Mannocci L, Fujioka E, Halpin PN, Palka DL, Garrison LP, Mullin KD, Cole TVN, Khan CB, McLellan WM, Pabst DA, Lockhart GG (2016) Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports 6: 22615. doi: 10.1038/srep22615.

[10] Wibbels, T., and E. Bevan. 2019. Kemp's Ridley, Lepidochelys kempii. The IUCN Red List of Threatened Species in 2019: e.T11533A142050590. Available from: https://www.iucnredlist.org/species/11533/142050590.

visual monitoring by protected species observers. Night vision and infrared cameras will be considered, depending on the extent of nighttime operations.

A complete suite of avoidance and mitigation measures for construction and geophysical survey activities will be developed in concert with agency consultation and project design criteria development.

Leading Light Wind will seek to use noise attenuation technologies to reduce sound from pile driving of foundations (if such methods are used) by 10 decibels.

Ship strike minimization

Leading Light Wind's vessel strike avoidance plan will recognize the risk to marine mammals and sea turtles, especially the North Atlantic right whale and Kemp's ridley. The plan will be consistent with the following NOAA NMFS guidance, conditions within the lease area, and any Incidental Take Authorizations. Vessel collision avoidance mitigation measures will include the following:

- Vessel operations awareness and collision avoidance
- Compliance with regulatory requirements
- Maintaining appropriate separation distance and reduction in speed when necessary
- Adequate reporting and updates

Leading Light Wind acknowledges the benefit of speed restrictions and other best managements practices in reducing the risk of ship strikes to marine mammals and sea turtles.

Figure 15-2. The piping plover (left) and silver-haired bat (right) are a couple of the endangered species with potential to migrate through the project area.

Additionally, Leading Light Wind will include adaptive mitigation by establishing a situational awareness network and monitoring NMFS North Atlantic right whale reporting channels, USCG VHF Channel 16, and real-time acoustic networks such as the WHOI/WCS Distributed Mission Operations Network buoys. This approach will facilitate a proactive response for the most vulnerable species throughout the project life.

15.6 Birds and bats

Species of interest

Leading Light Wind followed BOEM's guidelines and the Mid-Atlantic Ocean Data Portal's data regarding temporal use, abundance, and species distribution by avian species or groups in the lease area. By leveraging existing data from prior studies on bird and bat assemblages, Leading Light Wind will evaluate data gaps and evaluate potential offshore wind impacts, including review of those at higher risk for collision or displacement, and species that are protected by federal and/or state laws (see Figure 15-2). Leading Light Wind is open to collaborating on studies to further identify the temporal and spatial use of threatened and endangered species in the New York Bight. BOEM's *Revised Environmental Assessment for the Commercial*

*Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New Y*ork states that, "…the most likely taxa to occur in the offshore areas [of the New York WEAs] include approximately 19 species of waterfowl, 4 species of loons and grebes, 10 species of shearwaters and petrels, 3 species of gannets and cormorants, 2 shorebirds, 3 jaegers, 6 alcids, 3 sulids, and 20 species of gulls and terns (eBird, 2014; Table 4-5)." While population-level impacts from Leading Light Wind are not expected for any bird species, agency and stakeholder concern is highest for threatened and endangered bird species (e.g., rufa red knot, piping plover, and roseate tern) that may occasionally traverse the lease area, most likely during migration. In addition to species protected under ESA, there are species that NYSDEC has designated as High Priority of Greatest Conservation Need. These species may also warrant special consideration.

Leading Light Wind identified the following bats with the greatest potential to migrate through the lease area between breeding and wintering grounds in the spring and fall:

- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Silver-haired bat (*Lasionycteris noctivagans*)

[redacted]

While it is not anticipated that population-level impacts will occur for any bird or bat species from the project, Leading Light Wind is aware, from discussions with BOEM, that it would be useful to have a better understanding of how three federally listed bird species (e.g., rufa red knot, piping plover, and roseate tern) use and traverse the New York Bight. Occurrences of these species in the lease area are expected to be extremely limited, and similarly the potential for impacts from offshore wind. Leading Light Wind is considering collaborating with agencies and wildlife stakeholders to further study the movements of these T&E species, [redacted]. For the development of studies, academic, agency, and regional collaborators, such as RWSC and E-TWG, will be engaged as practicable. RWSC's database of ongoing research and research prioritization criteria (as they are developed) will help inform the studies most needed and identify existing work for collaborative effort.

Evaluating risks

To evaluate risks to birds and bats in general, and for species of greatest concern, Leading Light Wind will develop a monitoring program (pursuant to BOEM guidelines) to address specific questions, to include identifying key species of interest, and when possible, to contribute to understanding long-term project-specific impacts and larger scale efforts to understand cumulative impacts from offshore wind. Pre-construction surveys will monitor species distribution using acoustic and visual, and radio-tag methods to compare and observe potential offshore wind impacts, if any. Visual monitoring will occur during operational vessel transits to and from the lease area. Periodic monitoring will also be conducted to determine the need for perching-related deterrents for birds.

Minimizing risk

To avoid offshore wind impacts to birds and bats, Leading Light Wind will avoid key habitats and tree clearing within the site and export cable routes where appropriate and required during sensitive times of year (e.g., breeding season) to minimize risk to tree nesting birds and bat maternity colonies. Leading Light Wind will adhere to time-of-year restrictions as necessary to avoid onshore bird habitats at their most sensitive, where feasible and required, unless otherwise determined acceptable by the applicable agencies. To the extent practicable, Leading Light Wind will use lighting technology that minimizes offshore wind impacts on avian and bat species. [redacted]

[redacted]

Physical deterrents to perching (e.g., such as spikes and netting or other best available technology) will be implemented if there is demonstrated risk at the site (e.g., perching and roosting on infrastructure is a common occurrence) and to the extent that the physical deterrents do not represent a human safety hazard. The *NYSERDA Offshore Wind Master Plan, Birds and Bats Study* (NYSERDA 2017) includes guidelines to identify and avoid or reduce potential offshore wind impacts on birds and bats. Leading Light Wind will also consider these guidelines for additional measures that minimize offshore wind impacts on birds and bats.

Research and mitigation technology

[redacted]

Ongoing collaboration with other leaseholders will increase potential for identification of other technological approaches to assess bird and bat impacts from offshore wind. Leading Light Wind is also open to engagement on potential offset mitigation measures to support population health of birds and bats in the event mitigation strategies initially employed are considered insufficient at some later date. Further, as mentioned in Section 15.1, Leading Light Wind will adhere to the avoidance, minimization, and mitigation measures resulting from the pending PEIS of the New York Bight.

15.7 Fish, invertebrates, and their habitats

Establishing baseline data

Leading Light Wind conducted an in-depth desktop analysis of available and relevant environmental data to understand the spatial and temporal presence of fish, invertebrates, and their habitat within the project area. The analysis provided information on the presence of Atlantic sturgeon, (*Acipenser oxyrinchus oxyrinchus*) as well as spatial and temporal distribution of other species found within the lease area. [redacted]

As mentioned previously, Leading Light Wind anticipates conducting trawl surveys pre-construction, per BOEM guidelines (BOEM 2019). Several benthic surveys will be conducted to characterize benthic conditions and habitats within the lease area and export cable corridor.

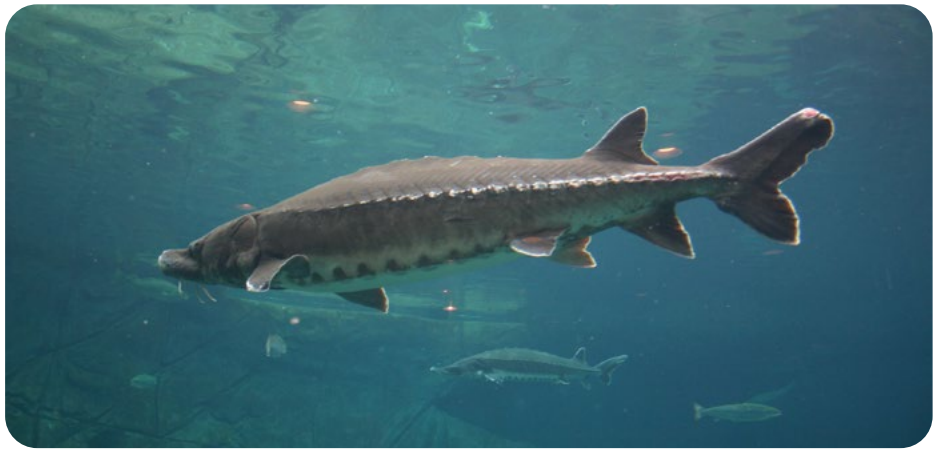


Figure 15-3. Leading Light Wind will minimize impacts to the environment, including the endangered Atlantic sturgeon, found in the project area.

Species of interest

The overall species of greatest concern for fish in the Leading Light Wind project area is the long-lived Atlantic sturgeon (see Figure 15-3). They migrate large distances, increasing chances of exposure from a variety of impacts. Offshore wind development impacts to Atlantic sturgeon include noise, ship strikes, and electromagnetic fields (EMF). Atlantic sturgeon are vulnerable to ship strikes; it is a suspected reason for poor recovery since their listing under the Endangered Species Act in 2012. Leading Light Wind will include consideration in its vessel plans for minimizing vessel traffic impacts on Atlantic sturgeon where practicable and Endangered Species Act consultation

outcomes will minimize these impacts. The Atlantic salmon, giant manta ray, and shortnose sturgeon are also listed as endangered under the Endangered Species Act and the oceanic whitetip shark and scalloped hammerhead shark are listed as threatened. In addition to species protected under the Act, NYSDEC has designated some species as High Priority of Greatest Conservation Need. These species may also warrant special consideration. Submerged aquatic vegetation provides vital habitat to fisheries species and is highly sensitive to disturbance. Leading Light Wind will avoid impacts to submerged aquatic vegetation. Recent studies indicate that demersal species such as crabs, lobsters, and bottom-dwelling fish (black sea bass) may be at greater risk compared to pelagic species because of increased likelihood of EMF exposure. Leading Light Wind will evaluate the risk to these species with EMF modeling and assessment. Planktonic species such as larval fish and copepods are of greater concern than more mobile species due to changes in stratification and hydrodynamics surrounding turbine foundations. Leading Light Wind will monitor plankton distribution and abundance throughout the lease area. Leading Light Wind will analyze risk to species by considering the likelihood of offshore wind impact and the severity of impact to each species.

Evaluating risks and impacts

Leading Light Wind will develop a pre-construction monitoring program to address specific questions, which will include identifying key species of interest, and when possible, contribute to the understanding of long-term project-specific impacts and larger scale efforts to understand cumulative impacts. Methodologies included in the monitoring program will include, but are not limited to, trawl surveys, ventless trap surveys, and acoustic telemetry surveys. Additionally, Leading Light Wind shall conduct EMF modeling and assessments to identify potential mitigation requirements.

Minimizing risks

Leading Light Wind intends to pursue multiple measures to minimize risk including project design, construction techniques, and operating practices. For example, Leading Light Wind intends to develop an anchoring plan to ensure that anchoring is avoided or minimized in complex habitats during construction and maintenance. Anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable. Where feasible and considered safe, we will use mid-line buoys on anchor lines to minimize impacts from anchor line sweep. During construction, operations, and maintenance, Leading Light Wind will utilize sensitive lighting schemes to minimize exposure of light, as practicable. Most construction vessels will maintain position using dynamic positioning, limiting the use of anchors and jack-up features, where feasible. Additionally, Leading Light Wind will consider the use of appropriate measures and timing during cable installation activities to minimize sediment resuspension and dispersal in areas of known historically contaminated sediments. As mentioned in Section 15.1, Leading Light Wind will adhere to the avoidance, minimization, and mitigation measures resulting from BOEMs programmatic EIS of the New York Bight.

Other measures to reduce risk

Ecosystem or habitat enhancements include structures that promote the artificial reef effect, which is inherent in offshore wind development. Leading Light Wind will consider further research to compliment ecosystem or habitat enhancements within the project area, [redacted]. Leading Light Wind is also open to engagement on potential offset mitigation measures to support population health of fish, invertebrates, and their habitat in the event mitigation strategies initially employed are considered insufficient at some later date.

15.8 Considerations for subsea and overland cables

Subsea and overland cables from offshore wind farms can have a variety of direct or indirect environmental impacts. Indirect, short- term impacts to environmental resources resulting from the construction and installation of cables include displacement of target species from noise, benthic disturbance, potential disruption of sensitive life cycles, and increased turbidity. Direct, short-term impacts include exclusion from an area due to construction or maintenance vessels. Indirect, long-term impacts of subsea cable installation can include EMF and habitat modification if burial depth cannot be achieved, and cables must be armored. Leading Light Wind has reviewed NYSERDA's *Draft Offshore Wind Cable Constraints Assessment* and is incorporating

concepts into the Environmental Mitigation Plan to avoid, minimize, and mitigate impacts from offshore wind cables. Mitigation measures for construction and operation of subsea and overland cables will be used to minimize any adverse impacts on marine mammals and sea turtles, birds and bats, or fish, invertebrates, and their habitats within the lease area and along any transmission line routes within state and federal waters and onshore. In addition to those mitigation measures listed below, the Cable Burial Risk Assessment will identify site specific approaches for cable burial, routing, and armoring.

Mitigation measures for pre-construction include determining specific locations for subsea and overland cables that will minimize adverse ecological impacts from cable installation. Reducing the overall footprint of subsea and overland cables can decrease interactions between infrastructure and marine resources. The footprint of linear infrastructure will be reduced as much as possible to minimize habitat and resource fragmentation. Leading Light Wind will include minimal in-water transmission cable length to the extent practicable to minimize environmental and usage impacts. Cables will be bundled as much as possible to minimize the number of corridors and cables. Leading Light Wind will locate and avoid sensitive resources to the extent that is reasonably possible, including, but not limited to, hard bottom habitat, cold water corals, submerged aquatic vegetation, emergent aquatic vegetation/ marshlands, coastal erosion hazard areas, EMF-sensitive species aggregation areas and migration routes, clam beds, historical areas, threatened and endangered species habitat, and areas of potentially significant archaeological resources. Micro-siting of the submarine export cable route will be used to further reduce potential impacts on sensitive habitats and minimize areas in which burial is more challenging and potentially more disruptive to the environment.

[redacted] Burial of cables will be conducted in accordance with recommendations and requirements from USACE and USGC. When appropriate, cable will include sheathing that reduces EMFs, heat, and vibration associated with cables. During operation, Leading Light Wind will monitor subsea and overland cables at regular intervals. Following installation of the submarine export and inter-array cables and terrestrial export cables, Leading Light Wind will conduct routine surveys or inspections of subsea cables to ensure and correct for exposure following hurricanes and other major events causing seabed disturbance. Leading Light Wind will conduct routine surveys or inspections of sub-sea cables and will conduct a survey or inspection to ensure and correct for cable exposure following hurricane or other major storm events causing disturbance to the seabed.

15.9 Additional considerations

Leading Light Wind's overall approach and philosophy to development is based on the belief that the natural environment and offshore wind energy development can mutually coexist and thrive. **Leading Light Wind will continuously evaluate and evolve this EMP so that the components of the EMP are adaptive and responsive to stakeholder needs and concerns.** As such, Leading Light Wind will update the EMP to reflect the results of iterative exchanges with members of the E-TWG, other developers, and other relevant stakeholders. Leading Light Wind will engage with the E-TWG and use feedback in these discussions to evolve the EMP. Leading Light Wind will continue working with the E-TWG to establish a process for updating the EMP. Formal updates to this document will likely occur after major project milestones. Any updates to the EMP will occur in a timely manner that reflects changes made based on key regulatory project deliverable dates. Leading Light Wind will notify stakeholders of any changes made to the EMP on its web page at https://leadinglightwind.com. Leading Light Wind expects that additional guidance and information will become available throughout the planning and regulatory process and as such will continue to consider its relevance to the EMP at the appropriate intervals.

15.10 Project decommissioning

Leading Light Wind does not expect impacts from decommissioning to exceed impacts resulting from the maximum design scenarios associated with construction. Considering that the impacts of decommissioning are unique to each site, it cannot be reasonably predicted in the pre-construction time frame how and to what extent the benthic environment and wildlife will be impacted. Leading Light Wind will adhere to BOEM's current decommissioning guidance, which includes submitting a decommissioning application, and receiving BOEM approval as early as two years before expiration of the lease or as late as 90 days after expiration. BOEM defines decommissioning as "the removal of all facilities, installations, and other devices permanently or temporarily attached to the seabed on the OCS to a depth of 15 feet below the mudline within two years following the termination of a lease or grant" (30 CFR Section 585.433, Section 585.910).

Leading Light Wind's decommissioning plan will build on experience with onshore wind, coordination with fisheries stakeholders, and compliance with regulatory requirements, with the purpose of returning the site to its environmental and visual character to prior to construction. The decommissioning plan will consider potential offshore wind impacts on protected and sensitive species and habitats including deciding what to leave in place and remove. Leading Light Wind's waste management during decommissioning will focus on re-use or recycling, with disposal as the last option. Wind turbines are composed primarily of steel, iron, copper, and aluminum, all of which are easily and fully recycled. The main exception to that has been the blades, which are composed primarily of fiberglass. As the owner of several thousand operating wind turbines, in 2017 Invenergy began researching and implementing a blade recycling process that turns unusable wind turbine blades into fiberglass pellets which can be used in other manufacturing end-uses, including as aggregate in new wind turbine foundations. This process has been used on several Invenergy sites where blades have been replaced, including its New York State projects. Although this recycling effort is limited in scope due to the small number of blades needing recycling in the US currently, recycling is expected to expand as the US turbine fleet ages.

Invenergy will continue to lead the industry in recycling turbine components, which will reduce the carbon intensity of the turbines Invenergy owns and operates.

Leading Light Wind will collaborate with fisheries and other environmental stakeholders, and local communities to better understand specific outcomes of decommissioning activities. The process for development of a decommissioning plan will be discussed further with the E-TWG and F-TWG and relevant regulators and stakeholders. The Leading Light Wind Communication Team will facilitate ongoing communication and engagement with the environmental community consistent with the core principles of transparency, diversity, and respect prior to, during, and after the decommissioning.

16 Stakeholder engagement plan

16 Stakeholder engagement plan

16.1 Overview

Overall philosophy and principles

Leading Light Wind is an American-led offshore wind project that will bring locally sourced renewable energy to New York. The project sponsors are building on their track record of impactful community engagement and innovation in sustainable American infrastructure to advance public health, create good-paying jobs, and support the local supply chain.

Leading Light Wind recognizes that meaningful stakeholder engagement is central to every area of NYSERDA's offshore wind program. As a committed industry partner, Leading Light Wind is building upon NYSERDA's efforts to integrate multifaceted stakeholder engagement strategies throughout every stage of the project. In doing so, we are building support for a just energy transition to help meet the goals of the Climate Leadership and Community Protection Act (the Climate Act).

Leading Light Wind is committed to involving affected and frontline communities in project development and decision-making. We embrace the full scope of potentially affected stakeholders and seek broad representation while elevating the voices of those historically left out of development decisions. Successful stakeholder engagement supports equitable access to the new opportunities the project is creating. **By directing opportunities and investments to the communities that have experienced the greatest environmental and health impacts from traditional energy development, Leading Light Wind is a champion for a just transition.**

The development of this Stakeholder Engagement Plan is premised on the belief that those individuals and organizations potentially affected by the project have a right to be involved in project development and shape project decision-making—and that Leading Light wind will be a stronger project for it. Leading Light Wind is seeking guidance and input from stakeholders to design future and continued engagements, with the goal of co-designing engagement activities that are accessible and provide meaningful opportunities to shape the project.

Stakeholders contribute valuable local and expert knowledge to project development and are treated with fairness and respect by the Leading Light Wind team. This includes clearly communicating how stakeholder input influences project decision-making and how stakeholder engagement is continuously supported over the long term. By engaging early and often, we are building accountability and trust to deliver a project that maximizes potential benefits. In summary, Leading Light Wind follows principles to understand, incorporate, and respond to the diverse perspectives, needs, and concerns of stakeholders at every stage of project development: humility, creativity, and connectivity (Figure 16-1).

When successfully executed, stakeholder engagement identifies nuanced challenges and opportunities to improve project outcomes for stakeholders and Leading Light Wind.

Overall approach to incorporating data and stakeholder feedback

Implementation of the Leading Light Wind project is a decades-long undertaking. As described in Section 12, the full life cycle of the Leading Light Wind project includes preconstruction, surveying, site design, construction, operations, and decommissioning. Project development, permitting, and construction total duration is anticipated to be eight years, and the project is expected to be operational in 2030 (see Section 12).

Accordingly, the Stakeholder Engagement Plan is a living and responsive document that will be expanded and enhanced over the full life cycle of the project. Leading Light Wind will regularly update the Stakeholder Engagement Plan to reflect the most recent, relevant project and industry research, data, and stakeholder feedback. This information will then be used to support project decision-making.

Humility

Leading Light Wind recognizes that the adoption of the Climate Act would not have been possible without the leadership of many advocates and communities on the frontline of climate change. Special consideration is given to the histories, experiences, and needs of disadvantaged, environmental justice, and other communities on the frontlines of climate change. We understand the importance of listening to and working with these communities to achieve a just transition in New York State and ensure all communities are included in the benefits of offshore wind development.

Creativity

The development of any offshore wind project is a complex challenge—and we cannot do it alone. Leading Light Wind is working to identify shared interests across different stakeholders, create opportunities for mutual learning and understanding, and collaboratively develop actionable goals. Our team is thinking outside the box and, together with stakeholders, identifying multiple pathways to achieve desired outcomes. We are flexible and willing to adapt our approach as needed over the full life cycle of the project.

Connectivity

Light Wind believes in employing the communities where we live and work. We are in and of the community and we believe that clear communication with stakeholders, early and often, will influence project decision-making for the better. During project development, we acknowledge that uncertainties are inevitable and commit to being open about project needs and interests. We track engagement and outreach to report progress toward commitments and relationship building. We provide project materials and resources for stakeholders and the public to the extent possible.

Figure 16-1: Leading Light Wind follows these principles to understand and respond to stakeholders at every stage of project development.

Leading Light Wind has developed a multipronged approach to stakeholder identification (see Section 16.2). This approach includes a comprehensive mapping exercise to characterize the communities that may potentially be affected by the project.

Our spatial analysis primarily relies upon the 2020 Decennial Census, which provides population data at the census tract level for a wide range of indicators. It considers the **social vulnerability index** developed by the Centers for Disease Control and Prevention and, for communities located within New York City, the Displacement Risk Map developed by the New York City Department of Housing Preservation and Development and the New York City Department of City Planning as part of the **Equitable Development Data Explorer**. This analysis will be repeated at regular intervals to reflect changes to the project and ensure the Stakeholder Engagement Plan reflects the most recent, relevant research and data.

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health, including natural or human-caused disasters or disease outbreaks. The index uses 15 variables from the census, such as poverty, lack of vehicle access, and crowded housing, to help local officials identify communities that may need support before, during, or after disasters.

The **Equitable Development Data Explorer** is a new interactive resource that equips New Yorkers with data to navigate challenging conversations about housing affordability, displacement, and racial equity in New York City. The Displacement Risk Map combines population, housing, and real estate market data to illustrate the level of risk residents may face of being displaced from their home or neighborhood.

The comprehensive mapping exercise identified those areas that may potentially be affected by the project and have been identified as disadvantaged communities (DACs) by the Climate Justice Working Group (CJWG).[1] For each DAC that may be potentially affected by the project, we considered the different indicators used by the CJWG and the relevant criteria of concern, including environmental burdens, climate-related risks, population characteristics, and health vulnerabilities. The criteria for identifying DACs are currently in draft form. Once the criteria are finalized by the CJWG, we will update the Stakeholder Engagement Plan accordingly. Additional discussion on proximate DACs is provided in Section 18.

As stakeholder engagement is a continuous process, updates to the plan will reflect stakeholder feedback that is provided throughout the full life cycle of the project. We are engaging stakeholders to understand important issues, identify shared interests, and collaboratively develop goals. Issues include local economic development and community investment, community health, climate resiliency, environmental costs and benefits, education, training, and hiring opportunities, environmental justice, and energy burden. These goals continue to develop and improve as the project matures.

Leading Light Wind has allocated resources dedicated to support long-term stakeholder engagement, community outreach, and project initiatives throughout the life of the project (see Table 16-1 on the next page). As project activities grow and mature, additional team resources will be added to support engagement. Changes to the project's team resources will be updated as needed to reflect current operating conditions and keep all stakeholders continually informed.

Existing guidance and best practices that will be followed

Development of the Stakeholder Engagement Plan was informed by NYSERDA's "Guiding Principles for Offshore Wind Stakeholder Engagement" as well as the most recent relevant guidance from the New York State Climate Action Council and CJWG, including the Climate Action Council's "Scoping Plan" (December 2022), the CJWG's "Draft Disadvantaged Communities Criteria and List Technical Documentation" (March 2022), and the "New York State Disadvantaged Communities Barriers and Opportunities Report" (December 2021) prepared by NYSERDA, the New York Power Authority, and the New York State Department of Environmental Conservation.

Leading Light Wind also draws guidance from Environmental Justice New York City (EJNYC). In 2017, New York City passed Local Laws 60 and 64 to assess environmental equity issues and develop a plan to incorporate

[1] The CJWG, comprising representatives from state agencies and environmental justice groups across New York State, was formed to identify DACs that are often overlooked in climate policy initiatives and ensure they directly benefit from the State's historic transition to clean energy. The CJWG used 45 indicators to identify 35% of the census tracts in New York State as DACs.

Table 16-1. Leading Light Wind external affairs team members.

Name	Roles/responsibilities	Contact information
Wes Jacobs	Project Director	wjacobs@invenergy.com
Michael Porto	External Engagement Director	mporto@invenergy.com
Amy Varghese	VP of External Affairs	amy.varghese@energyre.com
Brian Kerkhoven	Labor Liaison Officer	bkerkhoven@invenergy.com
Shannon Stewart	Agency Liaison Officer	sstewart@invenergy.com
Sarah Hudak	Fisheries Liaison Officer	shudak@searisksolutions.com
Hope Luhman	Tribal Liaison Officer	hope.luhman@wsp.com

environmental justice into the fabric of City decision-making. Known as EJNYC, this work centers on three main products: a report that will provide a comprehensive study of environmental justice in New York City; a public, web-based portal and mapping tool; and a plan that will identify initiatives for promoting environmental justice and recommendations for better embedding equity and environmental justice into City decision-making. The EJNYC Report is expected to be released in early 2023.

In addition, Leading Light Wind draws guidance from foundational texts of the environmental justice movement, such as the Jemez Principles for Democratic Organizing. Created at a meeting hosted by the Southwest Network for Environmental and Economic Justice in December of 1996, these six principles are used today as a foundation for diverse coalitions to make justice-based decisions together. They include the following:

Jemez Principles for Democratic Organizing

- Be inclusive
- Emphasis on bottom-up organizing
- Let people speak for themselves
- Work together in solidarity and mutuality
- Build just relationships among ourselves
- Commitment to self-transformation

Leading Light Wind draws guidance from more recent publications, such as the Ocean Justice Forum's Equitable and Just Ocean Policy Platform. Ocean Justice exists at the intersection of social inclusion, ocean stewardship, and racial justice. The Ocean Justice Forum recently convened leaders from 18 environmental justice, community, indigenous, and national nonprofit organizations, who used four overarching principles to guide the development of the platform and future work to achieve ocean justice. Their principles include the following:

Ocean Justice Forum's Equitable and Just Ocean Policy Platform

- Inclusive and equitable policy solutions
- Resourcing communities for conservation and climate adaption
- Equitable representation and authority in decision-making
- Accountability and a just transition

Other industry publications have informed the development of the Stakeholder Engagement Plan. They include the International Association for Public Participation's Public Participation Pillars and academic research, including a December 2017 article from *Energy Research & Social Science* titled, "Will communities 'open up' to offshore wind? Lessons learned from New England islands in the United States."

16.2 Stakeholder identification and stakeholder list

Overview and stakeholder identification objectives

Leading Light Wind in the community

Leading Light Wind will interact with many New York communities and ocean users over the life of the project. We have begun the process of identifying a working list of diverse stakeholders associated with the project. Our goal is to

develop a stakeholder outreach process that is inclusive and considers the full scope of potentially affected parties while directing engagement efforts toward lifting up and including those historically left out of development decisions, namely disadvantaged and environmental justice communities, Minority- and Women-Owned Business Enterprises (MWBEs), and Service-Disabled Veteran-Owned Businesses (SDVOBs).

Onshore components of the project have the potential to affect communities that are hosting or proximate to project infrastructure. Due to distance from shore, offshore components of the project are not expected to be visible to onshore communities, though they may potentially temporarily affect stakeholders that are active within the project area and organizations concerned with the project's potential effect on marine ecosystems. The Fisheries Mitigation Plan (Section 14) and the Environmental Mitigation Plan (Section 15) describe how Leading Light Wind is working collaboratively with environmental organizations, commercial and recreational fishermen, navigational safety committees, and the maritime industry to develop a cost-effective and environmentally responsible project.

[redacted]

Brooklyn [redacted]

[redacted]

[redacted]

Capital Region

[redacted]

Western New York

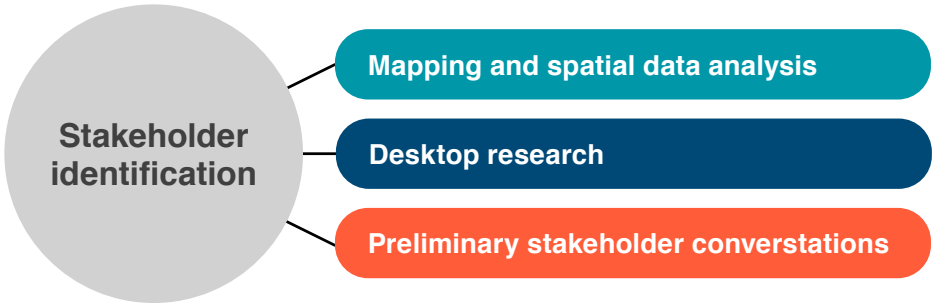
[redacted]

[redacted]

In addition to the DACs that are hosting or proximate to project infrastructure, additional DACs are engaged through Leading Light Wind's partnerships with community organizations, institutions, local businesses, and nonprofit organizations to provide hiring, training, and educational opportunities, as described in Section 16.4.

Stakeholder identification

Leading Light Wind has developed a multipronged approach to identify stakeholders who may potentially be affected by the project. This includes mapping and spatial data analysis, desktop research, and engagements with key stakeholders.



- **Mapping and spatial data analysis.** We conducted a comprehensive mapping exercise to characterize the communities that may be directly affected by the project. As described, this analysis primarily relies upon the 2020 Decennial Census, which provides population data at the census tract level for a wide range of indicators. It considers the social vulnerability index developed by the Centers for Disease Control and Prevention and, for communities located within New York City, the Displacement Risk Map developed by the New York City Department of Housing Preservation and Development and the New York City Department of City Planning as part of the Equitable Development Data Explorer. This analysis will be updated as the project further evolves the stakeholder list and Stakeholder Engagement Plan.
- **Desktop research.** Leading Light Wind conducted desktop research with the goal of identifying grassroots and community-based organizations that may be affected by the project, such as tenant associations and civic associations; groups associated with community facilities such as schools, libraries, and parks; faith-based groups; local businesses that serve as community hubs; and cultural organizations.
- **Preliminary stakeholder conversations.** Leading Light Wind is actively engaging in conversations with key stakeholders within those communities that may be affected by the project and others interested in the offshore wind industry. Our purpose is to better understand the local culture, history, and context and identify additional stakeholders, beyond those identified through desktop research.

Leading Light Wind anticipates the stakeholders within the communities that may potentially be affected by the project will include residents, local businesses, elected officials, environmental advocacy and environmental justice organizations, nonprofit organizations, institutions, indigenous nations, federal and state agencies, and organized labor (Figure 16-3). To date, the project has had more than 40 introductory briefings with various stakeholders (this does not include agency meetings).

- **Residents.** Leading Light Wind is engaging residents who live in communities that may potentially be affected by the project in order to share project information and solicit their input on project development. In addition, Leading Light Wind is engaging with civic organizations and other neighborhood-based groups, such as homeowners' associations, tenant associations, community gardens, and friends groups for local libraries and parks. Leading Light Wind will tailor stakeholder outreach efforts to each potentially affected community by providing translation and interpretation services, using diverse outreach channels, identifying accessible meeting spaces and time-of-day, and partnering with local community organizations and elected officials to help amplify our message and build trust. Through the stakeholder engagement process, the project team will deepen our understanding of local issues and community concerns.
- **Local businesses.** Leading Light Wind is engaging businesses at the individual and organizational level, and tailoring stakeholder outreach efforts to each potentially affected community. [redacted]

Figure 16-3. Stakeholders potentially affected by the project.

[redacted] Leading Light Wind has partnered with a number of local entities to support the development of a local supply chain (see Section 19) and is engaging and establishing partnerships to ensure local businesses have equitable access to offshore wind opportunities.

- **Elected officials.** Leading Light Wind is engaging local elected officials who represent the communities that will host project infrastructure and have an interest in the offshore wind industry. Stakeholders include New York City Council Members, Borough Presidents, and the Mayor's Office; New York State Assemblymembers and Senators; and United States Representatives and Senators. Key elected official engagement has included very productive discussions with City and State leaders [redacted]. We will continue to work with them on building support for the project, informing them of project activities, and identifying strategic partnerships to engage their constituents.
- **Environmental advocacy and environmental justice organizations.** Within New York State, environmental organizations advocated for passage of the Climate Act and are important partners in the clean energy transition. Leading Light Wind is engaging grassroots and regional environmental justice organizations that are active in the region and within the communities that will host project infrastructure. Organizations that advocate for environmental protections and marine conservation are critical to our ethos of environmental stewardship. Leading Light Wind is engaging with various local organizations such as [redacted], and has joined regional organizations including the Responsible Offshore Science Alliance and the Regional Wildlife Science Collaborative for Offshore Wind. Leading Light Wind will continue to engage environmental stakeholders throughout project development.
- **Nonprofit organizations.** Leading Light Wind is engaging a wide range of nonprofit organizations that are active within the communities that will host project infrastructure or are otherwise relevant to project development. We are focusing engagements with nonprofit organizations that provide programming for economic and workforce development and environmental education and stewardship. [redacted]
- **Institutions.** Leading Light Wind is engaging institutions with a focus on education, innovation, research, and workforce training institutions. Leading Light Wind is exploring opportunities with marine and fisheries research initiatives with leading institutions such as Rutgers University, while exploring opportunities to support smaller colleges and universities that have deep ties to local communities and may have greater funding

needs. [redacted] Through the Leading Light Wind Offshore Wind Scholars Program, Leading Light Wind will engage with New York City public schools across potentially affected communities and support student interest in learning about the clean energy transition and the offshore wind industry.

- **Indigenous nations.** Leading Light Wind is engaging indigenous nations such that the project can reflect their needs and interests. We recognize the unique histories of racism and discrimination experienced by Indigenous peoples and respect their centuries-old relationship with the land and water. Leading Light Wind has designated a Tribal Liaison Officer for the project who is directing engagement and coordination with all identified and federally recognized Native American tribes. While the project is in early development, initial outreach has been to provide indigenous nation representatives with the opportunity to learn about project plans and goals for continued engagement. Early outreach efforts were conducted in spring and summer of 2022. In anticipation of the issuance of final guidance for the Native American Tribal Communication Plan from Bureau of Ocean Energy Management, the project continues to gather information and keep the needed tribal points of contact up to date.
- **Federal and state agencies.** Leading Light Wind is communicating and collaborating with federal and state agencies (see Table 16-2 on the next page). An Agency Communications Plan, which identifies applicable federal agencies and outlines strategies and procedures for engagement over the life of the project, has been submitted to the Bureau of Ocean Energy Management. The agency communications plan is available online at the project website www.LeadingLightWind.com and is updated regularly. Leading Light Wind is active with early outreach and engagement to agency stakeholders. Through these successful meetings, agencies have offered additional data and resources to inform project routing. Their feedback has been incorporated into the analysis. Moving forward, Leading Light Wind will continue a frequent cadence of outreach to all agency partners. It is expected that two to four agency meetings per month for the next 6 to 12 months would occur in order to progress transmission routing, offshore surveys, state and federal permitting, and other aspects of project development further along.
- **Organized labor.** Leading Light Wind is engaging closely with organized labor and recognizes the historical significance of the labor movement in New York City and throughout the state. We will build upon this heritage and create new pathways into the middle class by engaging with labor throughout the Leading Light Wind project.

  Our initial outreach has focused on the development of a construction MOU that encompasses both our onshore work in New York City and throughout the Leading Light Wind project as well as our offshore construction work related to turbine installation and construction. [redacted] Our efforts build the trust and working relationships necessary to create prosperous partnerships for decades to come.

Assigning team members in your organization as the primary relationship holder

Leading Light Wind is committed to working with communities and stakeholders at every stage of development to ensure local voices are sought and heard, for the well-being of communities and the project's surrounding ecosystem. The robust and comprehensive planning process is led by our external affairs team and liaison officers. Primary points of contact are shown in Table 16-1 and include:

Project Director serves as primary point of contact regarding development activities and is focused on advancing the safe, equitable, and efficient development of the Leading Light Wind project.

External Engagement Director serves as the primary point of contact regarding all stakeholder engagement and community outreach activities.

Leading Light Wind is served by **multiple liaison officers** focused on key areas of engagement (labor, environmental, fisheries, tribal) who will oversee

outreach activities on behalf of the project. Liaison officers are fully integrated with the larger project team, report to the Project Director, and engage directly with their respective stakeholders. Responsibilities of the liaison officers include, but are not limited to the following:

- Convey project milestones and updates, information requests, and anticipated opportunities and challenges.
- Coordinate meetings and correspondence.
- Facilitate opportunities for Leading Light Wind and stakeholders to work toward collaborative solutions.

Table 16-1 provides contact information for the key communication team members for Leading Light Wind.

The description of current resources to support engagement activities is provided to stakeholders during regular meetings and conversations, via presentations and handouts, and is provided on the project website for the public and general inquiries. As team members are added to support these efforts (e.g., addition of community liaison officers), contact information and roles/responsibilities will be updated and posted to reflect organic changes in responsibilities throughout the project life cycle.

16.3 Stakeholder engagement goals

Defining goals and desired outcomes

Leading Light Wind is engaging stakeholders to understand the issues that are important to them, identify shared interests, and collaboratively develop goals. To aid in this effort, we have developed a set of preliminary goals across a diverse range of issues. We will refine and further advance these goals over time as the project matures and stakeholder engagement informs their development.

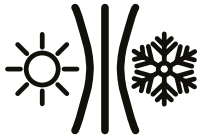
Goals are shared during individual stakeholder meetings to prompt critical feedback that is needed to evolve measurable metrics for tracking goal progress. Key inputs into goal development will include contributions from local elected officials, DACs and environmental justice community outreach in alignment with maturing partnerships, feedback from Indigenous Nations, involvement from labor organizations and fisheries stakeholders, and evolving conversations with other community leaders. Our goals are as follows:

Local economic development and community investment. Maximize opportunities created by Leading Light Wind to drive regional economic growth, create long-term accessible green jobs, advance domestic manufacturing, and promote innovative technologies to support frontline communities.

- Create new short- and long-term skilled employment opportunities in construction, manufacturing, and wind farm operations.
- Invest in ports, manufacturing, and supply chain infrastructure needed to make New York an all-in-one hub and industry leader on every level of the value chain.
- Support a just transition to a clean energy workforce by providing opportunities for members of communities that have experienced the greatest environmental and health consequences from the fossil fuel industry.
- Foster community development initiatives with guidance from a coalition of local partners and new investments in community-led projects.

Community health. Improve community health with a focus on supporting the most at-risk, frontline members of our communities.

- Support programs that address health impacts related to air quality, such as respiratory disease and cardiovascular disease, often affecting the most at-risk communities.
- Help New York State achieve net zero emissions, generating improvements to and investments in public health for all New Yorkers through emissions reductions.



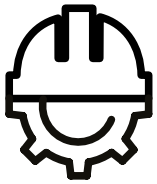
Climate resiliency. Design a project that will efficiently provide clean, locally produced power, meet the region's growing energy demands, and withstand increasing climate hazards.

- Support New York's ambitious climate goals by being part of the transition of the State's electricity supply to 100% clean renewable energy by 2040.
- Contribute to the modernization of the State's electric grid through added capacity and resiliency to bring reliable clean renewable energy to every part of the State.
- Improve community resiliency to climate impacts by hardening shoreline infrastructure around project facilities and supply chain sites.
- Foster and invest in programs that promote dignified, productive, and ecologically sustainable livelihoods to build communities with thriving economies.
- Build community economic resiliency in terms of diversifying the economy and expanding onshore supply chain.
- Increase resiliency of communities to respond after large storms and decrease impacts from flooding by restoring wetlands, helping armor shorelines, and support tree planting efforts.

Environmental costs and benefits. Build and operate the project in a responsible manner that minimizes environmental costs and maximizes benefits.

- Integrate sustainable practices into all aspects of project development, design, construction, and operation to minimize environmental impacts.

- Incorporate low-carbon technologies into project design and operation to improve air quality by lowering harmful emissions.
- Emphasize sustainable building strategies to design, construct and operate project facilities with fewer resources, reduced waste and negative environmental impacts, and decreased costs.
- Seek out partnerships to maximize opportunities for the project to support ecological restoration and biodiversity along the coastline and in the marine environment.

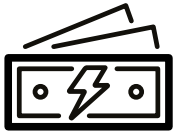


Education, training, and hiring opportunities. Foster the long-term sustainability of the offshore wind industry in the New York metropolitan area through workforce development investments.

- Create pathways to clean energy careers for New Yorkers, especially those from disadvantaged backgrounds.
- Continue Invenergy and energyRe's work to create hundreds of green jobs that are well-paying and long-term pathways to the green economy.
- Bring education, training, and hiring opportunities to the region, primarily to communities that have been historically excluded from other economic opportunities.

Environmental justice. Center the needs and interests of frontline communities throughout project development, recognizing that lower-income communities and communities of color experience the greatest environmental impacts and health consequences from energy development.

- Create opportunities for collaborative decision-making, invest in community-led priorities, and approach engagement through the lens of historical context and self-awareness.
- Take proactive steps to engage frontline communities in ways that are inclusive, meaningful, accessible, and transparent, consistent with New York's equity-driven Climate Act.
- Support a just energy transition by providing multiple pathways for DACs to receive the economic benefits of offshore wind development.
- Create local jobs and training programs that ensure minority and disadvantaged contractors have meaningful roles in the supply chain.



Energy burden. Help to reduce the energy burden on New York households spending a greater portion of their income on energy bills by supporting access for low-income households to the State's clean energy, energy efficiency, and assistance programs.

- Work with stakeholders to develop strategies that will equitably distribute the costs associated with transitioning toward clean energy sources.
- Support organizations working to improve the impacts associated with high energy burdens such as greater risk for respiratory diseases, increased stress and economic hardship, and barriers to moving out of poverty.

16.4 Stakeholder engagement activities, consultations, and partnerships

Planned activities and outreach

Leading Light Wind is implementing a thoughtful approach to planned activities and outreach that considers each stakeholder group and increases awareness and participation from each group. As described in Section 16.1,

development of this Stakeholder Engagement Plan is premised on the belief that the individuals and organizations that may be potentially affected by the project have a right to be involved in project development and influence project decision-making. Further, we seek input from stakeholders in designing how they engage with the project, with the goal of co-designing engagement activities that are accessible and provide meaningful opportunities to shape the project.

Leading Light Wind has notionally identified options for engagement with stakeholders, including but not limited to residents, local businesses, elected officials, environmental advocacy and environmental justice organizations, nonprofit organizations, and institutions. As each stakeholder group and opportunity to engage a group/ individual is unique, the Leading Light Wind outreach team employs the engagement tool appropriate for the opportunity and based on input/guidance from the stakeholders. Leading Light Wind will deploy the following:

- Host stakeholder meetings using a variety of formats, including one-on-one conversations, focus groups, listening sessions, charrettes, and tabletop working groups
- Host and participate in town hall meetings, roundtables, conferences, community building/awareness events, webinars regarding project activities designed to educate, share project information, and solicit feedback
- Establish steering committees for engagement in stakeholder groups (e.g., environmental nonprofit organizations, community benefits delivery)
- Participate in and attend technical working groups (e.g., E-TWG, F-TWG) and trade shows as a vendor
- Post timely project updates on Leading Light Wind's website and utilize social media to update and inform the public on project developments and activities
- Utilize stakeholder email lists and push text and social media notifications to provide regular project updates and other important notices, including via our project newsletter "Currents"
- Conduct surveys to obtain input and information from stakeholders regarding project activities
- Publish announcements and share project updates via print and online industry publications and local news outlets

Figure 16-4. Leading Light Wind will engage with stakeholders in a variety of ways.

Leading Light Wind considers accessibility when planning engagement activities in the following ways:

- Assume a range of education levels, cultural contexts, language proficiencies, digital access, physical access, employment/childcare timing, and understanding of the project development process and offshore wind industry so materials and activities provide maximum coverage.
- Use visuals or diagrams where possible.
- Explain where the project is in the development process and how input matters (i.e., what might it change).
- Have relevant documents readily available.
- Simplify the process of participation.
- Provide several ways for a person to participate.

Leading Light Wind will track the following metrics in order to ensure that the stakeholder engagement process is open and accessible to all participants:

- Outreach channels
- Community-based partners/trusted partners

- Notification lead time
- Meeting times-of-day
- Language (translation and interpretation)
- Legibility (plain language)
- Cultural, racial, and ethnic relevance
- Meeting location accessibility (provide virtual options)
- Transparency and context
- Incentives or compensation

Planned partnerships

The project team, Invenergy and energyRe, draw from their experience working in partnership with New York Power Authority to develop Clean Path New York, an $11 billion renewable energy and transmission infrastructure project that will enable the delivery of more than 7.5 million megawatt-hours of emissions-free energy into New York City every year, all of which will be generated in New York State.

As part of Clean Path New York, Invenergy and energyRe have constituted a $270 million community investment fund that will be governed by a board of directors, including local stakeholder representation, to make direct investments in communities across New York focused on workforce development, education, community health, and environmental stewardship.

[2] Rebel Cities: These Community Wind Farms in Denmark and Scotland are Decentralising Power to the People - Resilience.

[3] https://mjbizdaily.com/new-yorks-marijuana-social-equity-program-a-possible-game-changer/

Leading Light Wind Empire Equity Accelerator

Initially in Europe[2] and more recently in New York State,[3] community equity and direct participation in both infrastructure development and impactful new industries is increasingly prevalent. These values are borne out of overdue recognition of the disproportionate burden that many communities have historically shouldered in the development and hosting of large-scale infrastructure—as well as the systemic barriers these communities face in accessing opportunities in emerging economies.

In alignment with the importance of domestic leadership in the development of major clean energy infrastructure, Leading Light Wind is actively evaluating ways to engage our local communities and offer meaningful participation, including direct ownership, in the operational phase of this 30+ year infrastructure project. Included in our proposed $300 million community benefits program is a [redacted] Community Investment Fund that would be guided by community representatives and key stakeholders to inform funding allocations in service of community priorities. We are interested in initiating a dialogue as to whether a portion of that [redacted] could be allocated into a community reinvestment fund, the Leading Light Wind Empire Equity Accelerator (EEA), in cooperation with an accredited and qualified community or labor-affiliated non-profit organization, in a first-of-its-kind model to provide community/public equity in the project.

The EEA would build upon New York State's leadership with respect to community engagement and participatory ownership in business and infrastructure. Further, the EEA would advance contemporary priorities for the Governor, New York State, and the of Leading Light Wind project team as we, together, stand up a first-of-its-kind, American-led offshore wind project.

Building upon this concept, we could further leverage Governor Hochul's recently announced statewide Cap-and-Invest program through a matching framework (matching EEA funding with Cap-and-Invest revenues). As announced, the Cap-and-Invest program, which proposes to raise funds by capping carbon emissions, includes a primary goal of investing revenues in DACs – a commitment that is shared by Leading Light Wind.

If awarded through ORECRFP22-1, Leading Light Wind is prepared to establish a $300 million community benefits program [redacted] The community benefits program (see Table 16-3) encompasses Leading Light Wind's direct partnerships (both already established and future), required fisheries and wildlife monitoring funding, and community investment funding in line with the Clean Path New York model. We expect that the fund will be managed by a board of directors representing communities and stakeholder groups that serve as hosts to the project. The board will be constituted after the project secures a funding award from NYSERDA.

[redacted]

To provide focus to our community benefits program, Leading Light Wind has identified the following broad categories for investment:

Empowering local communities: Improve youth education, climate resiliency, social equity, public health, and air quality with a focus on supporting the most at-risk, frontline members of our local communities.

Leading Light Wind believes in a holistic just transition that goes beyond workforce re-tooling to invest in and give voice to communities that have been historically excluded from economic opportunities and overburdened with environmental injustices. To help address the multifaceted issues facing our urban coastal communities, Leading Light Wind will support community driven initiatives that are geared toward improving quality of life, resiliency, and empowering residents throughout our development process. Onshore infrastructure development will be a significant piece of the Leading Light Wind project. As such, we will consider sense of place and neighborhood character in the design of onshore assets, offering opportunities for co-benefits, community input, and beautification when feasible. The project has committed to designing waterfront facilities to adhere to Waterfront Alliance's WEDG program, standards that ensure resilience, ecological, and public access benefits in communities where waterfront operations take place. The project is in discussions to partner with organizations such as Newton Brown Urban Design Blade-Made, that re-imagines recycled wind turbine components to improve urban sites (Figure 16-5). We will establish participatory processes at different junctures throughout the project, such as planning charettes for onshore assets, an equitable governance model for the

Figure 16-5. Leading Light Wind is in discussions to partner with organizations such as Newton Brown Urban Design Blade-Made that re-imagines recycled wind turbine components to improve urban sites.

Community Investment Fund, and the establishment of a community advisory council, in order to give community members agency and power in project decisions. Additionally, we know that youth engagement is critical, as early exposure to opportunities will help foster the education and career pipelines the new clean energy economy will require. Through the Leading Light Wind Offshore Wind Scholars Program, the project will support youth programming to reinforce civic engagement and create access to future wealth building opportunities.

Building an inclusive next generation workforce: Support workforce development and education programs focused on pathways for priority populations to access green, family-sustaining jobs.

Leading Light Wind is committed to building a diverse and inclusive workforce that meets the needs of the offshore wind industry and creates family-sustaining jobs for New Yorkers. As an American-based company, Leading Light Wind understands the value of union labor in building out the American middle class. We recognize the historic inequities disadvantaged populations have faced when it comes to accessing union jobs and other opportunities for wealth-building. We also recognize the once in a generation opportunity to leverage the clean energy transition to redress legacies of inequality. To foster a just transition in New York State and facilitate equitable access to opportunities, Leading Light Wind will direct workforce training investments to institutions and organizations that are embedded in, and primarily serve, DACs and priority populations.

Accelerating the offshore wind supply chain: Foster the long-term sustainability of the offshore wind industry in New York State through various investments, including supporting capacity and access for Tier 3 and Tier 4 suppliers.

Leading Light Wind understands the immense potential that the clean energy transition brings for the revitalization of local economies. In addition to Leading Light Wind's partnerships with the proposed SCIP Facilities (see Section 19.3), we are committed to an equitable economic development strategy, one which empowers local entrepreneurs, innovators, and small businesses, especially those from historically marginalized communities. We know that these entities bring the greatest socioeconomic value to their communities and are most likely to reinvest in local neighborhoods, sharing the benefits of the new clean energy economy widely. Through our community benefits program, we are committed to reducing barriers-to-entry into offshore wind and investing in innovative solutions for the clean energy industry at large.

Leading environmental research: Provide support for environmental research that fosters innovation and collaboration within the offshore wind industry.

Leading Light Wind believes the natural environment and offshore wind can coexist and thrive. To that end, Leading Light Wind will support innovative research in the marine, fisheries, and environmental fields, as described in further detail in the Environmental Mitigation Plan and Fisheries Mitigation Plan. As US-focused research priorities are still being organized and coordinated, it is important for Leading Light Wind to engage with regional science organizations to ensure investment in research is strategic and advances gaining knowledge in the right areas and as quickly as possible. Leading Light Wind will use research, data, and stakeholder feedback to support decision-making throughout the life cycle of the project (preconstruction, surveys, site design, construction, operations, and decommissioning). Leading Light Wind will seek to maximize the impact of research efforts such as data collection, methodology, analysis, and dissemination by collaborating with other developers, particularly those in adjacent lease areas taking on similar initiatives. Leading Light Wind intends to collaborate with relevant stakeholders, potentially in association with other proposed offshore wind projects, to conduct all project related monitoring in scientifically valid ways that further the knowledge of movements and potential impacts of wildlife species of concern within the New York Bight. Monitoring provides an excellent platform for bolstering a shared understanding of the New York Bight and the larger Atlantic Ocean ecosystems but will require deliberate collaboration and coordination.

Leading Light Wind intends to spend 10% of the $300 million community benefits program pre-COD (2030). In addition to the Community Investment Fund, Leading Light Wind is building relationships with local institutions,

businesses, and community based organizations to identify specific opportunities for initial partnership and investment. Our team is intentional about pursuing partnerships that support existing offshore wind initiatives established by the city and state, reflect the priorities of communities affected by our project and provide benefits specifically disadvantaged and environmental justice communities and other priority populations.

[redacted]

[redacted]

[redacted]

[redacted]

16.5 Tracking progress and communications

Tracking stakeholder engagement

Leading Light Wind is utilizing Borealis, a stakeholder engagement software solution, to track relationship progress, log proposed and completed engagement activities, and report on outcomes of outreach. By centralizing stakeholder-related data in one location, the Borealis database allows team members to share and access stakeholder feedback in real time across all workstreams. Reports with tables and graphics are exported and shared for weekly and regular team tracking and collaboration, in addition to inclusion in reporting throughout the project duration. Features/functions of Borealis include these:

- Manage all aspects of stakeholder engagement from a single, centralized tool. Borealis consolidates stakeholder-related data, keeping it accessible in real time to all team members.
- Map stakeholders along with social and geographical factors for a visual overview of issues by location.
- Record stakeholder data and engagement activities, including emails, messages, social media posts, notes, and key documents.
- Streamline engagements with stakeholders logging their preferred method of communication (face-to-face, phone call, email, text message, etc.)
- Track engagements, grievances, commitments, and follow-ups to create a project-wide institutional record.
- Monitor team progress and demonstrate compliance to external stakeholders to illustrate the commitment of our engagement program.
- Analyze data and track key performance indicators to adjust strategies based on stakeholder feedback.
- Create customized reports to include maps, graphs, calendars, tables, and indicators to keep the project team fully informed.

By centralizing outreach activities across the project, Leading Light Wind is striving to reduce stakeholder outreach burden and ensure project activities are minimized to the extent practicable. In addition, we are coordinating with the other New York Bight lease developers (through the Programmatic Environmental Impact Statement process, NYSERDA technical working groups, and external ad hoc coordination), working to streamline engagement where practicable.

Outreach tracking protocols have been instituted to ensure completeness and consistency across the team. Outreach efforts are coordinated by our External Engagement Director, inputs into Borealis are overseen by the team's system administrator. Stakeholder engagement/ external affairs leads have been identified and are responsible for daily/weekly data entry into Borealis. Data management requirements include weekly entry of key meetings/stakeholder touch points, uploading notes, new stakeholders/POCs/organizations, and updating stakeholder data to keep it current. All team members using Borealis have completed training to ensure data accuracy and confidentiality.

Tracking stakeholder marketing efforts

Leading Light Wind's robust marketing and communications strategy aims to provide a broad audience of stakeholders and local communities with educational content and project updates. Our strategy focuses on consistent, frequent communication across multiple channels to ensure we reach people on the channels they are already using.

Leading Light Wind operates an up-to-date website that hosts information about the project, the team, news updates, and educational content regarding offshore wind. In September 2022, Leading Light Wind launched social media accounts on Instagram and Twitter. Project partners Invenergy and energyRe also provide regular project updates on LinkedIn. Leading Light Wind uses social media to amplify news about the project, communicate project milestones and updates, and introduce team members to the public.

Leading Light Wind launched an email newsletter, "Currents," to provide stakeholders and interested members of the public with regular project updates and milestones. The digital newsletter launched December 2022 and will be sent regularly. Leading Light Wind raises awareness of the newsletter in stakeholder meetings, on the website, and through social media posts. New users are able to opt-in to the newsletter via both the website and social media platforms.

In December 2022, Leading Light Wind launched a targeted digital campaign to raise awareness of the project among New York stakeholders. The digital campaign is intended to introduce Leading Light Wind to an expanded audience of community members, stakeholders, and industry leaders and is estimated to serve more than 1 million impressions.

Leading Light Wind communicates project updates and team additions through the press. Press outreach has focused on New York specific press as well as maritime and energy industry trade press. As of December 2022, Leading Light Wind news has been featured in *Empire Report, Politico New York, City & State,* and *Maritime Executive*.

To ensure efficient, effective, and accurate stakeholder meetings, Leading Light Wind has prepared a suite of stakeholder materials, including a project fact sheet and an overview presentation. For equity and accessibility, stakeholder materials are prepared to be compliant with the American with Disabilities Act and translated into languages relevant to our communities on interest. Materials are available on the project website so all information is transparent, available, and accessible for the public.

17
Visibility and viewshed impacts

17 Visibility and viewshed impacts

17.1 Overview

The WTGs and related infrastructure will be located more than 79 statute miles south of Jones Beach Island, the closest point in New York to the site. Due to distance and the curvature of the earth, they will not be visible from New York.

The closest shoreline to the site is on Long Beach Island, New Jersey, 41 statute miles away. Because the Leading Light Wind infrastructure is more than 20 statute miles from the nearest shoreline, there are no potential adverse impacts related to visibility of WTGs, the local and state economy, and historic and visual resources.

Leading Light Wind prepared visual simulations from two locations in New Jersey: 1) the Beach Haven community shoreline and, 2) the Brigantine Inlet Outlook at North Brigantine Natural Area. Figure 17-1 shows the locations of these two vantage points. The results of the study indicate that despite conservatively applying the largest WTGs to the visual simulations, the WTGs will not be visible from the New Jersey shoreline.

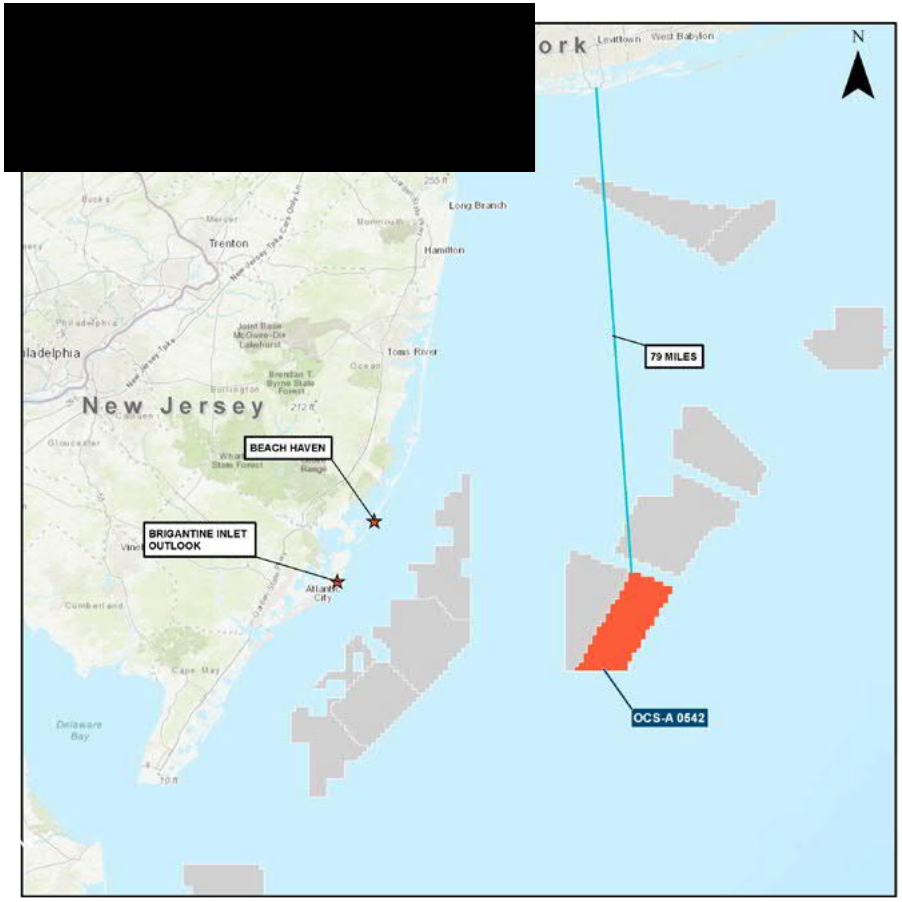


Figure 17-1. Location of visual simulation vantage points.

Figure 17-2. Representative simulation from the shore of Beach Haven.

Figure 17-3. Representative simulation from the overlook at North Brigantine Natural Area.

As shown, the Leading Light Wind project will be indiscernible from land. However, Leading Light Wind proposes the following project design features as best practice:

- WTGs will be painted white/light gray for less visibility from shore.
- Lighting will be minimized to reduce overall viewshed impacts. At 41 statute miles from the New Jersey shoreline, project lighting located on the nacelles [redacted] would not be visible because the nacelles will be below the visible horizon.
- Subject to regulatory approvals, WTG-to-WTG spacing for the Leading Light Wind project [redacted] limiting the massing of the WTG and visual impact of the project.

Additionally, Leading Light Wind will conduct the following communication and outreach efforts to inform the public about the minimum visibility of the project:

- Leading Light Wind will host public meetings in New Jersey to share project details and updates, including visualizations that illustrate project visibility.
- The project's permitting documents will be available online, on the Leading Light Wind website.

17.2 Visibility study documents

Detailed information on Leading Light Wind visibility and viewshed impacts is available in Appendix M and Appendix N.

Appendix M is an assessment of the visibility and viewshed analysis, including the potential impacts to visual resources. The visibility study presents visual simulations of the commercially scaled and technically feasible scenario of the Leading Light Wind generation facility. It considered views from publicly accessible lands with the closest proximity to the project from New Jersey and New York.

Appendix N provides the visual simulations of the project from the shore of Beach Haven, and an elevated overlook at North Brigantine Natural Area. The photos demonstrate the anticipated views of the horizon with WTGs at clear, partly cloudy, and overcast conditions during early morning, mid-afternoon, and late day, as well as one simulation illustrating nighttime conditions, with the WTGs lit under clear conditions.

Finally, the project shapefiles, including the WTG layout, project boundaries, waypoints from which visual simulations were made, and the bearings and directions of the visual simulations are provided in an attachment.

18 Disadvantaged communities impacts

18 Disadvantaged communities impacts

18.1 Introduction

The New York Climate Act defines "Disadvantaged Communities" (DACs) as underrepresented segments of the population that bear environmental and socioeconomic burdens as well as the legacies of racial and ethnic discrimination. The Climate Act recognizes that climate change especially heightens the vulnerability of DACs, and therefore actions undertaken by New York State to mitigate greenhouse gas emissions should not result in DACs having to bear a disproportionate burden of environmental or economic impacts.

In other contexts, particularly in federal designations, DACs share many of the same defining socioeconomic, environmental burden, health vulnerabilities, and climate risk characteristics that appropriately describe "Frontline Communities," "Overburdened Communities," and "Environmental Justice Communities."

As an offshore wind leaseholder in the New York Bight and an active developer of land-based renewables and transmission in New York, Leading Light Wind (via Invenergy Renewables) understands NYSERDA's mandate to ensure that the interests of DACs are explicitly valued in the ORECRFP22-1 selection process. We are committed to provide benefits to, and reduce burdens on, DACs in accordance with the New York Climate Act and the New York Public Service Commission October 15, 2020 Order Adopting Modifications to the Clean Energy Standard (the "CES Modification Order"). We recognize our role, responsibilities, and privilege to verify that DACs are treated in accordance with the requirements and guidance of the Climate Act and CES Modification Order and will not create new burdens in DACs, will reduce existing burdens as possible, will provide for public health, environmental, and economic benefits, and will provide training and workforce opportunities.

To analyze the potential benefits and burdens on DACs, we utilized (and will continue to utilize) a four-step process (Figure 18-1).

Leading Light Wind will coordinate with NYSERDA throughout project implementation to align the investments and associated benefits with NYSERDA's broader approach for the delivery, measurement, tracking, and reporting of benefits to DACs, pursuant to the provisions of the Climate Act.

Step 1

Map the DACs that may be impacted directly by the development, construction, or operation of the project and identify the relevant criteria such as environmental burdens and climate risks, population characteristics, and health vulnerabilities that concern the communities. The mapping and identification of these populations (presented in Section 18.2) is essential to establishing effective strategies for engaging them in the planning process. When meaningful opportunities for interaction are established, the planning process can draw upon the perspectives of communities to identify existing needs, localized deficiencies, and demand for services. Mapping of these populations not only provides a baseline for assessing impacts of the project, but aids in the development of an effective public involvement program.

Step 2

Perform outreach and engagement with the communities to discuss the project and to get feedback from members of the communities, as described in our Stakeholder Engagement Plan. This process is designed to listen to potentially impacted communities, including people of color and low-income families and individuals, to hear and document their concerns and confirm their understanding of the potential project impacts and opportunities.

Step 3

Perform technical analysis in which baseline measures of burden indicators that concern the target DACs are compared to "build" scenarios to determine if the DACs are likely to be impacted in perceptible ways by the build activities, and if so, whether these impacts fall to DACs disproportionately when compared to other impacted areas. A comprehensive list of the potential burden indicators is presented below in Section 18.5. Given the nature and location of the development, construction, and operation of the proposed offshore wind generation facilities and the proposed SCIP facilities, few of these criteria indicators are likely to be experienced either disproportionately, or at all, by DACs as a result of the project build scenario, and those impacts that may meet these criteria indicators are likely to be incremental in nature, minor, and temporary.

Step 4

Assess the results of conducting the community outreach and technical analysis to determine the impacts of the proposed project on the targeted DACs. Leading Light Wind will document the results and take appropriate actions as necessary in consultation with the communities and NYSERDA.

Figure 18-1. Leading Light Wind will utilize a four-step process to analyze the impacts of the project on DACs.

18.2 Identification and description of impacted disadvantaged communities

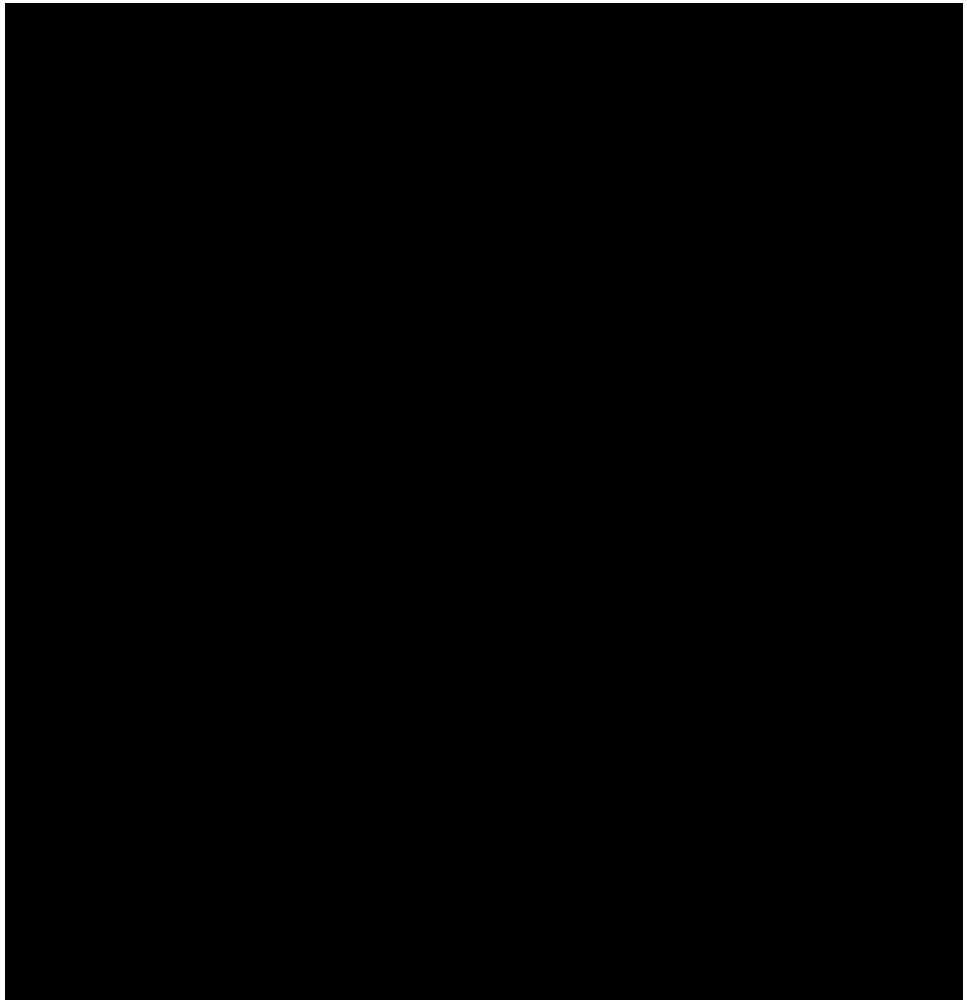
DACs hosting or proximate to the proposed project sites, including landfall, interconnection, converter stations and substations, energy storage locations, manufacturing and marshaling sites, and operation and maintenance hubs (project infrastructure) are identified using the NYSERDA draft DACs geographic information system (GIS) mapping files (March 2022).

“Proximate” communities are those that may reasonably be expected to be affected by the identified uses for each instance of project infrastructure, as described more fully within this section below. Identification of proximate communities will be an ongoing process tightly integrated with the continuing stakeholder engagement process described in our Stakeholder Engagement Plan (see Section 16).

Other targeted DACs may include those neither hosting nor proximate to project infrastructure but engaged directly through the efforts of Leading Light Wind, as described in the Stakeholder Engagement Plan, for other activities including workforce development, job recruitment, capital investments, or other proposed programs intended to create opportunities for DACs. Overall benefits of spending on clean energy could include energy efficiency programs/projects, investments in the areas of housing, pollution reduction, low-income energy assistance, and energy, transportation, and economic development.

[redacted]

[redacted]



18.3 Leading Light Wind engagement with disadvantaged communities

To facilitate engagement with DACs regarding potential benefits and burdens of the project, Leading Light Wind has developed a list of goals and policies associated with DACs. This list is consistent with the Climate Act's focus on building an inclusive, clean energy economy that promotes education, training, and hiring opportunities. As further detailed in our Stakeholder Engagement Plan, these goals will drive engagement and inform conversations with community members to set clear and realistic endpoints for mutual agreement. The goals include the following:

Local economic development and community investment

Leading Light Wind will maximize opportunities created by the project investments to drive regional economic growth, create long-term accessible green jobs, advance domestic manufacturing, and promote innovative technologies to support frontline communities.

Community health

Leading Light Wind will endeavor to improve community health with a focus on supporting the most at-risk, frontline members of DACs.

Climate resiliency

Leading Light Wind will design the project to efficiently provide clean, locally produced power, meet the region's growing energy demands, and withstand increasing climate hazards.

Environmental costs and benefits

Leading Light Wind will build and operate the project in a responsible manner that minimizes environmental impacts and maximizes benefits.

Education, training, and hiring opportunities

Leading Light Wind will foster the long-term sustainability of the offshore wind industry in the New York metropolitan area through workforce development investments.

Environmental justice

Leading Light Wind will center the needs and interests of frontline communities throughout project development, recognizing that lower-income communities and communities of color experience the greatest environmental impacts and health consequences from energy development activities.

Energy burden

Leading Light Wind will reduce the energy burden on New York households that are currently spending a greater portion of their income on energy bills by supporting access for low-income households to the state's clean energy, energy efficiency, and assistance programs.

18.4 Community benefits analysis

Leading Light Wind is committed to providing project benefits to DACs, in line with the requirements of the Climate Act and the CES Modification Order, and consistent with Leading Light Wind's policy to promote diversity, equity, inclusion, and justice principles. As per the requirements of Appendix C.3 of the RFP, the benefits are identified and categorized as follows:

Category A
Project-specific expenditures

Category B
Community-focused investments

Category C
Climate, public health, and other intrinsic benefits

Project-specific expenditures (Category A)

Project-specific expenditures (Category A) are associated with the development, construction, and operation of the project, including:

- Construction payroll-related expenditures benefiting DACs, including wages and benefits
- Administrative and general payroll-related expenditures benefiting DACs, including wages and benefits
- Financial, legal, technical, and other consulting services, including wages and benefits
- Purchases of goods and services benefiting DACs associated with construction, general project-related activities, and supporting consulting services (including sales tax where applicable)
- Payroll expenditures associated with operations and maintenance, plant management, and long-term project development
- Land use payments associated with the project
- Host community payments for those municipalities that host the project

Community-focused investments (Category B)

Community-focused investments (Category B) includes investments and expenditures made to support DACs, including economic development activities, approaches to improve access to clean energy solutions, opportunities to address existing environmental justice issues, or the adoption of community host benefit agreements. Benefits may also include elevating local stakeholders, particularly those from DACs, to positions of power throughout project development, including establishing a participatory and equitable governance model for Leading Light Wind's Community Investment Fund, and inclusive and justice-centered visioning processes around project infrastructure development. Leading Light Wind will support community-led initiatives aimed at improving the social, environmental, and economic fabric of communities affected by the project, including, but not limited to those outlined in Section 16.4 of the Stakeholder Engagement Plan.

Climate, public health, and other intrinsic benefits (Category C)

Climate, public health, and other intrinsic benefits (Category C) includes benefits beyond those outlined in Categories A and B that accrue to DACs from the project, including intrinsic benefits to DACs resulting from reduced fossil fuel generation. Such intrinsic benefits include corresponding emissions reductions and associated public health benefits, such as improved air quality, reduced rates of asthma and other upper respiratory diseases, a reduction in medical expenditures, and an overall improved quality of life. By achieving the 2030 and 2040 grid emission reduction targets, the state will greatly reduce fossil fuel combustion releases of carbon dioxide and other greenhouse gases into the atmosphere along with co-pollutants such as sulfur dioxide, nitrogen oxides, and particulate matter.

The greatest benefits from those reduced emissions will be realized in the DACs that currently bear the cost of those emissions on a disproportionate basis. As discussed in greater detail in Section 21 ("Reducing carbon emissions and embodied carbon" portion) of this proposal, Leading Light Wind is taking active measures to realize significant incremental reductions in net emissions of carbon and other fossil co-pollutants from the project, including embodied air pollutants released from the whole process of raw material acquisition, manufacture, processing, transportation, marketing, and purchase. Leading Light Wind is incorporating carbon assessments and co-pollutant intensity in design, sourcing, and construction. These actions are expected to minimize emissions within our supply chain. We have developed and implemented a methodology to account for estimated project life cycle emissions and have created a specific plan that details the methodology used to track and report the project's life cycle emissions to NYSERDA. The emissions reporting will include detailed direct and indirect emissions accounting for carbon and co-pollutants, with a calculation of estimated climate and public health benefits accruing to New York State in general and DACs in particular over the life of the project.

[redacted] In addition, the Stakeholder Engagement Plan (Section 16 and the standalone attachment) provides additional information regarding the project's relevant partnerships and planned community benefits for DACs.

18.5 Burdens and risks

The Climate Act focuses not only on increasing program benefits to DACs, but also on ending the disproportionate burdens that have been imposed on those communities.

In determining the criteria to identify DACs, the Climate Justice Working Group (CJWG) identified 35% of census tracts in New York as DACs. Most of these tracts are identified on the basis of environmental and climate change burdens and risk indicators. The scoring approach used by CJWG considers each census tract's relative burden, risk, vulnerability, or sensitivity based on these indicators.

The environmental and climate change burdens and risk indicators include:

- Potential pollution exposures (e.g., vehicle traffic density, diesel truck and bus traffic, particulate matter and benzene concentrations, wastewater discharge)
- Land use and facilities associated with historical discrimination or disinvestment (e.g., remediation sites, Clean Air Act Risk Management Plan sites, major oil storage facilities, power generation facilities, active landfills, municipal waste combustors, scrap metal processors, industrial/manufacturing/mining land use, and high vacancy areas)
- Potential climate change risks (e.g., extreme heat projections, coastal and inland flooding, low vegetative cover, agricultural land, and high drive times to hospitals or urgent/critical care facilities)

In addition to these potential burdens and risks that are known to concern DACs disproportionately, Leading Light Wind will monitor for federally recognized "disproportionately high and adverse human health or environmental effects" criteria that are typically applied in benefit and burden analyses for federal programs, such as those administered by the US Environmental Protection Agency (EPA) and the US Department of Transportation (DOT). These include the following:

- Air, noise, and water pollution and soil contamination
- Bodily impairment, infirmity, illness, or death
- Destruction or disruption of man-made or natural resources
- Destruction or diminution of aesthetic values
- Destruction or disruption of community cohesion or a community's economic vitality
- Destruction or disruption of the availability of public and private facilities and services
- Vibration
- Adverse employment effects
- Displacement of persons, businesses, farms, or nonprofit organizations
- Increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community

Given the nature and location of the development, construction, and operation of the offshore wind generation facilities and the proposed SCIP facilities, few of these criteria are likely to be experienced either disproportionately, or at all, by DACs as a result of the build scenario of the project. Those impacts that may meet these criteria indicators are likely to be incremental in nature and temporary during construction.

[redacted]

we expect that the benefits offered by the development, construction, and operation of the offshore wind generation facilities and the proposed SCIP facilities are expected to have overwhelming benefits that will more than compensate for minor and temporary burdens.

19
New York economic benefits

19 New York economic benefits

19.1 Overview

The purpose of the Leading Light Wind Economic Benefits Plan is as follows:

1. Present our approach to economic benefit design
2. Provide detailed descriptions of the economic benefit claims submitted in the offer data forms
3. Explain, justify, and substantiate the claims
4. Provide information on our approach to fulfilling the claims
5. Capture the broader impacts and causal sequence of the economic benefits

Benefits are the positive impacts from project investments. The Climate Act codified New York State's commitment to ensuring that the transition to renewable and clean energy be a "just transition" that properly benefits all New Yorkers, with specific attention to the just transition principles and strategies expressed in the New York Climate Action Council's "Final Scoping Plan" (December 2022). Leading Light Wind understands that these principles include the following:

- Stakeholder engagement, collaborative planning, and support for vibrant, healthy communities with strong and diversified economies
- Equitable access to high-quality, family-sustaining jobs, particularly for members of DACs and other priority populations (e.g., women, minorities, and service veterans) who have disproportionately been excluded from the benefits of the clean energy economy
- Redevelopment of industrial communities, repurposing of former manufacturing sites and fossil-based electric generation infrastructure
- Development of a robust in-state offshore wind supply chain

As the only American-led offshore wind developer with a lease in the New York Bight, and with deep links to New York State and its clean energy transition, Invenergy and its affiliates are uniquely positioned to fully appreciate and support Governor Hochul's goal to establish New York as the regional offshore wind hub and industry leader on every level of the value chain.

As described herein, Leading Light Wind will leverage the public and private investments and the economic benefits delivered by the associated SCIP

facilities to advance the development of the offshore wind industry in New York and the realize the potential long-term economic benefits to the state.

This section, supported by Leading Light Wind's Stakeholder Engagement Plan, provides a detailed accounting of the significant benefits to all New Yorkers from our planned investments. These targeted investments are designed to specifically benefit members of DACs, New York's highly skilled and well-trained union workforce, Minority- and Women-Owned Businesses (MWBEs), Service-Disabled Veteran-Owned Businesses (SDVOBs), and Disadvantaged Business Enterprises (DBEs).

19.2 Economic Benefits Plan

As requested by NYSERDA, the Economic Benefits Plan for the project is being provided as a separate attachment. This attachment includes discussion of the MWBE and SDVOB benefits for the project.

19.3 Supply Chain Investment Plan(s)

Leading Light Wind supply chain philosophy

Leading Light Wind understands that the regional growth and permanence of a new industry on the historical scale of offshore wind requires the establishment of strong and durable linkages between established firms at the top of the value chain. We have developed strong partnerships with established leaders of the global offshore wind industry and new domestic innovators at the cutting edge of offshore wind infrastructure development. Each facility proposal that make up the SCIPs presented here is a product of intense collaboration and creative design partnerships between the potential funding recipients and Leading Light Wind.

Our goal is to provide New York State with offshore wind supply chain investments that align with state goals and create enduring linkages.

These firms will provide or facilitate the primary component manufacturing, assembly, and installation activities, with small to medium New York enterprises providing support services and supply of materials, equipment, and labor.

These small to medium New York enterprises comprise a crucial part of the in-state value chain by providing increased opportunities for just distribution of clean energy transition benefits to DACs, New York's highly-skilled and well-trained union workforce, MWBEs, SDVOBs, and DBEs.

Leading Light Wind, its affiliates, and SCIP partners will engage existing and new local supply chain partners and work with organized labor to support an aggressive program of local supply chain and workforce development, including unionization of MWBE and SDVOB contractors. The local economic expansion represented by the proposed offshore wind generation facilities and our SCIP facility portfolio provides opportunity for additional expansion through every level of the value chain, through servicing of the increased input demands of the primary component manufacturers.

Leading Light Wind appreciates the levers we control as a clean energy developer at the top of the offshore wind value chain. We are committed to seeking opportunities for small to medium businesses in New York State, including MWBEs, SDVOBs, and DBEs, that will provide important services to the SCIPs. These businesses will provide many of the workforce opportunities to members of DACs and other priority populations who have suffered disproportionate economic consequences from historic and ongoing discrimination in contracting.

As discussed in our Jobs and Workforce Plan, in addition to the New York State Supplier Opportunities Protocol to be enacted by Leading Light Wind in compliance with the RFP, we will work with our SCIP partners to set firm goals for inclusionary contracting, including setting baseline expectations for percentages of work to be contracted to MWBEs, SDVOBs, and DBEs.

Figure 19-1. Leading Light Wind is committed to seeking opportunities for small to medium businesses in New York State.

To enable long-term success of the offshore wind industry, in-state supply must grow to meet the expanded regional demand and drive the increased output. If the in-state supply chain cannot expand to absorb the additional output, this will result in leakage of production and employment out of the state and the loss of critical growth opportunity.

Leading Light Wind is committed to work to strengthen linkages between our Tier 1 and Tier 2 suppliers and contractors and SCIP facilities and their Tier 3 and Tier 4 in-state suppliers and services providers. Strong interfirm linkages assure that an industry is likely to remain rooted in New York. Successful supplier and service firms provide quality inputs to producers, making them more successful. This keeps the New York State offshore wind value chain innovative and sustaining its market readiness and competitive advantage.

Introduction to SCIP Facilities

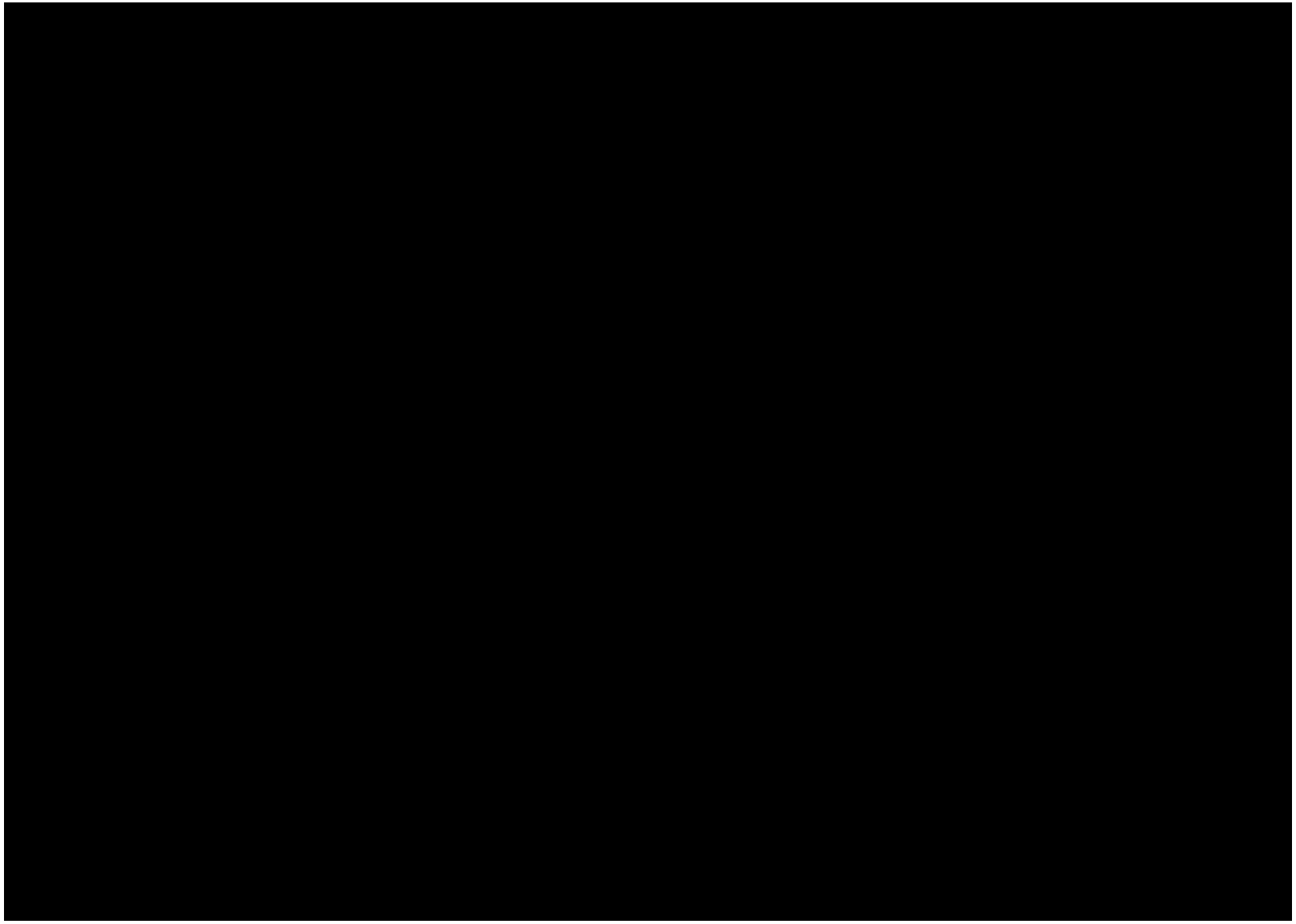
As outlined in this section, Leading Light Wind has cultivated partnerships for seven distinct SCIP opportunities covering twelve total SCIP facilities. These opportunities have been carefully vetted by Leading Light Wind to ensure they are economically feasible and offer maximum benefit to the offshore wind project as well as jobs and economic benefits to New York State. The proposed SCIP facilities provide a wide range of key offshore wind-supporting infrastructure and activities. A high-level summary of each SCIP facility is provided in this section below. Additional details on each SCIP facility is provided in their associated Appendix C.2 attachments. [redacted]

The location and functions for these facilities are summarized in Table 19-1 on the next page.

The SCIP facilities were selected based on their ability to bring value to both the project and New York State in terms of investment in construction, operations, job creation, retention of existing jobs, and opportunity creation for existing New York firms. Each proposed SCIP facility funding recipient has provided a finance plan to support the proposed SCIP facility investment, including a breakdown of proposed New York State funding and non-New York State funding investment sources. As shown in Tables 19-2 and 19-3, each of the SCIP facilities meets or exceeds SCIP eligibility requirements for jobs and activity fundability thresholds.

[redacted]

[redacted]



[redacted]

Proposed SCIPs

Leading Light Wind has arranged these SCIP facilities into 3 potential SCIP Options, to provide a continuum of options to NYSERDA ranging from most competitive OREC pricing to maximizing economic benefits within the state. We have endeavored to present a mix of manufacturing options, to include both blades and nacelles, as well as options with manufacturing, marshaling, and opportunities for Tier 2+ suppliers. The 3 options are summarized in Table 19-5 and are as follows:

- **SCIP Option A** is comprised of the GE Blade Factory, the Arthur Kill Terminal, and the BNY.
- **SCIP Option B** is comprised of the SGRE Nacelle Factory, the Arthur Kill Terminal, and the BNY.
- **SCIP Option C** provides the greatest amount of local content and economic benefits to New York State. It is comprised of the GE Blade Factory, the GE Nacelle Factory, the Arthur Kill Terminal, the BNY, and the Cimolai-HY Steel Fabrication Plant.

Table 19-5 provides a summary of these options, with more detailed descriptions in the following sections.

[redacted]

[redacted]

[redacted]

[redacted]

No exclusivity agreements

As we have certified in the Proposer Certification Form for this submittal and this SCIP proposal, no arrangement exists between Leading Light Wind and any funding recipient, landowner, developer or proposed end user of a SCIP facility that materially restricted the ability of such parties to collaborate with other proposers in developing SCIPs, as further described in Section 2.1.2 of the RFP.

[redacted]

SCIP data forms

A complete SCIP Data Form has been provided for each SCIP facility. Narrative detailed descriptions of the Category 2, 4, and 5 economic benefit claims submitted in the SCIP Data Forms are presented as per the template for economic benefits claims entries (Table C.2.2 of the RFP) with totals by each of the economic benefit dollar categories, including total expenditures, labor expenditures in New York State, expenditures in New York State DACs, expenditures with New York State MWBEs and SDVOBs. A SCIP Economic Benefits Plan describing in detail the contents of each SCIP data form, is provided as an attachment.

SCIP facility funding agreements

Leading Light Wind understands that, as described in the RFP, NYSERDA will work with the funding recipient(s) to enter into a SCIP facility funding agreement for each SCIP facility. The agreement will cover the terms and conditions of the New York State funding as described for each SCIP facility in their attached Facility Supply Chain Investment Plan.

SCIP eligibility requirements: Investment fundability thresholds

[redacted]

19.4 New York Jobs and Workforce Plan

As detailed more fully in our Jobs and Workforce Plan attachment, this section provides our philosophy, strategy, and commitments for taking full

advantage of the transformational workforce opportunities presented by the clean energy transition. The plan supports the transition away from traditional energy sources and industries and is aligned with the clean energy economy workforce goals of the New York Climate Act. These include the following:

- Engaging fully with organized labor
- Providing critical support for industry-wide skills training and education
- Paying prevailing wages for the entire construction force
- Promoting a more diverse workforce in New York State

Our plan assures that this a "just transition" to the new clean energy economy as envisioned by the just transition principles and strategies expressed in the New York State Climate Action Council "Scoping Plan" (December 2022).

The Jobs and Workforce Plan provides our comprehensive, overall approach and demonstrates a commitment to engaging New York's highly skilled and well-trained union workforce in a way that maximizes opportunities for members of DACs, MWBEs, SDVOBs, and DBEs. As discussed in detail below, offshore wind requires labor-intensive manufacturing, transportation, and operation, which will create job opportunities for thousands across all phases of the offshore wind development, deployment, and operations value chain.

Our New York Jobs and Workforce Plan will evolve over time as our relationships with organized labor, workforce training providers, academia, and government deepen and expand through the various phases of project planning, construction and long-term operation. This approach is intended to allow flexibility and room for growth as the project matures.

Background and summary

The New York Climate Act recognizes that workers are at the front lines of climate change and that a well-trained, organized, and diverse workforce is the cornerstone to building a new clean energy economy in New York State.

As an offshore wind area leaseholder in the New York Bight and the developer of a significant portion of the future clean energy power supply for New York, Leading Light Wind recognizes its role, responsibilities, and privilege to ensure that career opportunities in the new clean energy economy as envisioned by the Climate Act are created and shared geographically and demographically to increase access to good jobs for marginalized communities.

Climate change has a disproportionate impact on low-income people, women, and workers. It is in the interest of New York State and Leading Light Wind to protect and promote the interests of these groups against the impacts of climate change and to advance our equity goals by ensuring quality employment opportunities in safe working environments.

Offshore wind is poised to provide the next great increase in clean energy employment opportunities. Between 2019 and 2040, New York State is projected to see employment growth in occupations related to offshore wind (i.e., excluding "induced" employment projections) of 13,900 to 17,700 jobs, as per the Scenario 2 ("Low Carbon Fuels") and Scenario 3 ("Accelerated Transition") investment and policy scenarios, detailed in the 2022 New York State Climate Action Council "Scoping Plan." Manufacturing and other supply chain occupations will account for just over half (52%) of these new offshore wind-related jobs, with construction and professional services accounting for approximately 31% and 17%, respectively.

As discussed in more detail below, in addition to the New York State Supplier Opportunities Protocol, to be enacted by Leading Light Wind in compliance with the RFP, Leading Light Wind will negotiate with our supply chain and our partners in organized labor to set firm goals for inclusionary contracting, including setting baseline expectations for percentages of work to be contracted to MWBEs, SDVOBs, and DBEs across all phases of the project.

Leading Light Wind will prioritize hiring and training directly from local host communities as well as individuals from adjacent DACs or historically marginalized backgrounds. [redacted]

To make full use of the learned workforce experience of the previous solicitations and to provide our input and expertise to continually improve the offshore wind workforce in New York State, Leading Light Wind will cooperate diligently with the Jobs and Supply Chain Technical Working Group (JSC-TWG), the independent advisory body led by NYSERDA. The group is composed of offshore wind developers, global manufacturers, local economic development stakeholders, academia, and state agencies. It is focused on advancing workforce development and identification of near- and long-term workforce development needs.

Labor engagement

Labor Liaison Officer (LLO)

The Labor Liaison Officer (LLO) for the Leading Light Wind project is Mr. Brian Kerkhoven. His relationships with labor leaders throughout New York City, Long Island, and the rest of New York State uniquely position him to be an effective interface between the Leading Light Wind project and organized labor. Brian joined the Leading Light Wind team with nearly a decade of labor experience, most recently serving as the Energy Policy Adviser for North America's Building Trades Unions (NABTU). He also previously served as an energy, environmental, and labor staffer for two members of Congress, and as a renewable energy policy analysis for a financial firm focused on the Obama administration's American Reinvestment and Recovery Act clean energy funding provided to the US Department of Energy.

In his role as an Energy Policy Advisor for NABTU, Brian played in integral role developing some of the first relationships between organized labor and the nascent offshore wind industry in the US. This exposed him to the numerous work opportunities and job requirements offered by the offshore wind industry. Brian's work centered on educating European offshore wind industry counterparts on the nuances of American organized labor and the building trades. His efforts led to a shift in the European corporate labor strategy, which up until recently focused on instituting the European offshore wind construction model in the US Union leaders recognize Brian's early work as one of the primary reasons that Orsted agreed to sign a the first of its kind Memorandum of Understanding (MOU) with American organized labor. These efforts eventually lead to the National Offshore Wind Agreement (NOWA) signed between NABTU and Orsted, which is now widely recognized as the template for a Project Labor Agreement (PLA) for offshore wind construction.

Outreach and partnerships

Organized labor is the backbone of the American middle class. Leading Light Wind embraces this moniker and recognizes the historical significance of the labor movement in New York City and throughout the state. We will build upon this heritage and create new pathways into the middle class by engaging with labor throughout the Leading Light Wind ecosystem.

To best position our project to meet New York's goals and targets for organized labor in the offshore wind industry, we have instituted a union first culture within the development team with the goal of, to the fullest extent possible, incorporating union interests into everything we do. We will apply this union-first approach wherever possible.

Leading Light Wind intends to work closely and equitably with our union partners. Our labor outreach has built the foundation for lasting relationships with numerous NYS and national labor organizations, including leadership at the New York State Building & Construction Trades Council (NYSBCTC), New York State American Federation of Labor Congress of Industrial Unions (NYS AFL-CIO), NYC Central Labor Council, Long Island Federation of Labor, the AFL-CIO, and NABTU. Our conversations relate to the use of organized labor throughout our onshore and offshore construction and our future operations.

Specific to our construction, Leading Light Wind has signed an MOU with NABTU memorializing our commitment to union construction on our project throughout New York State as well as offshore. By signing with NABTU, which represents the NYCBCTC and all the Building Trades Councils through North America, Leading Light Wind commits to entering a PLA with the NYSBCTC for our onshore construction – port construction, battery storage facility, and pre-assembly work – and a separate PLA for onshore power infrastructure. Our MOU also includes the commitment to NABTU to utilize the National Offshore Wind Agreement, which is the standard PLA for all union-related offshore wind construction.

We believe these early efforts and partnerships will best position Leading Light Wind to fully utilize the world-renowned training and apprenticeship programs synonymous with the building and construction trades and New York state organized labor. The resulting MOU is provided in Appendix O.

[redacted]

Our intention is to develop some of the strongest PLAs in the industry, with clear provisions related to worker safety, industry leading compensation and benefits, training modules, and recruitment strategies to attract and retain workers looking to make a career in the offshore wind industry. The opportunities to be created through our partnership with the Building Trades, and memorialized in our MOU, will expand the current union efforts to diversify the construction industry, and the offshore wind industry at large, while utilizing strategic workforce development models to create new pathways into the middle class for historically underserved Americans, including those from DACs and MWBE and SDVOB businesses.

In addition to serving as a preliminary action towards the execution of unitary labor agreements (the PLAs), the MOU with NABTU supports our goal of transitioning US union construction workers into the offshore wind industry, provide for the standardization of the terms and conditions of employment for all employees performing construction work, and promote labor harmony. The MOU includes the following important provisions:

[redacted]

It is well-documented that using PLAs on high cost, extensive construction projects results in cost savings, increased productivity, training opportunities, on-time project delivery, increased worker safety, and more opportunities for individuals and contractors from DACs. In addition, PLAs achieve substantial cost savings by standardizing terms between various local Collective Bargaining Agreements (CBAs) and establishing clear prevailing wage rates to be paid to our union construction workforces.

[redacted]

Training programs

[redacted] we will also focus on growing the offshore wind workforce with our labor partners through their existing apprenticeship readiness collective and the creation of our new

Leading Light Wind stakeholder partnerships. These programs provide proven track records to recruit and train people of color, veterans, women, and people from DACs. In addition, our PLAs will build upon this infrastructure, integrating the programs into the communities we operate while providing coordination plans between our contractors and the program directors.

Leading Light Wind has identified the following programs for our primary partnerships on training and workforce development:

- **Construction Skills (CSKILLS)** apprenticeship readiness program, which provides training and Direct Entry access to New York City public high school seniors and other residents seeking careers in the unionized building and construction trades.
- **New York Helmets to Hardhats**, which is a 501(c)3 Direct Entry Program assisting active-duty veterans, National Guard, and Reservists to careers with the New York Building Trades unions and affiliated employers. This program will build upon Invenergy's longstanding partnerships with, and commitment to, the veteran community.
- **Pathways to Apprenticeship (P2A)**, which is a Direct Entry pre-apprenticeship program that recruits, trains, and mentors people from low-income communities for placement and success in union construction apprenticeship programs in New York City.
- **Nontraditional Employment for Women (NEW)**, which prepares, trains, and places women in careers in the skilled construction, utility, and maintenance trades, helping women achieve economic independence and a secure future for themselves and their families.

[redacted]Through our work with the NYS Building and Construction Trades Councils, we are excited to create pre-apprenticeship programs in local schools. The purpose of these programs is to expose students to career opportunities afforded to those who have no intention of enrolling in college. Pre-apprenticeship programs, for example, allow for the local building trade unions to apply their world-renown training program and curriculum to the next generation of blue-collar workforce, while exposing this demographic to opportunities for well-paying, middle class careers. This is especially applicable to our neighbors in surrounding DACs. Leading Light Wind will not ignore its neighbors and will make every effort to engage community leaders early in our development and throughout our project's construction and continuing operations.

Industry-wide training and education

Leading Light Wind understands that the role of workforce skills training is pivotal to the success of the ambitious economic development goals of the Climate Act in general, and a critical ingredient in realizing the potential long-term economic benefits to New York State from the regional development of offshore wind.

Continued development of the offshore wind industry in New York and along the Eastern Seaboard requires the associated development of a robust skills training ecosystem. Providing all levels of training for each of the offshore wind-related occupations requires a different amount of minimum education. For example, occupations such as management, operations analyst, engineering, environmental scientists and geoscientists, and sales typically require a four-year bachelor's degree or higher, whereas occupations such as business and financial operations, administrative support, construction trades workers, installation, maintenance and repair, production work, and transportation and material moving occupations typically require high school, apprenticeship, or post-secondary training such as a two-year associate degree.

Specialized offshore wind-related occupational training courses may vary in term from three to five days for specialized equipment or safety certifications, to two years of post-secondary coursework for assembly and production occupations (e.g., wind turbine service technicians). These courses typically do not require training prerequisites and are essential part of building the offshore wind workforce in New York.

Several training programs are already available in New York. The 2022 New York Offshore Wind Workforce Gap Analysis found that New York has a wide selection of vocational trade programs that could support offshore wind workforce development, including more than 750 programs that offer curricula for key occupations in the offshore wind supply chain. Vocations include electricians, machinists, technicians, and equipment operators. Though these trade programs may not yet currently contain material specific to offshore wind, the baseline knowledge remains key, and applicable to the construction and operations phases of offshore wind project development.

Led by the efforts of the New York Offshore Wind Training Institute, many institutions and training providers are already preparing offshore wind curricula, including the National Offshore Wind Training Center at Suffolk

Figure 19-2. Leading Light Wind is supporting the industry-wide establishment of quality offshore wind training in New York State.

County Community College on Long Island. The center will train and certify offshore wind construction, assembly, and production occupation workers through the nation's first Global Wind Organization training center for offshore wind.

Other training courses and certifications required for offshore wind operations may still not be widely available in New York State. For example, the Offshore Petroleum Industry Training Organization certified Helicopter Underwater Egress Training is a prerequisite for all personnel transfer/crew changes through helicopters. The Helicopter Underwater Egress Training may be paired with Helicopter Safety and Use of EBS (Emergency Breathing System). Many programs in New York, including the CUNY campus network, offer a two-year associate's degree in many of the offshore wind construction, assembly, and production occupations, including advanced manufacturing, welding and fabrication, etc. Hudson Valley Community College in Troy and LaGuardia Community College in Queens were both recently awarded funding through the Offshore Wind Training Institute to initiate programs to provide training and associate-level degrees and certification for these occupations. Apprenticeship and pre-apprenticeship programs also provide a significant source of opportunity for workforce development and skills training, especially for local residents, with some programs focusing on increasing the number of women, people of color, and transitioning veterans in the skilled trades. Major apprenticeship programs already established in New York State include the Department of Labor's Registered Apprenticeship Program, which offers a wide variety of sponsored curricula and job placement activities, and union-led apprenticeship programs such as those offered by NABTU and the International Brotherhood of Electrical Workers.

Apprenticeship training produces skilled workers through a combination of structured on-the-job training with a skilled trainer and trade-specific classroom instruction. Programs are conducted by employers, groups of employers, and jointly by employers and unions. Apprentices are full-time paid employees who produce high-quality work while they learn skills that enhance their employment prospects. They are paid on a graduated scale; this assures that salary reflects the degree of skill achieved.

In addition to providing traditional craft and trade-based apprenticeship training curricula (e.g., carpenters, mechanics, electricians), apprenticeship programs in New York State are expanding registered apprenticeship programs into emerging and expanding industries linked to the new clean energy economy, like advanced manufacturing and information technology. Leading Light Wind has sought out and engaged with many New York State offshore wind training efforts that are currently underway or in the planning stage. We have investigated potential collaborations and partnerships with the goal of supporting the industry-wide establishment of quality offshore wind training in New York State.

Depending on the bid option selected by NYSERDA, we estimate that the proposed projects will provide between 4,600 and 7,900 new jobs (and between 19,600 and 25,600 new jobs when including SCIPs), and are prepared to execute a specific plan of actions to strongly support existing industry-wide offshore wind training resources in New York State to grow a skilled workforce to fill those jobs—especially those resources that focus on providing training and placement opportunities to members of DACs and other priority populations.

Creating good jobs and a thriving economy is a core concern of New York State, and Leading Light Wind fully understands that setting clear standards for job quality and training standards encourages not only high-quality work but positive economic impacts.

Leading Light Wind is currently cultivating the following collaborations and partnerships; funding amounts are conditioned upon an ORECRFP22-1 award. Letters of intent that further describe the nature of these partnerships are provided in an attachment.

[redacted]

[redacted]

Just-transition considerations

New York State Supplier Opportunities Protocol

As per Section 2.2.13 of the RFP, Leading Light Wind shall implement the following New York Supplier Opportunity Protocol throughout our procurement

and contracting efforts related to all facets of the project, including offshore wind generating facilities (energy storage facilities) and SCIP facilities in support of providing opportunities to New York small to medium business entities.

- Leading Light Wind shall offer New York companies the opportunity to provide goods and services, including enabling domestic US iron and steel supplier contracts, for which there is capability in New York State to our contractors and other suppliers of the project (including energy storage). Leading Light Wind shall communicate all opportunities for supplier contracts for the project with an anticipated contract value of $1 million or greater not already committed as of the date of this ORECRFP22-1 submittal to New York State companies. We will use the New York Offshore Wind Supply Chain Database maintained by NYSERDA. Exceptions will be for the provision of goods and services that cannot practically be performed by the New York State supply chain at this time. We shall encourage all contractors and other suppliers to reference and review this database regardless of the contract value.
- Leading Light Wind shall report on New York State supplier opportunity activities for direct contracts and for subcontracts associated with the project. This action is aligned with the progress reporting requirements under Section 6.02 of the agreement. Leading Light Wind shall utilize the New York Offshore Wind Supply Chain Database as maintained by NYSERDA or its designee on an ongoing basis. Reporting would cover the opportunity and associated marketing through the database.
- Leading Light Wind and its contractors and other suppliers will undertake efforts to maximize contract and subcontract opportunities for MWBEs and SDVOBs and communicate supplier opportunities to MWBE and SDVOB using the MWBE Certified Database maintained by Empire State Development. We will also use the Directory of New York State Certified SDVOB maintained by the Office of General Services. Opportunities will be for goods with anticipated contract value of over $250,000, and for services with contract value expected over $100,000.
- Leading Light Wind shall include within the Stakeholder Engagement Plan a section outlining outreach efforts and strategy to enhance the participation of New York companies, including MWBE and SDVOB firms, in the renewable energy sector and shall report commitments and expenditures to MWBE and SDVOB firms as part of the contract quarterly report.

Our commitment to DACs and priority populations

Leading Light Wind will prioritize hiring and training directly from local host communities as well as individuals from adjacent DACs or historically marginalized backgrounds. [redacted]

To make full use of the learned workforce experience of the previous solicitations and to provide our input and expertise to continually improve the offshore wind workforce in New York State, Leading Light Wind will cooperate diligently with the Jobs and Supply Chain Technical Working Group (JSC-TWG), the independent advisory body led by NYSERDA and composed of offshore wind developers, global manufacturers, local economic development stakeholders, academia, and state agencies. It is focused on advancing workforce development and identification of near- and long-term workforce development needs.

Opportunities for MWBE/SDVOB/DBE contractors and subcontractors

In addition to the New York State Supplier Opportunities Protocol to be enacted by Leading Light Wind in compliance with the RFP, we will negotiate with our supply chain and our partners in organized labor to set firm goals for inclusionary contracting, including setting baseline expectations for percentages of work to be contracted to MWBEs, SDVOBs, and DBEs across all phases of the project.

Leading Light Wind will negotiate with our organized labor partners to include in the PLA stipulations and requirements for the unionization and contracting of MWBEs, SDVOBs, and DBEs that are duly competitive against similarly sized businesses, including long-term plans to increase the unionization of MWBEs, SDVOBs, and DBEs for construction and professional services related to offshore wind that will allow them to gain valuable experience working on transformative New York clean energy projects.

Jobs commitments

The job commitments for each bid alternative are provided in our Economic Benefits Plan attachment.

20 Energy storage

20 Energy storage

20.1 Introduction

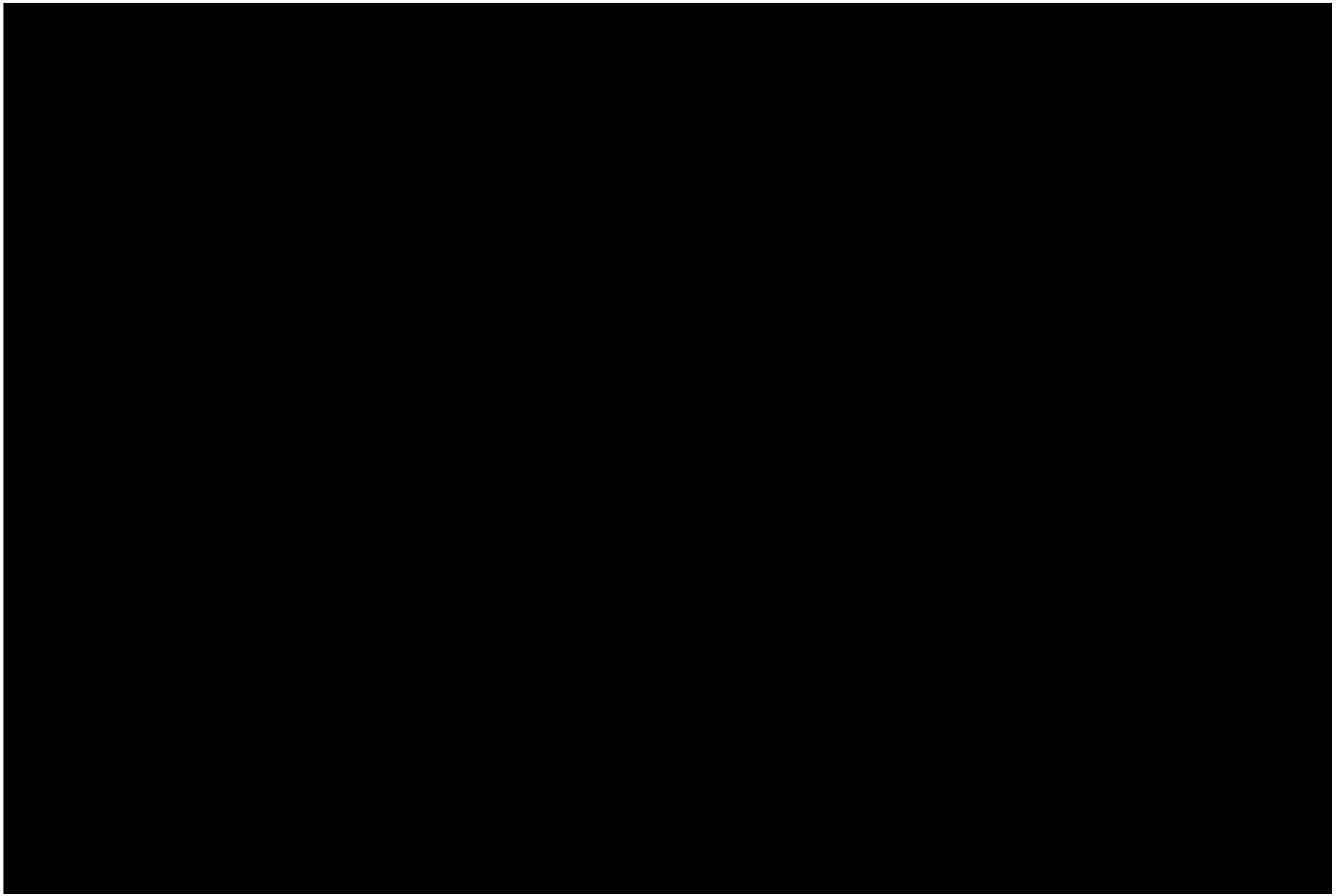
In contribution toward Governor Hochul's nation-leading energy storage target of 6 GW by 2030, Leading Light Wind is offering an optional 104 MW/416 MWh energy storage project as part of its bid submission.

[redacted]

Leading Light Wind expects to serve as the developer, owner, and operator for the project.

[redacted]

[redacted]



[redacted]

20.2 Energy storage interconnection point and plan

[redacted]

[redacted]

20.3 Energy storage status

[redacted]This section provides an overview of the permitting plan, financing plan, technology and equipment, and current high-level development schedule for the project.

Permitting plan

As discussed in Section 3, Invenergy is an experienced developer in New York State, with **over 900 MW of renewable and battery storage capacity** in operation or contracted and an extensive pipeline of development-stage projects. Our involvement in New York has shown that early, clear, and regular communication is an essential component to successfully develop any new energy infrastructure.

The Leading Light Wind development team has developed broad experience with the New York State permitting process under the State Environmental Quality Review Act, Article 10, and Article VII, as well as established relationships with the federal agencies. We are confident in our understanding of the state and local permitting processes for battery storage in New York State. Most notably, we have experience obtaining negative declarations related to BESS under the Act. The Leading Light Wind development team is prepared to collect and submit necessary environmental data for local review and any supplementary studies and information needed for the lead agency to

reach an informed conclusion. Based on prior experience, the Leading Light Wind development team would anticipate a BESS to be classified as a Type I or unlisted action and would prepare for submission of a Full Environmental Assessment Form for review by the lead agency. Leading Light Wind would compose Part I of the form and continue coordination with the lead agency to provide any supplemental information deemed necessary for Part II.

The Leading Light Wind development team has direct experience preparing spill prevention, control, and countermeasure plans, agricultural data statements, visual and noise simulations, and stormwater pollution prevention plans, among others, for the purposes of receiving a negative declaration via the State Environmental Quality Review Act process.

The schedule listed in Figure 20-3 below provides generalized guidelines for when we would seek necessary permits.

Environment and safety: Early-stage development	Site approval: Mid-stage development	Pre-con checklist: Late-stage development
State Environmental Quality Review Act negative declaration **Issuing group:** Lead agency (TBD) **Notes:** Type I or unlisted action, Full Environmental Assessment Form anticipated, supplementary studies anticipated.	**Site plan approval** **Issuing group:** Town or planning board **Notes:** Site plans to include survey data, electrical and civil designs, local environmental data, and community considerations such as audio and visual screening.	**Zoning permit** **Issuing group:** Zoning/code enforcement officer Notes: Often, materials submitted for site plan approval and Special Use Permit are sufficient for obtaining a zoning permit. In some cases, more focused discussion of the host town's Comprehensive Plan and/or zoning district descriptions and layout is necessary.
[redacted]	**Special Use Permit** **Issuing group:** Town or planning board **Notes:** Justification for use-case of the property for a BESS application will be submitted with accompanying data and information on Leading Light wind's operation projects. Development of a Fire and Emergency Response Plan based on collaboration with local first responder is also a standard supplement for Leading Light Wind's permit applications.	**Building permit** **Issuing group:** Building inspector **Notes:** Approval is needed from a building inspector prior to start of construction. Administering agencies vary county to county, but often a county Planning and Development Department, Department of Health, or comparable department is responsible for issuing the building permit. **Driveway permit*** **Issuing group:** Highway Department or zoning/code enforcement officer **Notes:** Where new access to a parcel is needed for the BESS project, a driveway permit may be needed. Leading Light Wind would intend to use existing access for the purpose of this proposal.

Figure 20-3. [redacted] permitting plan by development stage.

Financing plan

[redacted] We expect that the OREC cash flows that are attributable to the addition of the energy storage project will serve as a key source of revenue stability that will provide revenue certainty for project investors that is needed to unlock low cost financing for the project.

As discussed in Section 7, Leading Light Wind's highly experienced capital markets team is unparalleled in the US renewable energy sector. We maintain strong relationships with a wide range of financial partners, including international and domestic banks, multilateral development banks, export credit agencies, tax equity investors, and financial investors. As a result, Leading Light Wind has direct access to a variety of capital sources, allowing us to optimally finance each project on an individual basis.

At Final Investment Decision, Leading Light Wind expects to have financing arrangements in place that are appropriate for the project. This is likely to include committed construction loan lenders and tax equity investors, and final project financing arrangements that include a combination of project debt, tax equity, and sponsor cash equity.

Technology and equipment

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

20.4 Carbon accounting and treatment

Leading Light Wind confirms that the energy storage will be included in the carbon accounting and treatment of embodied carbon utilized for the project in accordance with the methodologies discussed in Section 21.2 of this proposal.

20.5 Assumptions

[redacted]

20.6 Carbon emissions reduction

Strategic location

[redacted] was strategically sited near Leading Light Wind's point of interconnection and near downstate fossil fuel plants to maximize curtailment benefits and displacement of fossil generation, respectively.

Intended dispatch

The proposed energy storage peaking plant is intended to operate to maximize energy delivered by Leading Light Wind while providing capacity, energy shifting, and operating reserve services to maximize revenue and displacement of fossil fuel generation. Maximizing these benefits are not mutually exclusive. Wholesale markets already provide price signals to incentivize dispatch in this manner (see Figure 20-4 on the next page).

Periods of low prices, when the energy storage will charge, are also periods of low demand, when spare capacity is available and the risk of a system outage is low. Conversely, periods of highest prices are highly correlated to periods of highest demand when the system needs reliable capacity. Historically, this has been provided by fossil peaker plants. The proposed dispatch will support New York State's decarbonization goals by enabling higher renewable penetration and displacing fossil fuel generation in these ways:

1. Charging during periods of excess renewable energy, especially during periods the energy would have been otherwise curtailed
2. Discharging during periods of low renewable availability, high demand

[redacted]

Decarbonization and health benefits

[redacted]

The proposed energy storage system will provide long-term health and climate benefits by shifting grid energy from off-peak to peak hours, displacing fossil-fired peaker generators and associated pollutants, including nitrous oxide (NOx), sulfur dioxide (SO_2), and carbon dioxide (CO_2).

NOx and SO_2 pollutants tend to dominate estimates of impact of fossil fuel combustion emissions due to their direct and measurable impact on human health. The main health impacts of NOx and SO_2 emissions are related to their contribution to the formation of secondary particulate matter with diameters of

2.5 microns or less ($PM_{2.5}$). Long-term exposure to these has significant public health consequences, including increased mortality risk, particularly from cardiovascular causes. Reduction of these pollutants, particularly in densely populated urban areas, results in decreases in mortality, emergency room visits, and hospital stays, as well as the prevalence of acute and chronic respiratory diseases.

To evaluate the system-wide impact of [redacted] on regional offsets in fossil-fired generation, PROMOD, by Hitachi Energy, was used to model the Climate Act-compliant New York State electricity system in 2030. The PROMOD model receives as input the 2030-forecasted resource mix, transmission topology, import and export limits, and demand, and then calculates the security constrained and economic dispatch of all the resources on the system. The analysis showed that **fossil fuel generation in New York was reduced by over 2 million MWh/year, down 7.2%** compared to without Leading Light Wind and [redacted] (Figure 20-6). In particular, [redacted] directly contributed to over a 33,000 MWh/year reduction in fossil fuel generation in New York. Converting the reduction in fossil fuel generation to an estimated reduction in annual emissions reveals that NOx, SO_2, and CO_2 emissions were reduced by 82,000 pounds, 21,000 pounds, and 24,000 tons, respectively.[1]

The removal of the NOx, SO_2 pollutants associated with the reduction of thermal output is estimated

[redacted]

7.1%	Thermal generation	7.2%	Thermal generation
6.9%	CO_2 emissions	7.0%	CO_2 emissions
7.0%	NOx emissions	7.1%	NOx emissions

[redacted]

to have a monetary value of almost $1.5 million annually.[2] Using the US government Social Cost of Carbon estimate for 2020 of $42/ton of CO_2,[3] the total monetary value for climate benefits resulting from reduction of fossil plant operation is over $1 million annually. The emissions offset value of the energy storage project is likely to increase as the grid becomes cleaner with increased penetration of renewable energy during off-peak hours (e.g., with offshore wind).

20.7 Benefits to the electric grid

[redacted] will provide a wide variety of benefits to the New York State power system, including increased reliability and resiliency, as well as the economic, decarbonization, and health benefits that result from an overall operational improvement to the system and reduction in fossil peaker generation and associated emissions.

Reliability benefits

Maintaining system reliability means ensuring sufficient generation resources are available to meet load, while maintaining sufficient operating reserves to meet flexibility needs and respond to contingencies.

[1] Unless otherwise stated, emissions data presented in this section was retrieved from the US EPA Emissions & Generation Resource Integrated Database website: https://www.epa.gov/egrid and the US EPA Air Markets Program Data website: https://ampd.epa.gov/ampd/.

[2] The estimated monetary value of the health benefits through the reduction of NO_x and SO_2 emissions is provided by the US EPA CO-Benefits Risk Assessment (COBRA) screening tool, which enables estimation of the air quality and health benefits of different emission reduction scenarios. https://cobra.epa.gov/.

[3] US Environmental Protection Agency, "The Social Cost of Carbon." https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html.

As New York transitions to a more renewable grid, balancing loads with intermittent generation will require energy storage to supplement the declining use of fossil peaker units.

Climate Act-compliant models, including the PROMOD model mentioned previously and the New York Power Authority's model described in its *Small Clean Power Plant Adaptation Study* (SCPP Study), show that the run-times of the fossil peaker plant fleet are projected to decline 70% to 87.5% in both frequency and duration from current levels.[4]

Further, due to the shorter, later, and faster ramping peak periods anticipated, average peak loads for the fossil fleet are projected to decrease by almost half by 2030, and peak energy flows during the four-hour evening peak period between 17:00 and 21:00 decrease to approximately 30%.[5] These capacity factors and peak flows are projected using merchant signals. The models include a significant or total alleviation of the current load pockets around Zones J and K, eliminating their current practice of out-of-merit order dispatch. This dramatic decline in the fossil fleet capacity factors and peak energy flows is attributed to corresponding changes to the generation mix and improvements in transfer capacity required for New York State to achieve its Clean Energy Standard target of having 70% of electricity consumed in New York supplied by renewable power. These changes include the following:

- Increase in transmission capacity between upstate and downstate New York to support the expansion of wind and solar resources in upstate and western New York to New York City
- Interconnection of new offshore wind projects directly into Zone J
- Champlain Hudson Power Express Tier 4 transmission project, bringing hydropower from Hydro-Quebec

These changes mark out a potential new role for the New York's downstate fossil fleet. As new bulk renewable energy flows into Zones J and K, the existing gas-fired turbines would no longer be required to provide out-of-merit order power due to line congestion. Instead they are dispatched following merchant price signals from the NYISO day-ahead and real-time markets during the four-hour evening peak period. This provides the right opportunity to transition the downstate fossil fleet with energy storage that can help shift renewable output to peak times to displace these emitting units.

[redacted] can displace an equivalent amount of fossil fuel peaking generating capacity during its four-hour discharge, providing significant additional availability at a lower cost to the grid (see "Economic benefits" below).

Resiliency benefits

As indicated in the previous section, system reliability primarily relates to equipment availability and potential interruptions to customer power service when generating equipment cannot produce sufficient power, or when transmission and distribution networks cannot move sufficient power to consumers.

The PROMOD and SCPP models demonstrate that energy storage on the system increases reliability for the entire system by strategically locating resources capable of providing sufficient power when it is needed most, in response to new system reliability needs arising from the increasing penetration of bulk flows of variable renewable energy.

[redacted] also increases the resiliency of the system by providing enhanced flexibility to firm up the increasing flows of variable renewable energy. "System flexibility" refers to the ability of grid operators to closely align supply and demand in the system using energy resources that can start, stop, and ramp quickly and economically, and operate across a wide output range, providing spinning reserves and other ancillary services.

By 2030, new challenges relating to the stability of the power system and its ability to withstand grid frequency disturbances are expected to emerge as variable renewable generation penetration levels achieve 25% to 50% of the energy supply in New York. At these levels it is possible that variable renewable generation output covers most or even all of power demand in certain situations and time periods. These occurrences may typically be when variable renewable generation output is at a maximum during daily periods of low demand, such as overnight or on weekends, or seasonally, such as in the spring, when wind power and solar PV both may see high output.

[4] See Figure 11: Base Case Annual SCPP Operations, p.23 of the SCPP Study.

[5] See Figure 12: Average Hourly SCPP Operations, p.24 of the SCPP Study.

In systems where inverter-based resources, (including wind, solar, and battery energy storage) are replacing mechanical-based synchronous machines that traditionally provide system inertia and primary frequency response, certain counterbalancing effects decrease the need for inertia overall to maintain grid frequency and the need for fast-ramping secondary frequency response to maintain stability. Fewer synchronous power plants on the system will mean variable renewable generation and energy storage will have to move toward being able to provide all essential reliability services for the grid. Only this will allow these resources to cover close to 100% of power demand on occasions in an entire synchronous grid area.

While combustion turbines are currently one of the primary suppliers of flexibility to the system, lithium-ion battery storage provides sub-second, virtually unconstrained ramp rates compared to ramp rates of several to tens of minutes for combustion turbines to reach full power. Further, battery storage can perform these services without the opportunity and maintenance costs that result from the use of combustion turbines. The economic benefits that flow from these resiliency benefits and quantify their value are discussed in the following section.

Economic benefits

Energy storage provides significant costs savings to load-serving entities and their customers. Battery energy storage systems are extremely effective at balancing supply and demand. As a result, they lower the market-wide price of energy. Combined with the volume of energy (MWh) that the load server must procure each hour, a small energy price ($/MWh) reduction translates into significant savings.

However, within the current market system, energy storage cannot capture a meaningful portion of the value it creates. The Climate Act-compliant PROMOD model results show that [redacted] does not capture enough revenue to cover its costs, but **reduces cost to load by over $2 million annually**, compared to the case without it. The savings this system creates for the NYISO load are 70 to 90 times greater than the revenue realized by the energy storage system.

Energy storage can capture revenue in the NYISO market through energy arbitrage, capacity, and ancillary services. Wholesale market price signals incentivize energy arbitrage dispatch, which consists of purchasing cheap (off-peak) energy to charge the system and selling it later at a higher price (typically in on-peak periods), making charged energy available when its needed most. As a result, energy arbitrage helps suppress price increases by supplying energy at points of high demand, which represent the points where the energy cost is higher.

Energy arbitrage leads to additional and significant indirect economic benefits through the resulting optimization of the system, including reduced fuel-use and other operation and maintenance costs. This includes the ability to time-shift energy from efficient and clean baseload generation (e.g., combined cycle, geothermal, or wind generation) to offset use of less efficient, dirtier on-peak generation.

Other optimizations leading to system economic benefits include the reduction of energy losses if energy is transmitted during off-peak times, and dynamic operating benefits for the system fossil generation as equipment is used less frequently (i.e., has fewer startups), operates at a more constant output when it is used (avoided part load operation), and operates at its rated output level most of the time when in use.

Decarbonization benefits

See Section 20.6, Carbon emissions reduction.

Transmission, congestion, and curtailment benefits

By operating as described in Section 20.6, [redacted] is projected to alleviate regional transmission constraints, local congestion, and renewable curtailment that is estimated due to the operation of future proposed generators. The Climate Act-compliant PROMOD model results provide power flows across the NYISO system, which allows for isolating the flowgate contribution to locational marginal price congestion. [redacted]

These benefits are due to storage charging during periods of excess offshore wind generation, particularly during periods the energy would have been otherwise curtailed, and discharging that energy when offshore wind generation is low. [redacted]

[redacted]

20.9 Energy storage experience

Invenergy was one of the earlier pioneers in advanced energy storage, completing its first advanced battery storage project in 2012. Since then, Invenergy has amassed over 150,000 hours of battery system runtime experience. [redacted]

In 2019, Invenergy received the **Energy Storage Association's Brad Roberts Award** recognizing extraordinary accomplishments in the storage market and comprehensive industry commitment and participation.

Invenergy currently has 18 battery storage projects either operating, under construction, or contracted (see Figure 20-8 and Table 20-7). These represent nearly 500 MW of capacity and over 1,500 MWh. This includes the Orangeville Storage project in Orangeville, NY, the second largest battery storage project operating in New York as measured in MWh.

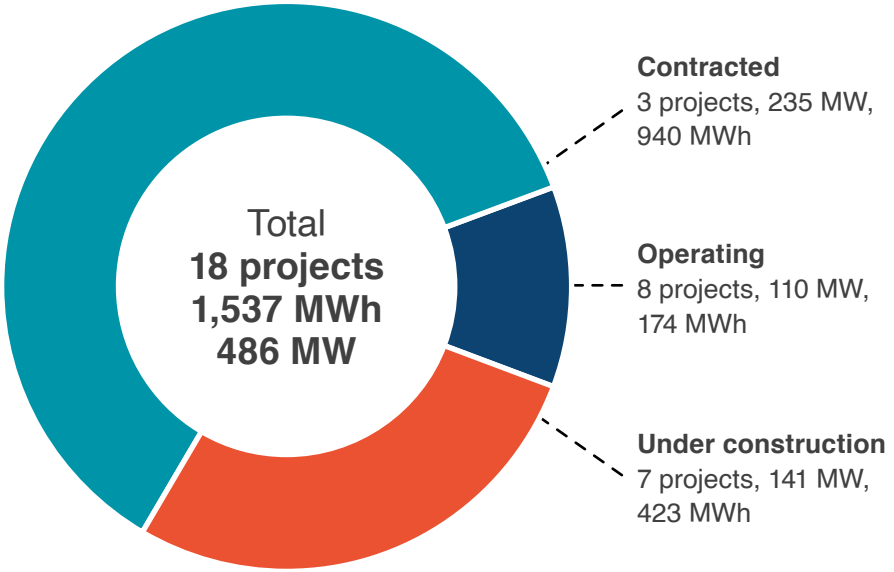


Figure 20-8. Invenergy's operating, under construction, and contracted storage portfolio.

Leading Light Wind is agnostic to battery suppliers and will select a top-tier battery supplier to provide a cost-effective and reliable energy storage system. We have experience working with a variety of battery manufacturers and will select battery technologies and vendors that provide the best storage system based upon system reliability, performance, flexibility, and cost. To date, our advanced energy storage experience has focused on lithium-ion battery technology, which is tested and proven and has been deployed worldwide. We have expertise across the major lithium-ion chemistries, including nickel cobalt manganese, nickel cobalt aluminum, and lithium iron phosphate.

Storage operations

Invenergy monitors over 4,000 data points per MWh from its storage facilities. It has personnel staffed 24/7 with remote access for battery and inverter control. Invenergy's battery storage control software optimizes state of charge and maximizes system performance, efficiency, and life. Invenergy can accept dispatch instructions from the customer and direct the storage system to respond, or have it run autonomously in a variety of modes to maintain voltage or frequency, shave peaks, and optimize economic dispatch.

Invenergy Services has built upon the preventative maintenance schedule required by battery and inverter manufacturers to fit internal best practices. Invenergy prioritizes acquiring and archiving all data that manufacturers have available, which allows much of the preventative maintenance and troubleshooting to be done by Invenergy Services technicians and operators. Invenergy Services has augmented manufacturer maintenance to include capacity tests, voltage balancing, and alarm testing.

Project	Status	Location	COD	Power rating (MW)	Energy (MWh AC)
Grand Ridge IV Storage	Operating	Illinois	2012	1.5	1
Grand Ridge Storage	Operating	Illinois	2014	31.5	31.5
Beech Ridge Storage	Operating	West Virginia	2015	31.5	31.5
Grand Ridge IV Expansion	Operating	Illinois	2016	3	1.3
MidAm Knoxville	Operating	Iowa	2018	1	4
Orangeville Storage	Operating	New York	2022	20	20
La Toba Storage	Operating	Mexico	2022	20	80
Westar	Operating	Kansas	2023	1	4.7
Desert Star	Construction	Arizona	2023	10	30
Cotton Center	Construction	Arizona	2023	17	51
Paloma	Construction	Arizona	2023	17	51
Gila Bend	Construction	Arizona	2023	32	96
Hyder I	Construction	Arizona	2023	16	48
Hyder II	Construction	Arizona	2023	14	42
Foothills	Construction	Arizona	2023	35	105
Paris	Contracted	Wisconsin	2024	110	440
El Sol	Contracted	Arizona	2024	50	200
Darien Storage	Contracted	Wisconsin	2025	75	300
			Total	**485.5**	**1,537**

Table 20-7. Invenergy's storage portfolio by project status.

Capacity tests

Capacity tests, typically biannual, to track system health and diagnose premature degradation

Voltage balancing

Cell and system-level voltage balancing to improve capacity

Alarm testing

Regular alarm testing to ensure remote visibility

Invenergy Services' data analytics team has developed leading indicators for degradation and failures. Data analysis also pinpoints bad components within the system to save technicians time locating them on site. Data also leads to performance improvement. For example, at a 3 MW facility, Invenergy uses two-second data from over 8,000 data points to thermally map the storage system. Insights from this data enable HVAC adjustments that improve cooling efficiency.

Storage safety

Safe operation of advanced energy storage systems begins with safe equipment and compliance with safety codes and regulations. Invenergy's equipment suppliers manufacture to stringent quality standards, and equipment at our projects must be tested and certified by third-party professionals.

As a member of the ACP's Storage Safety, Codes, and Standards Committee, and various NFPA 885 Task Groups, Invenergy is an industry leader in advancing responsible supply chain practices and emergency response planning, including the development of new authorities having jurisdiction and project development resources for electric storage system safety.

The Leading Light Wind project will develop an Emergency Response Plan with local authorities. Emergency Response Plans for storage projects require quarterly safety drills and annual safety training with local first responders. Each advanced energy storage project is equipped with a battery management system that constantly monitors key safety parameters and can automatically stop operations if necessary. Any alarm also notifies the Invenergy Control Center, which has redundant remote shutdown capability and will alert local technicians to investigate further or notify local emergency services if conditions require.

Automatic fire suppression systems are installed at all Invenergy energy storage projects. These systems use suppression agents certified by the US Environmental Protection Agency and meet all relevant codes and regulations. Invenergy complies with several major standards in its battery systems designs, such as the International Fire Code 2021 and National Fire Protection Association 855. Invenergy works with manufacturers to ensure all equipment has been stringently tested to prominent safety standards, including UL9540A.

Community engagement

Community engagement for the [redacted] project is discussed in Section 16 of this proposal. Leading Light Wind is committed to authentically involving affected communities in project development and decision-making. We have begun the process of identifying a working list of diverse stakeholders associated with the project. [redacted] In doing this work, we embrace the full scope of potentially affected stakeholders and seek broad representation while elevating the voices of those historically left out of development decisions, namely disadvantaged and environmental justice communities, MWBEs, and SDVOBs. [redacted] Successful community engagement will support equitable access to the new opportunities the project is creating. Leading Light Wind will continue to seek input from stakeholders to design future and continued engagements, with the goal of co-designing engagement activities that are accessible and provide meaningful opportunities to shape the project.

Partnerships with local elected officials and nearby schools will be leveraged to build support for the project and also involve nearby communities in learning about the clean energy transition. We will ensure the local community understands the benefits of the project and alleviate any concerns they may have with this emerging technology and infrastructure.

Benefits and burdens to DACs

The Climate Act calls for the energy sector to prioritize the safety, health, and economic growth of DACs and adopt practices that enable and empower these communities to thrive in the clean energy future. Leading Light Wind understands that not only is this the right thing to do, but it is beneficial to the success of the proposed projects, as DACs can provide historical knowledge and local expertise to inform workforce training and development needs and opportunities, as well as community investments that would best serve their neighborhoods.

[redacted] project is expected to provide benefits by reducing fossil fuel use in downstate power plants, improving local air quality and greenhouse gas emissions, including in nearby DACs. Replacing peaker plant generation in [redacted] nearby communities with stored clean energy will decrease adverse human health effects from cardiovascular and respiratory illnesses. Other potential benefits may include economic benefits that result from the development, construction, and operation of the proposed battery energy storage projects. These include the creation of short-term jobs for demolition and construction activities as well as long-term jobs and economic opportunities for small local businesses associated with the operation and maintenance of the proposed battery energy storage facility over the several decades-long expected lifetime of the project. As part of our overall Stakeholder Engagement Plan, Leading Light Wind will work with local nonprofits, including education and workforce-focused organizations, and elected officials, to involve nearby DACs in the planning and design process.

Potential burdens associated with the project may include an increase in vehicle traffic and vehicle emissions at the site and surrounding area, but it is expected that these burdens will be temporary and keeping with surrounding land use.

21
Reducing carbon emissions and embodied carbon

21 Reducing carbon emissions and embodied carbon

21.1 Understanding project carbon footprint

The life cycle carbon emissions of the Leading Light Wind project will include direct and indirect emissions throughout every phase, including development, construction, and operation.

The project's "direct" emissions will include fuel combustion-related releases from the project itself. These direct emissions include:

- Emissions from local transportation of components to the project marshaling and assembly sites (whether by land, air, or sea)
- Installing, maintaining, and removing the assembly facilities
- Transporting personnel to offshore sites
- Any operational emissions from sources located on the wind turbine generators and electrical service platforms

Direct emissions will primarily come from internal combustion engines, including marine diesel engines on vessels, diesel engines on construction equipment, and diesel generators.

"Indirect" emissions are those released throughout the project's supply chain and include emissions from raw material extraction and processing, fabrication of parts, manufacturing and assembly of project components, and long- distance transportation of the components to the project site for installation. The term "embodied carbon" refers to indirect carbon emissions that are "embedded" (or embodied) in the finished offshore wind farm facilities.

[redacted]Over time, as firming technologies like energy storage come online, we expect that our project will enable the retirement of fossil fueled generators. The project's "carbon payback period" (typically measured in months and years) is the time required for the system carbon emissions displaced by wind power to equal the life cycle carbon emissions (direct and indirect) of the wind farm.

According to the National Renewable Energy Laboratory (NREL), average carbon payback periods for offshore wind are estimated to be approximately one-half year (0.50 years) when comparing to average US network carbon emission rates, and somewhat less (0.40 years) when modeling marginal displacements (i.e., the displacements of marginal generators, which typically have higher carbon emission rates).[1]

These results indicate that offshore wind already has the lowest carbon footprint of all electricity generating technologies, including fossil fuels, other renewables, energy storage, and nuclear energy.

[1] Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update, NREL. (2021)

The energy payback period is closely related to the carbon payback period. This is the amount of time it takes for an energy system to generate the amount of energy equivalent to the amount of energy required to produce the system. In this case, the offshore wind farm generates electricity without any additional energetic input to compensate the energetic expenses for production, use, and disposal. For renewable power systems, carbon and energetic payback periods typically demonstrate a strong correlation between each other because the carbon emissions are mainly based on the energetic expenditures.

As offshore wind generation also produces zero-emission electricity, any potential additional life cycle carbon emission reductions will be marginal improvements at best when taken in context of the carbon payback period and net lifetime emission savings. The ratio between displaced emissions and the life cycle carbon emissions is already relatively large, indicating that as the emission savings may grow, the relative accumulated benefits will continue to diminish. Therefore, a cost-benefit analysis of every emission saving measure is essential to assure that the investment has value in terms of absolute climate benefits.

Although the carbon payback period is the primary useful measure for the project's life cycle carbon emissions, the total "net emission savings" is also of interest. The net emission savings are the total displaced emissions over the entire service life of the project, minus the life cycle carbon emissions. This measure provides a large "headline" number that is descriptive of the overall impact of the project over the long term, but is subject to high levels of uncertainty as it is dependent on the ultimate service life of the project, the average capacity factor, and the emission rate of the grid over a time period of several decades.

By contrast, the carbon payback period includes only the engineering, procurement, and construction phase of the wind farm plus the first one or two years of operation. Therefore, it is subject to less uncertainty.

Figure 21-1. Offshore wind has the lowest carbon footprint of all electricity generating technologies.

Modeling emissions reductions

[redacted]

[redacted]

Proposed tools and methodologies for tracking life cycle carbon emissions

The US Environmental Protection Agency (EPA) has developed a specific, fit-for-purpose tool capable of providing sophisticated tracking and reporting of life cycle carbon emissions based on the Environmentally Extended Input-Output Model or EEIO. EEIO models are based on economic input-output (IO) tables that represent monetary exchanges between sectors in an economy as well as consumption by final consumers in a balanced accounting framework.

The IO model is also the basis for tracking and reporting the economic benefits of the wind project, including associated Supply Chain Investment Plans (SCIPs). Therefore, the EEIO used for life cycle carbon emission analysis can leverage the same production model used in that effort, providing an efficiency of effort and harmonization of results.

The EPA tool, known as the United States Environmentally-Extended Input-Output (USEEIO), is a family of models calculating potential environmental impacts, energy and resource use, and waste generation along with economic impacts. It uses the same input-output accounts data products issued by the US Bureau of Economic Analysis that are used by industry-standard IO models and applications.

The tool tracks the full spectrum of the US industrial economy with over 400 industries and commodities. In addition to greenhouse gases (GHG) including carbon dioxide, methane, nitrous oxide, etc., the USEEIO family of models uses a wide variety of satellite tables with EPA environmental information and data to track and report supply chain lifecycle analysis for criteria and hazardous air pollutants, mineral extraction, energy extraction, water extraction, land use, etc.[2]

The original 2017 release of the EPA USEEIO was updated in July 2020 to develop a complete set of US domestic supply chain GHG emission factors from the production and upstream supply chain activities of different sectors and products in the US economy. These GHG supply chain factors were incorporated into the latest version (2.0) of the USEEIO tools released in April 2022. The USEEIO 2.0 code and extensive data tables are maintained by EPA and are provided on an open-source basis through several Python and R packages, allowing for full transparency and customization of the model.

The use of EEIO models for estimation of supply chain emissions is most appropriate for product groups and when assessing supply chain GHG

[2] For more information regarding the US EPA USEEIO model see: US EPA, US Environmentally-Extended Input-Output (USEEIO) Technical Content.

impacts via financial activity data, such as a detailed bill of expenditures. EEIO models can also be used for screening or streamlining the potential supply chain impact estimation for specific products and supply chains and specific regions (e.g., New York State or the entire North Atlantic region).

For more specific product supply chain accounting, the use of other methods including process-based life cycle inventories, or mixes of EEIO and process-based life cycle inventories (so-called process-based hybrid analysis or IO- based hybrid analysis), are used to balance tradeoffs between process-based and EEIO-based methodologies. EEIO data provides less granularity, and process-based lifecycle analysis can underestimate actual supply chain emissions. For example, when supply chain "cutoffs" (missing inputs in supply chains) are intentionally or unintentionally applied, this results in omitted supply chain emissions.

The EPA USEEIO tool is an industry standard, open-source, and transparent tool for tracking and reporting of life cycle carbon emissions. Leading Light Wind will use it to validate, following commissioning of the project, a final accounting of the project's embodied carbon, the project's ultimate carbon footprint, and the project's energy and carbon payback periods.

21.2 Carbon emission reduction measures

In general, the offshore wind life cycle includes these elements:

1. Manufacturing of wind farm components
2. Transportation and installation
3. Operations and maintenance
4. Dismantling and disposal

Offshore wind life cycle carbon emissions

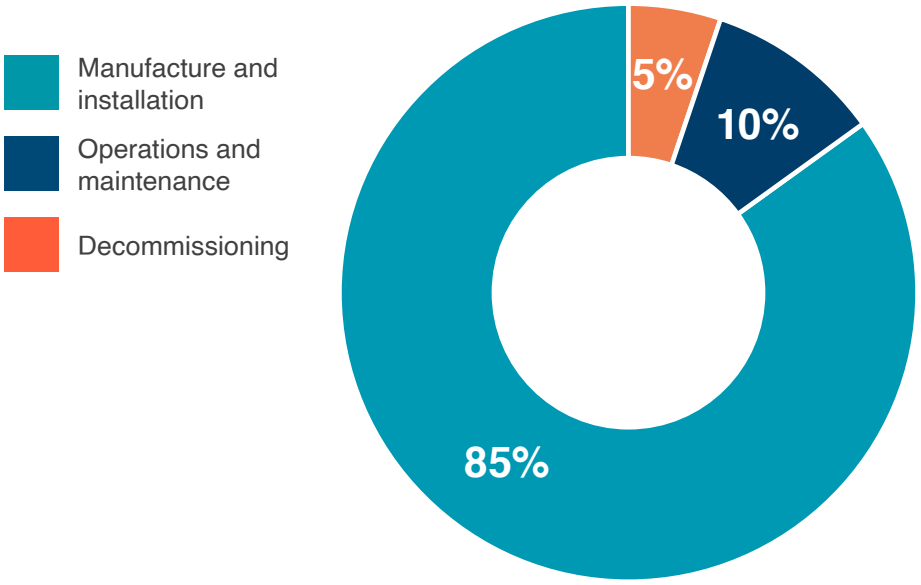


Figure 21-3. Carbon emissions at each stage of the offshore wind life cycle.

As shown in Figure 21-3, NREL estimates that the manufacture and installation stages together account for over 85% of the total life cycle carbon emissions of the offshore wind farm, with approximately 70% arising during the extraction of materials and manufacture of components, particularly the manufacture of foundations and turbines due the ferrous metal content.

The operations and maintenance component contributes about 10% of the total life cycle carbon emissions. These are mainly attributable to maintenance activities including personnel transportation (using vessels or helicopters) and the manufacture, transportation, and installation of replacement parts (e.g., gear boxes, transformers, generators, blades).

The life cycle carbon emissions of the decommissioning phase of the wind farm are about 5% of the total. They generally include emissions resulting from project decommissioning and disassembly, transportation to the waste site, and ultimate disposal and/or recycling of the equipment and other site material.

The impacts or credits of potential recycling of materials and reuse of components can, however, introduce some significant variation to carbon emissions estimates at this stage, due to varying assumptions about

the use of recycled materials and the recyclability of any waste. Prior to implementation of the project carbon accounting system, a detailed review of any potential recycling processes that would be included into the project design will be completed and documented for the final carbon footprint validation.

The optimization of life cycle carbon emissions is the minimizing of direct and indirect emissions at minimal cost in one or more of the four life cycle elements of the wind farm. Leading Light Wind has adopted the following commitments to specific low-carbon practices that will also assist in lowering the project's life cycle carbon emissions. The measures and approaches listed below are generic, but with time will evolve into detailed implementation strategies, activities, and measurement criteria, including specific investment opportunities, suppliers, and contractors.

Direct measures approach

Direct measures may include use of the "best available control technologies" (BACT) selection methodology standards as part of the project's EPA Outer Continental Shelf (OCS) Air Permit (40 CFR Part 55) to lower GHG emissions from applicable OCS major sources. The 800 MW Vineyard Wind project became the first offshore wind project to receive the OCS Air Permit from EPA in May 2021.

Leading Light Wind will leverage these permitting conditions to develop a project design that meets BACT standards and will minimize direct carbon emissions and provide important co-benefits by minimizing fuel combustion-related emissions during construction and operation. The applicable OCS major sources may include pollutant-emitting diesel-fired electric generating sets ("gen-sets") and/or diesel-powered engines on jack-up vessels, cable-laying vessels, crew transportation vessels, and other various support vessels (including foreign-flagged vessels), as well as diesel engines used for commissioning and backup power gen-sets on wind turbine generators and electric service platforms.[3]

The Vineyard Wind OCS Air Permit includes evaluation of various BACT for diesel-fired engines on vessels, including the implementation of new engine design factors and retrofits for older engines impacting operational parameters and add-on pollution control technologies.

Given the current development of the offshore wind contracting and installation market, and the expected reliance of offshore wind developers on third parties for provision of vessel fleets, EPA deems the replacement and/or retrofit of third-party engines and use of the add-on pollution control technologies to be technically infeasible for diesel-fired vessel engines.

In place of these control technologies, EPA has required the implementation of work practice standards for diesel-fired vessel engines, targeted towards requiring use of the cleanest engine available at the time of deployment.

For marine engines on US-flagged ships, the emission limits are divided into different Tier standards, ranging from Tier I, which allows the highest emissions, to Tier IV having the most pollution control technologies built into its design. Foreign-flagged vessels must meet the applicable emission standards of the International Maritime Organization. As the majority of GHG emissions from internal combustion engines are in the form of CO_2, the use of the most efficient engine available at the time of deployment (resulting in the lowest overall emissions of GHG) is also identified by EPA as an option for BACT for GHG emissions.

Combined with the tiered engine standards, EPA also considered inherently lower-emitting processes, practices, and designs within a BACT analysis as a valid approach if the use of such processes is feasible when also considering economic, energy, and environmental impacts of the control technology.

For vessel engines, this may include technology allowing for the use of green synthetic fuels. Although post-combustion controls such as sequestering or offsetting emissions through techniques such as carbon capture are actively being considered and tested for use with vessels or vessel fuel manufacturing, EPA does not consider these post-combustion technologies technically feasible at this time.

Based on these results from the recent offshore wind OCS air permitting process, the strategy of optimizing the tiered vessel engine standard and using add-on pollution controls where feasible are proposed as the primary direct carbon emission control technologies. Other technologies that are not technically feasible now but may be within a few years or by the end of the decade are being developed as secondary direct measures.

[3] EPA applies BACT to GHG emissions in those circumstances where a source emits GHG in the amount of at least 75,000 tons-per-year (tpy) on a CO_2e basis where the facility has already triggered Prevention of Significant Deterioration (PSD) review for another regulated New Source Review (NSR) pollutant. According to its EPA Air permit, the 800 MW Vineyard Wind project as a Potential-to-Emit (PTE) of 202,579 tpy.

Table 21-1 provides a summary of potential direct measures to be used by Leading Light Wind.

Indirect measures approach

Another potentially large source of carbon reductions includes indirect emissions from the supply chain (see Table 21-2 on the next page). These include:

1. Reduction of emissions from the suppliers' and contractors' own corporate operations and production processes
2. Emissions released in connection with their consumption of purchased electricity, steam, heat and cooling
3. Emissions associated with purchased goods and services from their own supply chain that are incorporated into their final production

For those organizations that use the Greenhouse Gas Protocol (the "GHG Protocol") to develop a full corporate GHG inventory, these emissions are referred to respectively as Scope 1, Scope 2, and Scope 3 emissions.[5]

Type of Direct Measure	Timeframe	Action/Description
Primary	Short-term	Contractors use the "cleanest engine available" work practice standard of higher-tier vessel engines for US-flagged vessels or their equivalent as per the International Maritime Organization emission standards for foreign-flagged vessels and add-on pollution control technologies where deemed feasible by EPA for smaller diesel-fired engines and gen-sets as used on wind turbine generators and electric service platforms.
Secondary	Long-term	Contractors use new engine design factors and retrofits for older engines impacting operational parameters (e.g., peak cylinder pressure and temperature; injection pressure and compression ratio; fuel injection timing, air-fuel mixing) as well as add-on pollution control technologies (selective catalytic reduction, diesel oxidation catalysts). Implementation of these technologies may be formalized through use of the International Maritime Organization Energy Efficiency Design Index (EEDI) for new ships and a Ship Energy Efficiency Management Plan (SEEMP) for all ships.[4]
		Contractors reduce or eliminate carbon emissions by switching to zero carbon sources of energy for construction and operation of the project, such as green hydrogen or green liquid synthetic fuels (methanol, ethanol, etc.) where economically and technically feasible.
		Contractors reduce or eliminate carbon emissions through use of post-combustion controls such as sequestering or offsetting emissions through techniques such as carbon capture where economically and technically feasible.

Table 21-1. Potential direct measures.

[4] The EEDI is a non-prescriptive, performance-based mechanism that leaves the choice of technologies to use in a specific ship design to the industry. The SEEMP is an operational measure that establishes a mechanism to improve the energy efficiency of a ship in a cost-effective manner.

[5] The World Resources Institute (WRI) GHG Protocol is a well-accepted international industry standard that provides a formalized, detailed methodology for the collection and reporting of carbon emission reductions. Scope 3 carbon emission reduction in the offshore supply chain are typically measured per MW or MWh of capacity delivered to the market off of an assumed baseline year. The amount of MWh generated is based on the number and type of components produced and shipped in the financial year along with contracted values for capacity factor and lifetime.

Action	Description
Reduce	Strategic suppliers and contractors reduce their firm's own direct carbon emissions and engage their supply chain in carbon reduction targets. They develop strategies to measure and reduce their emissions pertaining directly to components and services of the offered scope of work.
Report	Suppliers and contractors use the GHG Protocol along with the USEEIO methodologies and tools for tracking their carbon emission reduction targets and reporting their progress to Leading Light Wind. Reduction targets and progress shall be measured per MW capacity or potential MWh delivered, where applicable.
Implement solutions	**Offshore shipping and long-distance transportation:** E.g., use of control technologies such as those that lead to efficiency improvements of diesel-fired engines, use of add-on pollution controls, overall fleet improvements, or use of green synthetic fuels.
	Low-carbon steel production or steel replacement: E.g., recovering energy and reusing materials from steel-production waste streams (slag); reinvesting revenues for carbon capture and storage; using green-hydrogen-powered direct reduction of iron; or using suitable bio-composites or other low-carbon structural material substitutes.
	Waste reduction targets: E.g., implementation of waste reduction and "circularity" principals in the design stage of component manufacture and service protocols; refurbished component utilization, including support of repair and refurbishment infrastructure for minor offshore wind components; and/or development and recovery of recyclable materials.
	Carbon intensity-based targets: E.g., use of less carbon-intensive production processes including energy efficiency measures and on-site cogeneration; purchasing electricity from renewable sources or less carbon-intensive sources of energy; and/or reductions in consumption of carbon-intensive materials (steel, cement, aluminum).

Table 21-2. Potential indirect measures.

In general, Scope 3 emissions, which represent the embodied carbon resulting from every lower tier in the supply chain, account for the vast majority — in some instances up to 99% — of the embodied carbon content of offshore wind supply chain components.

Therefore, significant reductions in indirect emissions may be possible through targeted procurement of components and services, where economically feasible, from OEMs, suppliers, and contractors that have plans in place to lower their direct emissions and carbon footprint and lower the embodied carbon emissions of their respective supply chains.

A review of sustainability plans issued by major suppliers and contractors in the offshore wind space indicates several areas of focus that have been adopted in recent years toward reduction of Scope 3 emissions. The steel and shipping sectors contribute to a large portion of the offshore wind supply chain carbon emissions and remain difficult to abate effectively in the short term.

As discussed above, modest measures are currently available for improving the efficiency of diesel-fired engines to provide marginal carbon emission reductions. In the long term, fuel requirements for offshore vessels may be met with green synthetic fuels, leading to more significant decarbonization of long-distance transport.

Development and availability of low-carbon steel or suitable low-carbon structural material substitutes (e.g., bio-composites such as laminated veneer lumber) are also critical to achieving Scope 3 reductions.

Offshore wind is a large consumer of steel and offers an ability to provide cost-competitive sustainable energy solutions.

This can help decarbonize steel production through measures such as recovering energy and reusing materials from steel production waste streams (e.g., slag); reinvesting revenues for carbon capture and storage; or using green-hydrogen-powered direct reduction of iron as a key step in cutting the emissions from blast furnaces.

Other Scope 3 strategies that may be taken by OEMs, suppliers, and contractors include engaging their supply chain in waste and carbon reduction targets and developing strategies to measure and reduce their emissions through use of less carbon-intensive materials and by purchasing electricity from renewable sources. Intensity-based targets incentivize sustainability partnerships with suppliers that reduce carbon emissions. Waste reductions through the value chain include the development of recyclable materials and refurbished component utilization, including support of repair and refurbishment infrastructure for minor offshore wind components.

Engaging strategic suppliers and their supply chains in specific carbon reduction activities described above allows Leading Light Wind to leverage the work of our suppliers and contractors who are already actively engaged to lower their Scope 3 emissions through innovative measures. In general, Leading Light Wind and its suppliers and contractors shall use the GHG Protocol along with the USEEIO methodologies and tools for tracking and reporting carbon emission reduction targets and progress in the offshore wind supply chain.

Carbon accounting validation

As indicated above, the US EPA USEEIO methodologies and tools are industry standard, open-source, and transparent instruments for tracking and reporting life cycle carbon emissions. Leading Light Wind will use them to validate, following commissioning of the project, a final accounting of the project's embodied carbon, the project's ultimate carbon footprint, and the project's energy and carbon payback periods.

Upon commissioning of the project, Leading Light Wind will make commercially reasonable efforts to work with NYSERDA to validate and publicly disclose a final accounting of the project's carbon footprint and energy and carbon payback periods per the requirements of Section 12.07(f) of the agreement.

Leading Light Wind

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