



U.S. DEPARTMENT OF
ENERGY

BOEM
Bureau of Ocean Energy
Management



Atlantic Offshore Wind Transmission **Stakeholder Workshop**

June 28, 2022

Stay tuned...we will begin at 12:00 PM ET



U.S. DEPARTMENT OF
ENERGY

BOEM
Bureau of Ocean Energy
Management



Atlantic Offshore Wind Transmission **Stakeholder Workshop**

June 28, 2022

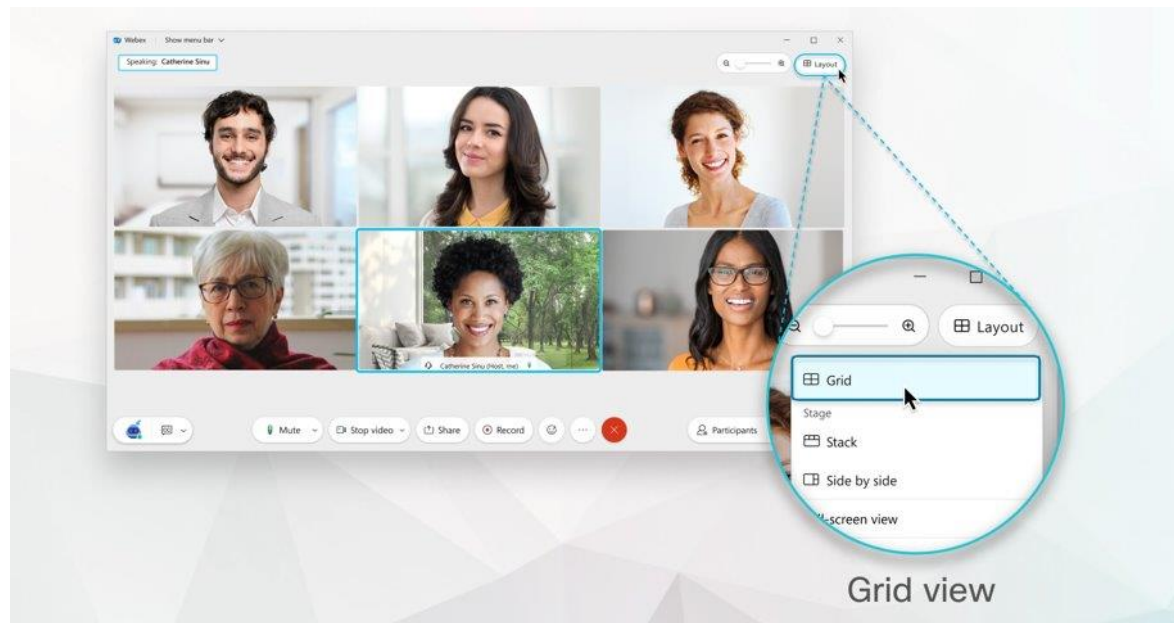
Welcome and Housekeeping

Questions?

If you have technical questions – please put them in the chat box for the host.

Please submit your questions in the chat box. Reference the speaker or topic.

Optimal Viewing



Welcome



Alissa Baker

Offshore Wind Transmission Lead, Office of Electricity
U.S. Department of Energy

Agenda



12:00PM	Welcome
12:15PM	Keynote Remarks
12:35PM	Presentation: Introduction to Offshore Wind in the Atlantic Region
12:45PM	Presentation: DOE & BOEM Action
1:20PM	Presentation: Offshore Wind and Transmission Development
2:15PM	Break
2:25PM	Presentation: Coordinated Transmission Planning 101
2:45PM	Presentation: Environmental Benefits and Considerations of Coordinated Offshore Wind Transmission
3:05PM	Presentation: Social Benefits and Considerations of Coordinated Offshore Wind Transmission
3:25PM	Presentation: DOE Funding Efforts
3:40PM	Feedback Opportunity
3:55PM	Closing Remarks

Menti Introduction



Chris Lawrence

Management and Program Analyst, Office of Electricity
U.S. Department of Energy

DOE & BOEM Action



Kelly Speakes-Backman

Principal Deputy Assistant
Secretary, Office of Energy
Efficiency and Renewable Energy
U.S. Department of Energy



Amanda Lefton

Director, Bureau of Ocean Energy
Management,
U.S. Department of the Interior

Keynote Remarks



Congressman Paul Tonko

D - New York's 20th District

Introduction to Offshore Wind in the Atlantic Region



Walter Cruickshank

Deputy Director, Bureau of Ocean Energy Management,
U.S. Department of the Interior



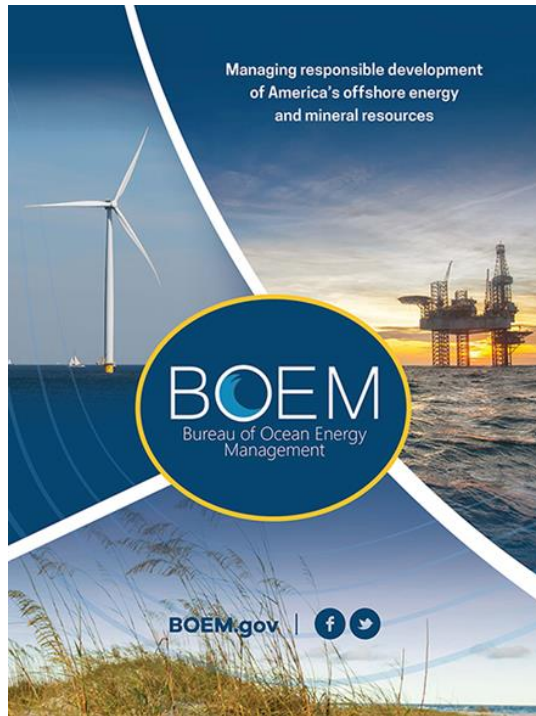
BOEM Bureau of
Ocean Energy Management

Offshore Wind Transmission Stakeholder Workshop

June 28, 2022

Walter Cruickshank, Deputy Director

BOEM's Mission



The mission of the Bureau of Ocean Energy Management is to manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.

Administration Priority

Goal to deploy 30 GW of offshore wind by 2030

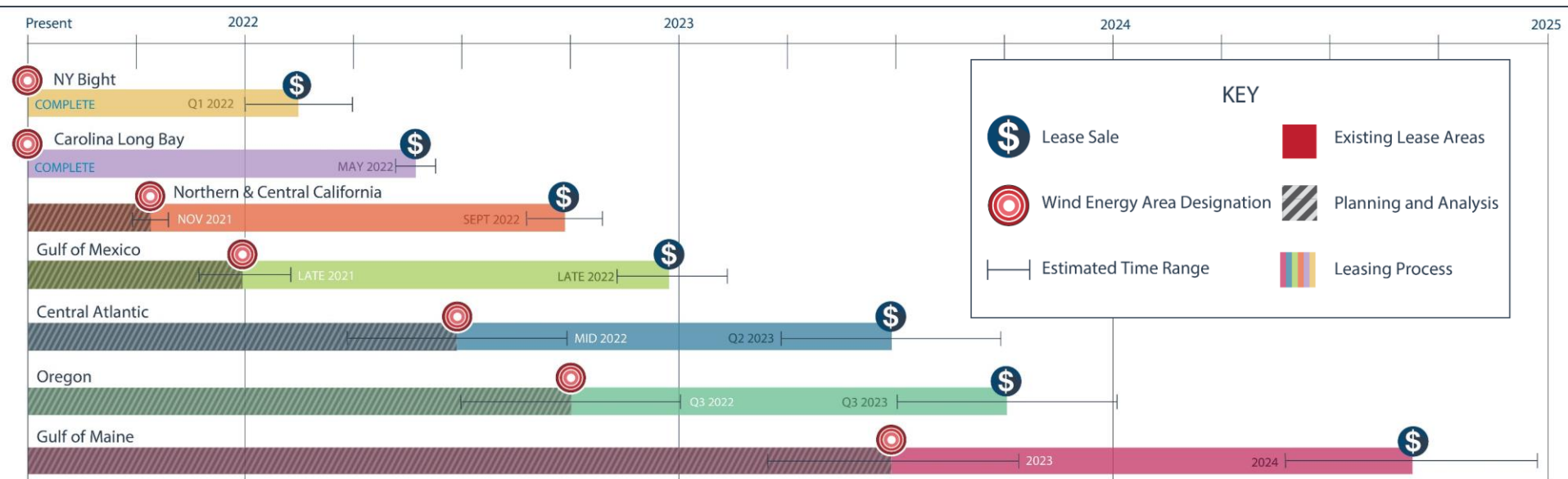
- Create nearly 80,000 jobs
- \$109 billion revenue opportunity to businesses in the supply chain

BOEM goals for 2025:

- 7 lease sales (2 already held)
- Complete review of 16 Construction and Operations Plans



BOEM Offshore Wind Leasing Path Forward 2021-2025



Our path forward will help achieve the first-ever **national offshore wind goal** to deploy **30 gigawatts of offshore wind by 2030**, which would create nearly **80,000 jobs**



Renewable Energy Program by the Numbers



Competitive Lease Sales Completed:

10

Active Commercial Offshore Leases Issued:

27

Active Research Offshore Leases Issued:

2

Site Assessment Plans (SAPs) Approved:

14

General Activities Plans Approved:

1

Construction and Operations Plans (COPs):

- Approved Since 2021

2

- NEPA Process Underway

10

- Other COPs Submitted

5

- Anticipated Within Next 12 Months

2

Guidance:

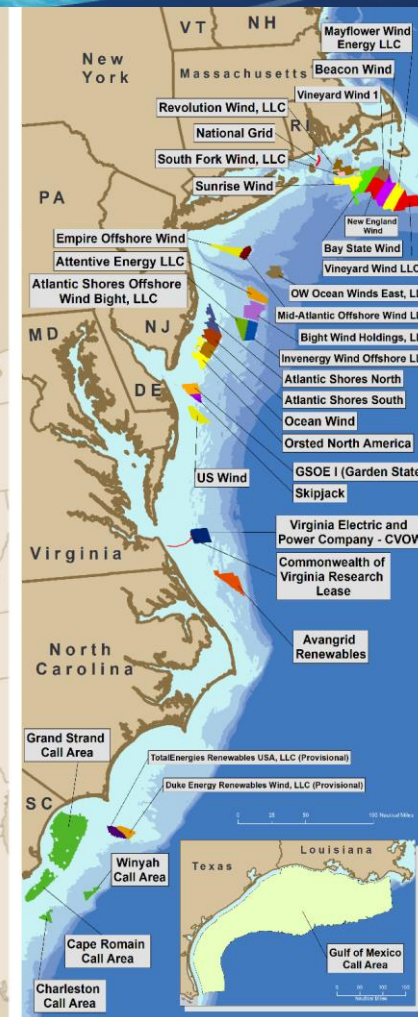
11

Leasing Under Consideration:

5

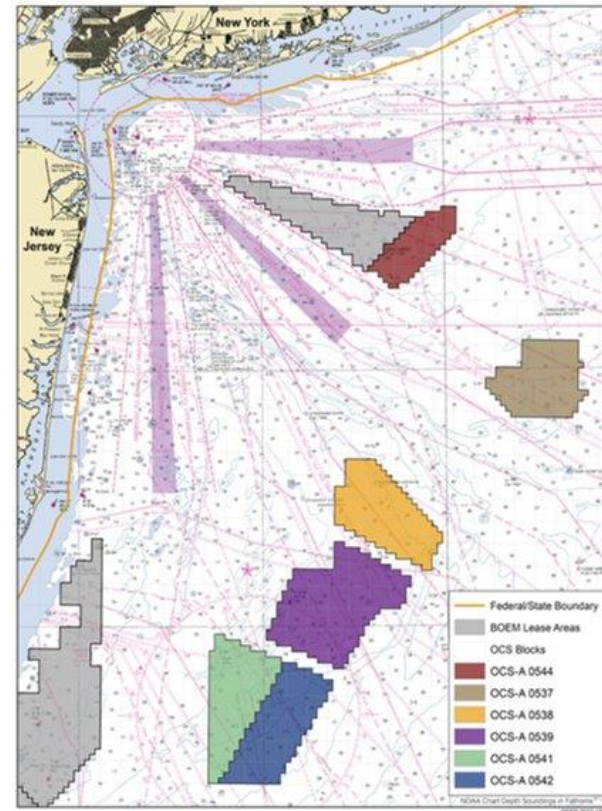
Steel in the Federal Waters:

2020



Transmission Planning

- What is the best way to connect this amount of power to the grid?
 - Minimizes impacts to other ocean users
 - Does not waste resources
 - Benefits to overall renewable energy goals
- Need for longer term planning approach to transmission
 - All of government approach, including regional and state planning efforts
- Joint Department of Energy - BOEM offshore wind transmission effort



Ocean user and Stakeholder Participation

- Critical to hear all viewpoints throughout process
- OSWTransmission@hq.doe.gov to submit any feedback on anything you hear today
- BOEM provides other opportunities for project specific and regional input as offshore wind leases and Right of Way Grants develop



BOEM

Bureau of Ocean Energy
Management

BOEM.gov



DOE & BOEM Action



Alissa Baker

Offshore Wind Transmission Lead,
Office of Electricity,
U.S. Department of Energy



Josh Gange

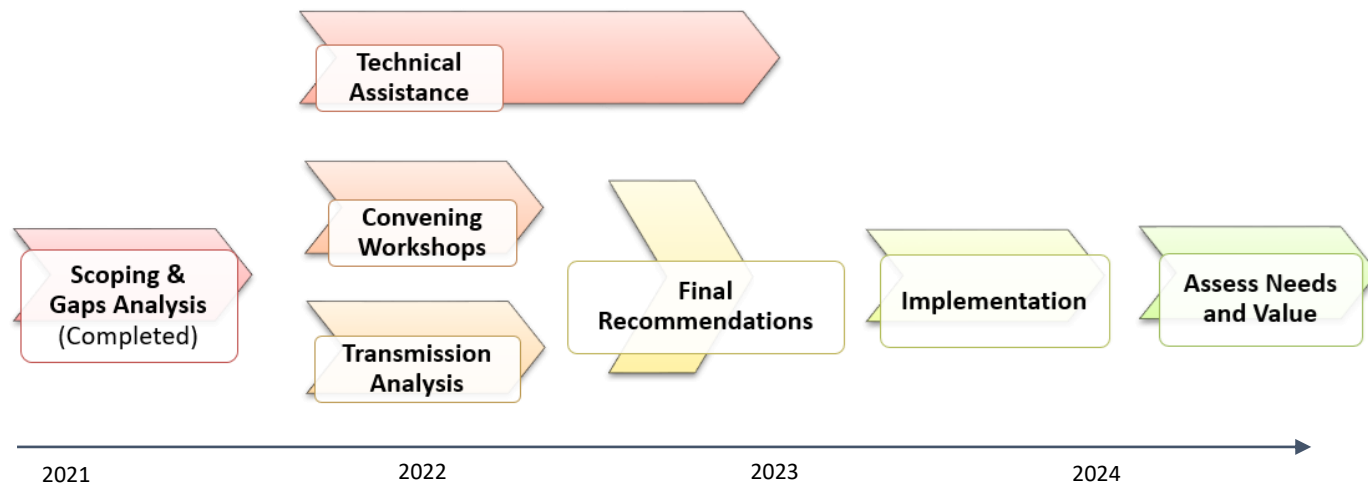
Renewable Energy Program Specialist,
Bureau of Ocean Energy Management,
U.S. Department of the Interior

Atlantic Offshore Wind Transmission Stakeholder Workshop



DOE & BOEM Coordinated Offshore Wind Transmission Effort

PURPOSE To identify a proposed planned approach for Atlantic offshore wind (OSW) transmission and interconnection that will achieve the Biden Administration's goal of 30 GW of OSW deployed capacity by 2030 *and* to facilitate OSW development beyond the 2030 goal. The effort will consider transmission solutions that would reduce onshore congestion and support system interconnection, including potential onshore transmission upgrades.



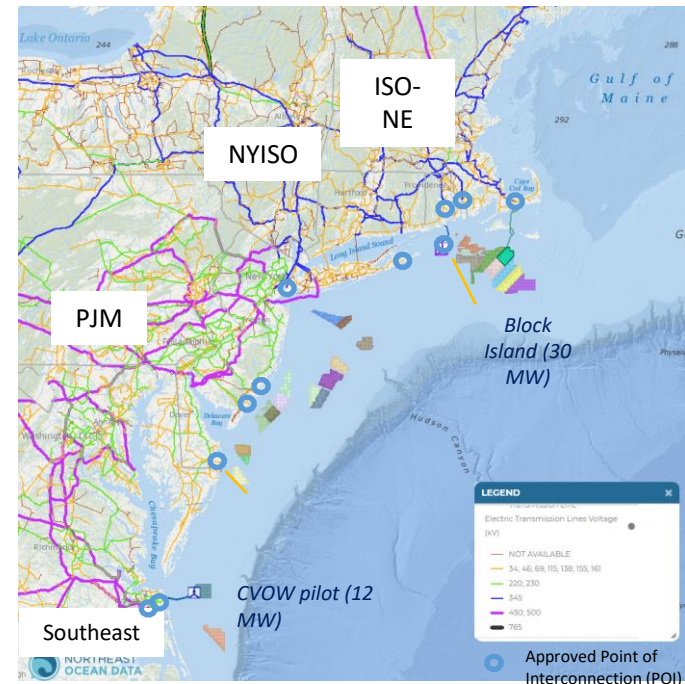
Scoping & Gaps Analysis

Near-term

1. Initial development may limit future potential. Existing permitting process and developer incentives may prevent the optimal use of onshore and offshore transmission infrastructure for future development.
2. Generally, weaker transmission system built along coast. Onshore upgrades may be critical path in the near-term.
3. Siting challenges. Siting of transmission requires enhanced marine spatial planning and holistic studies to identify the potential POIs and routes to them; mitigate multi-use conflicts; and maximize throughput capacity of offshore substations, cable routes, POIs, and landfalls to limit disturbances.

Med- & Long-Term

4. Cost allocation mechanisms are inadequate and offshore wind transmission costs are high. Proactive development challenges conventional processes. FERC policy changes needed. Potential need for federal/state funding or loan guarantees to offset costs.
5. Reforms may pose project delays. Existing processes may be functional for initial OSW projects.
6. Current interconnection practice is unsustainable. Strategic thinking beyond single projects is needed to effectively use cable capacity and landing points to reduce environmental and community impact. Future potential solutions include shared corridors, mesh-ready generation lead lines, hub and spoke models, meshed grids, and regional and interregional backbones. Corresponding onshore infrastructure projects will be needed as well.
7. Proactive development brings project-on-project risk. Transmission is likely to lag generation development.



DOE & BOEM Scoping Discussions: June-August 2021

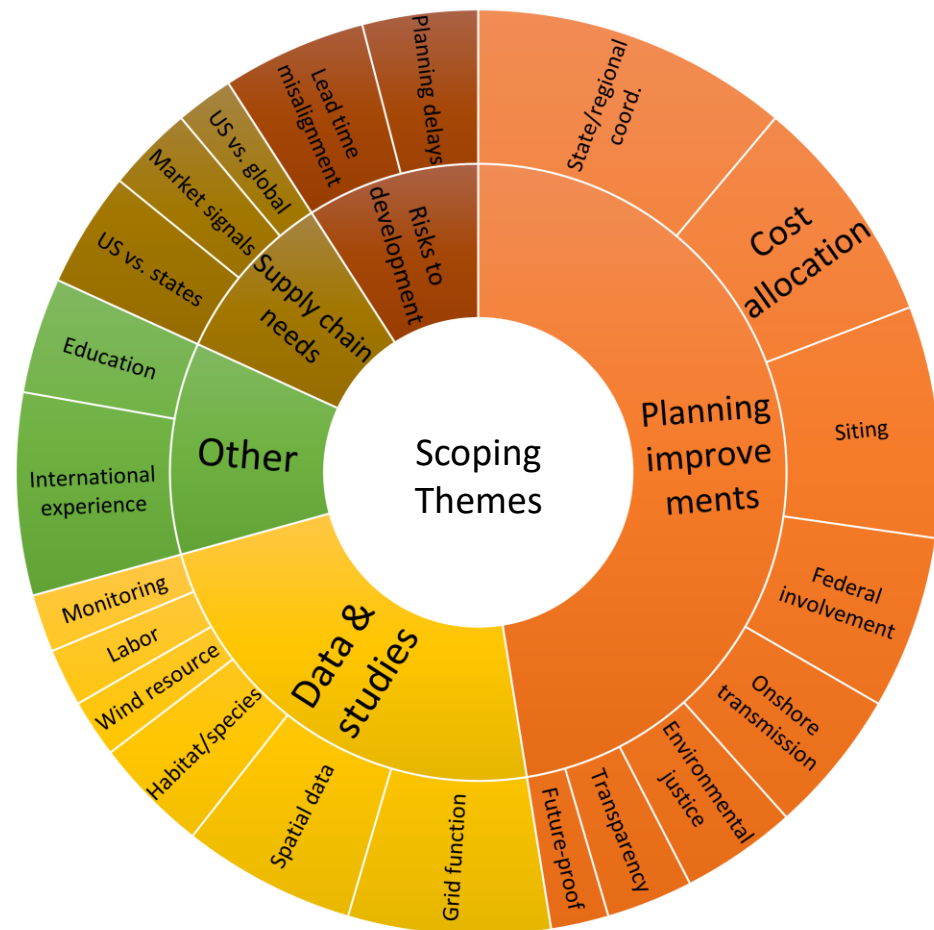
Tribal Nations

Federal Agencies

DOD	USACE
NOAA	USCG

Non-federal Groups & Organizations

NGOs (business, tech, environment)	State energy offices and agencies
Project developers	Transmission providers
Public Utility Commissions	Fisheries Organizations
Regional ocean coordinators	Unions
Regional Transmission Operators	Utilities



Scoping Calls

What we heard...

Need for long-term, interregional transmission planning

- Including meaningful involvement from stakeholders
- Federally funded
- Power flow analysis including topography
- Marine spatial planning for key landing points
- Reliability and resilience analysis

Need for national transmission planning

What we are doing about it...

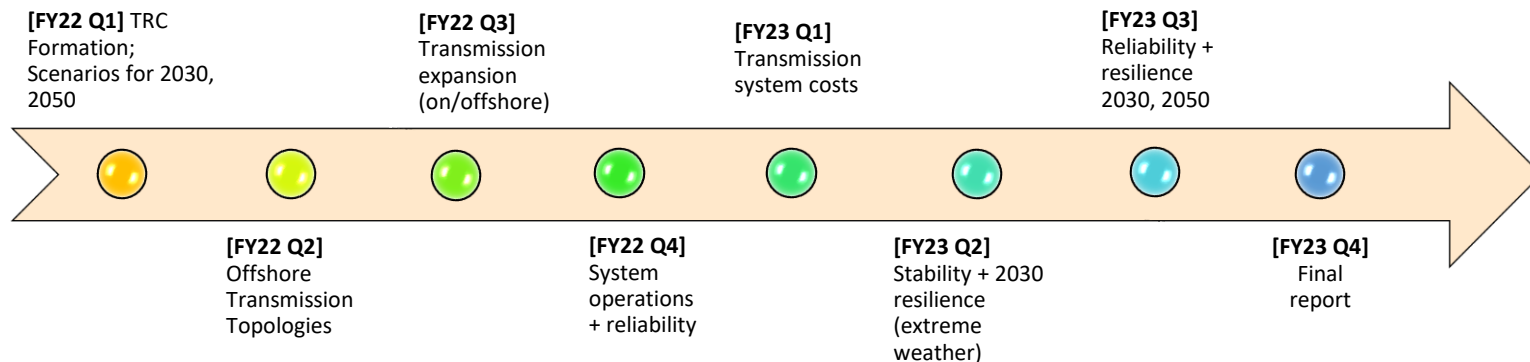
- Atlantic OSW Transmission Study
- National Transmission Planning Study
- National Transmission Needs Study



www.energy.gov/oe/national-transmission-planning-study



Atlantic OSW Transmission (AOSWT) Study



PURPOSE: Conduct comprehensive transmission analysis that compares costs and benefits of transmission buildout scenarios while considering grid operability, reliability and resilience and environmental impacts. The data and results will inform convening.

LEAD: DOE Wind Energy Technologies Office (WETO) with analysis led by the National Renewable Energy Laboratory (NREL) and the Pacific Northwest National Laboratory (PNNL)

OBJECTIVES:

- Through multiple scenarios of inter-state, inter-regional transmission topologies (including meshed networks and backbones) evaluate multiple pathways for OSW deployment across the Atlantic coast in support of the national 30 gigawatt (GW) by 2030 & 110 GW by 2050 goal.
- Evaluate reliability and resilience of the power system in the near-term (2030) and long-term (2050), including component reliability, cable failures, and resulting costs.
- Identify if there is a crossover point (either in time or in GW) at which the benefits of a coordinated transmission framework will outweigh the benefits of radial interconnections, identifying critical decision points given uncertainties.



Scoping Calls

What we heard...

- Need for more R&D
 - R&D for higher voltage technologies, including high voltage, direct current (HVDC)
 - System protection for multi-terminal models
 - Potential applications for Grid Enhancing Technologies (GETs)
- Need queue reform to reduce uncertainty in generation interconnection, including offshore wind

What we are doing about it...

- DOE's Wind Energy Technologies Office (WETO) investment in R&D

www.energy.gov/eere/wind/



Highlights from DOE WETO's OSW Transmission-related R&D work

- **HVDC Protection & Breakers** - Understanding the protection and HVDC breaker needs for Offshore Grid Development in the Atlantic.
- **National Intra-hour wind power production database** – Develop weather forecasting and power production at subhourly, 5-minute intervals across U.S., including offshore. For existing and planned wind farms.
- **Transmission Optimization with Grid Enhancing Technologies (TOGETs)** – Identify business needs and ultimately test deployed GETs by conducting a full-scale, multi-faceted field exercise.
- **GridPACK-Wind** – High performance modeling and simulation for wind integration.
- **I2X** – supports interconnection reforms for all projects, including OSW.
- **UNIFI Grid forming consortium** - set new guidance for secure and reliable inverter operations.



Scoping Calls

What we heard...

Transmission regulation around system planning, cost allocation, and interconnection queues is disadvantageous to OSW development



What we are doing about it...

FERC has issued several relevant Notice of Proposed Rulemakings in 2022

- April: RM21-17
Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection
Comments due by 8/17
- June: RM22-14
Improvements to Generator Interconnection Procedures and Agreements
Comments due by 9/27
- June: RM22-10
Transmission System Planning Performance Requirements for Extreme Weather
Comments due by 9/27



Scoping Calls

What we heard...

Need for federal funding to address cost-allocation and short-term affordability of coordinated transmission

What we are doing about it...

New DOE funding and financing programs through DOE's Office of Electricity, Loan Programs Office, and Western Area Power Administration

- Transmission Facilitation Program
- Smart Grid Investment Grant Program
- Grid Resilience Grant
- WAPA Transmission Infrastructure Program
- Innovative Clean Energy Loan Guarantees

www.energy.gov/oe/federal-financing-tools

Scoping Calls

What we heard...

- Request for Federal involvement, particularly with regard to the potential for inter-state and inter-regional coordination
- Request for increased conversations (both formal and informal) with Federal partners

What we are doing about it...

Atlantic Offshore Wind Transmission Convening Workshops

- Federal Register notice (87 FR 2769) published 1/19/22
- Formal kick-off with states (Atlantic Coast from Maine through South Carolina), Federal agencies, RTOs, and Tribal Nations on 5/3/22

DOE & BOEM Convening Workshops

PURPOSE: DOE and BOEM conduct a series of convening workshops, in consultation with FERC and other federal agencies, to **develop a set of recommendations** for OSW transmission development, planning policy, and permitting policy. Tribal Nations, states, regional transmission operators, developers, ocean users, and other stakeholders will be engaged to develop collaborative solutions.

OUTCOMES: Throughout the convening workshops, feedback will be solicited to inform an action plan with recommendations for:

1. Phased development of shared transmission resources;
2. Identification of potential routes and needed onshore upgrades to facilitate these solutions;
3. Nearer-term recommendations for optimizing cable routes and existing POIs; and
4. Recommendations for incorporating policy and permitting changes into the existing regulatory framework.

These recommendations and a time-bound action plan will be documented in a report at the conclusion of the convening workshops.



Scoping Calls

What we heard...

- Desire to learn more about status of current projects

What we are doing about it...

- BOEM regularly updates the website as projects advance
 - New Leases strengthen stipulations for transparency in process
- [The FAST-41 Process | Permitting Dashboard \(performance.gov\)](#)
 - Project permitting timelines

Scoping Calls

What we heard...

- The U.S. should look to international models for guidance on transmission planning

What we are doing about it...

- DOE and BOEM have engaged with, and continues to work with, several foreign delegations to discuss transmission planning including, Denmark, Germany, the United Kingdom, and the Netherlands



Scoping Calls

What we heard...

- Need to engage with the fishing community, to find ways to avoid and minimize impacts to the fishing industry

What we are doing about it...

- BOEM requires lessee to create a fisheries communication plan and employ a fisheries liaison
- On June 23, 2022 BOEM released a draft fisheries mitigation strategy
 - [Reducing or Avoiding Impacts of Offshore Wind Energy on Fisheries | Bureau of Ocean Energy Management \(boem.gov\)](#)
- Open comment period and associated public meetings

Scoping Calls

What we heard...

- Interest in ensuring domestic supply chain & associated jobs are developed

What we are doing about it...

- Operating fee incentives for workforce and supply chain development in New York Bight
 - Efforts to enter into Project Labor Agreements
 - Supply Chain Statement of Goals
- Bidding Credits in Carolina Long Bay auction to support workforce training and domestic supply chain
- Proposed sale notice for California lease sale includes proposals for bidding credits for workforce training and domestic supply chain, community benefits
- [FACT SHEET: Biden Administration Launches New Federal-State Offshore Wind Partnership to Grow American-Made Clean Energy | The White House](#)



Scoping Calls

What we heard...

- Ensuring Tribal Nation engagement on offshore wind projects and associated cable routing

What we are doing about it...

- BOEM modified lease stipulations in subsequent lease sales (NY Bight, Carolina Long Bay):
 - Requires a Native American Tribal Engagement Plan with progress reporting requirements
 - Lessees to consult with Tribal Nations on transmission routing prior to proposing a route in a Construction and Operations Plan (COP)



What is Next?

- DOE & BOEM are continuing to work on these important issues, and we request your continued input and collaboration
- Please use today's workshop to give us feedback and share your thoughts on OSW transmission for the Atlantic region
 - Feedback session via Menti later today
 - Webex chat function throughout the event
 - Email the team at OSWtransmission@hq.doe.gov after the workshop
- Keep an eye out for upcoming DOE & BOEM sponsored OSW Transmission Convening Workshop events



Questions?



Please submit your questions in the chat box.
Reference the speaker or topic.

A dark-themed chat interface mockup. At the top left is a dropdown arrow and the word "Chat". At the top right is a close button (X). Below this is a "To:" label followed by a dropdown menu showing "Host" and a downward arrow. At the bottom is a large text input field with the placeholder text "Enter chat message here" and a send button (paper plane icon) on the right.

Chat

To: Host

Enter chat message here

Offshore Wind & Transmission Development



Josh Gange

Renewable Energy Program
Specialist, Bureau of Ocean
Energy Management,
U.S. Department of the
Interior



Suzanne Glatz

Director, Strategic Initiatives
& Interregional Planning
PJM Interconnection



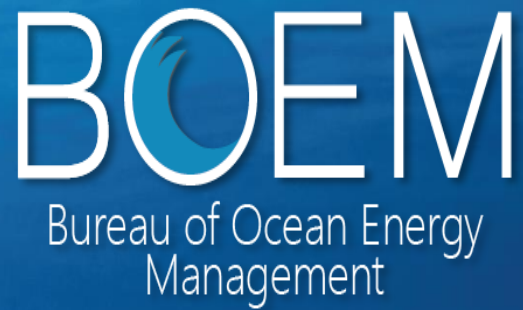
Laila El-Ashmawy

Project Manager, Offshore
Wind,
NYSERDA



John Vu

Executive Director,
NextEra Energy
Transmission



Offshore Wind Transmission Framework

June 28, 2022

Josh Gange, Office of Renewable Energy Programs



Federal Regulatory Framework

- Under OCSLA §1337(p)(1)(C), the Secretary may grant a lease, easement, or ROW on the OCS for activities that produce or support production, transportation, or transmission of energy sources other than oil and gas.
- §585.104 states that except as otherwise authorized by law, it will be unlawful for any person to construct, operate, or maintain any facility to produce, transport, or support generation of electricity or other energy product derived from a renewable energy resource on any part of the OCS, except under and in accordance with the terms of a lease, easement, or ROW issued pursuant to the OCS Lands Act.



Two Paths

1. **Transmission as part of an offshore wind lease**

- 585.200(b) - a lease confers the right to one or more project easements without further competition for transmission

2. **Transmission under a Right of Way Grant**

- 585.300 - an ROW grant authorizes the holder to install on the OCS cables, pipelines, and associated facilities that involve the transportation or transmission of electricity or other energy product from renewable energy projects.

Transmission as Part of a Lease

1. **A lessee negotiates with state entities and utilities to determine appropriate landfall and grid connections points**
 - BOEM does not have jurisdiction over landfall sites, nor state waters
2. **An easement to shore is granted with a lease**
 - The details of the easement(s) are provided as part of the COP
3. **Easement may be presented in COP as options under a Project Design Envelope**
 - Allows for more than one option to be considered

Right of Way Grant Process

1. **OCSLA requires a competitive process unless BOEM determines there is competitive interest (585.307)**
 - BOEM likely issues a Request for Competitive Interest
 - Also solicits information about the area proposed
2. **If competition exists, BOEM will utilize a competitive process to award the ROW Grant (e.g., auction)**
3. **BOEM will conduct an environmental analysis and assess multiple use conflicts prior to making a decision on whether to issue a ROW Grant**

ROW Process Continued

4. **The Grant holder will propose the project within one year of issuance of the ROW in the form of a General Activities Plan (GAP)**
 - Grantee conducts survey work to identify any hazards, cultural resources, and to optimize the route
 - Discusses methods and equipment to be utilized
5. **The GAP will trigger additional NEPA process and consultations with other agencies prior to any approval and installation, or denial**



Bureau of Ocean Energy
Management

BOEM.gov



joshua.gange@boem.gov, Office of Renewable Energy Programs



Offshore Wind & Transmission Development Interconnection Process

Suzanne Glatz
System Planning, PJM Interconnection
Atlantic Offshore Wind Transmission
Stakeholder Workshop
June 28, 2022

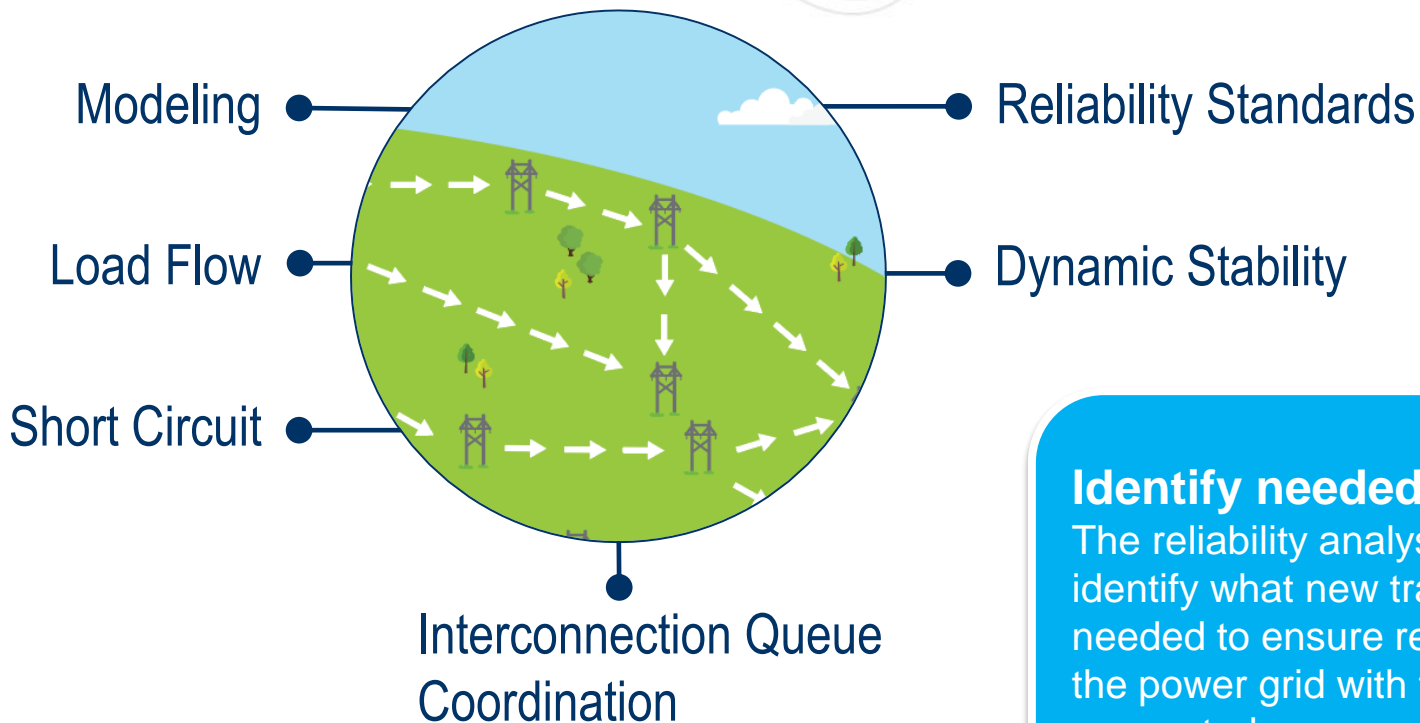
Transmission Planning and Interconnecting New Generation

What is the process to interconnect new offshore wind generation?

- Study Process
- Construction Phase



Interconnection Study Phase – PJM Reliability Analysis

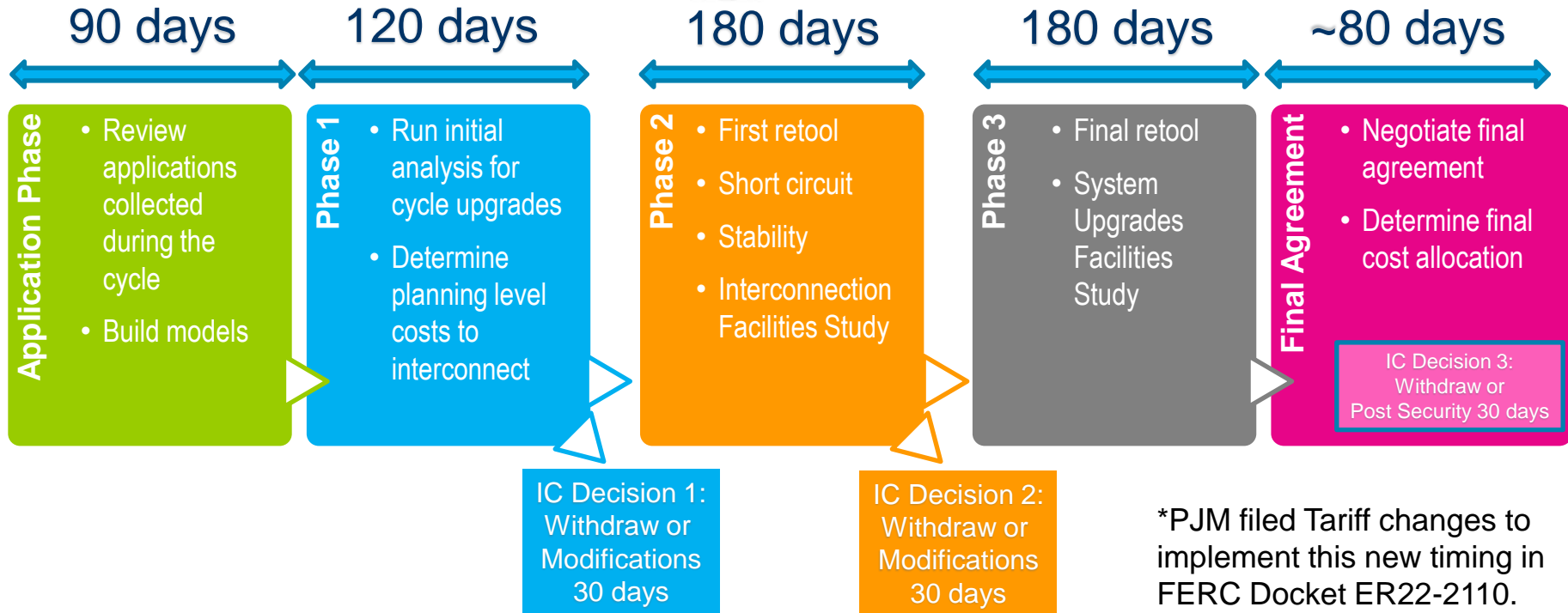


Identify needed transmission –

The reliability analysis is performed to identify what new transmission is needed to ensure reliable operation of the power grid with the new generation connected.

PJM Interconnection Study Process

Total Time per Cycle – 710 Days





State Agreement Approach and Coordinate Planning

- In Order 1000, FERC required regional grid operators to “provide for the consideration of transmission needs driven by public policy requirements in the regional transmission planning processes.”
- The State Agreement Approach is a provision in the OA (*developed with input from PJM states*) where a state or group of states can sponsor a project to meet its state public policy requirements, as long as it agrees to voluntarily be responsible for cost responsibility for transmission project.

State Agreement Approach

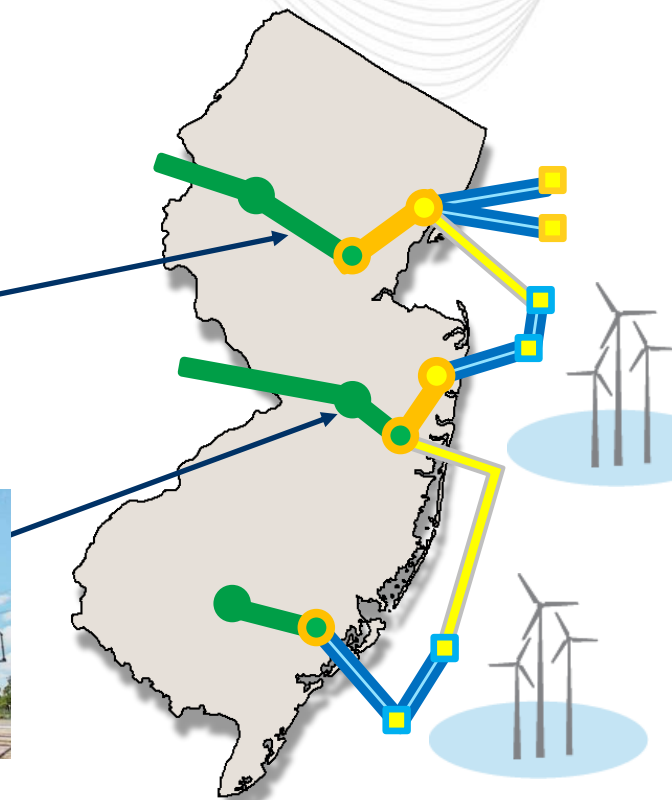
- RTEP planning process
- Baseline project (or Supplemental Project)
- Subject to state’s commitment for cost responsibility
- Transmission investment is recovered through transmission cost of service rates

Interconnection Process – Construction Phase



At completion of the study process, PJM tenders an Interconnection Service Agreement (ISA) to the Generator Owner.

PJM monitors the construction phase of the transmission and generation throughout to commercial operation date.



Presenter:

Suzanne Glatz

Suzanne.Glatz@pjm.com

PJM Transmission Expansion Advisory Committee

<http://www.pjm.com/committees-and-groups/committees/teac.aspx>



Member Hotline

(610) 666-8980

(866) 400-8980

custsvc@pjm.com



NYSERDA

Laila El-Ashmawy **NYSERDA Offshore Wind Team**

DOE & BOEM Atlantic Offshore Wind
Transmission Stakeholder Workshop
June 28, 2022



New York is committed to
100% clean
carbon-free electricity
by **2040**

most aggressive in the nation

NATION-LEADING GOAL

9,000 MW
of offshore wind
by 2035

10,000 JOBS

**ENOUGH TO POWER
6 MILLION HOMES**

**BILLIONS IN
INFRASTRUCTURE**

**30% OF NEW YORK'S
ELECTRICITY LOAD**



Initial Report on the New York Power Grid Study

NYS Department of Public Service (DPS)

Published Jan 2021



Next Up: Coordinating a Future Offshore Wind Transmission Network: **New York State Cable Corridor Study** to detail best approaches for delivering +6 GW to NYC

Key Findings:

- > Grid can accept 9 GW of Offshore Wind without major upgrades
- > Greater than 6 GW of OSW into New York City (Zone J)
- > Permitting complexities in the NY Harbor and Long Island Sound
- > “Meshed” configuration of offshore transmission provides flexibility
- > Storage emphasized alongside offshore wind

NYSERDA'S THIRD OFFSHORE WIND PROCUREMENT *Transmission*

- "Meshed-Ready" Transmission
- Enabling future beneficial meshed connections
- Standardization to support "Plug-and-Play" framework
- Commercial designs to support multi-zonal injection
- HVDC radial lines to minimize stakeholder disruption and environmental footprint





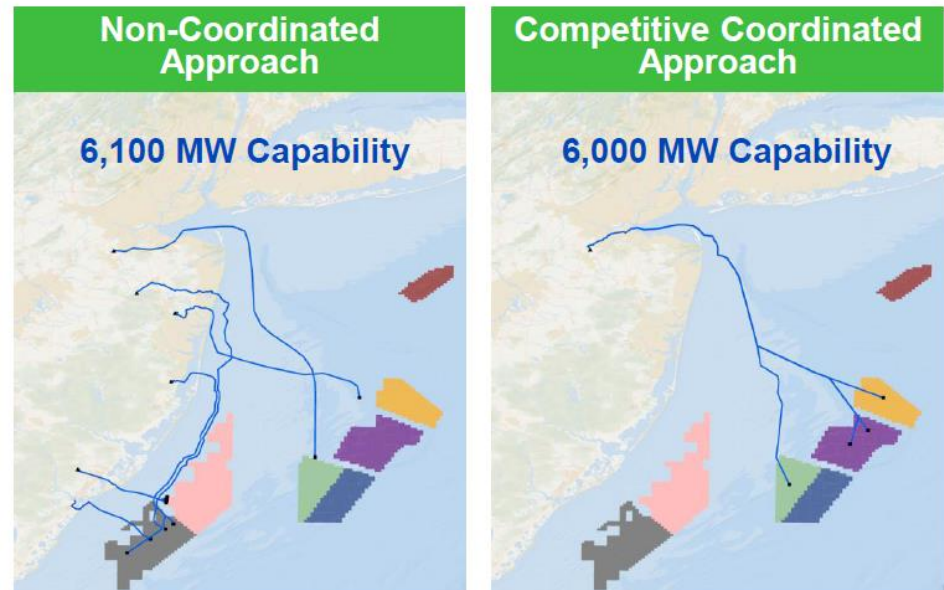
NextEra Energy Transmission

Johnbinh Vu – Executive Director, Development

A competitive coordinated offshore transmission approach will be less costly and more effective to deliver offshore wind

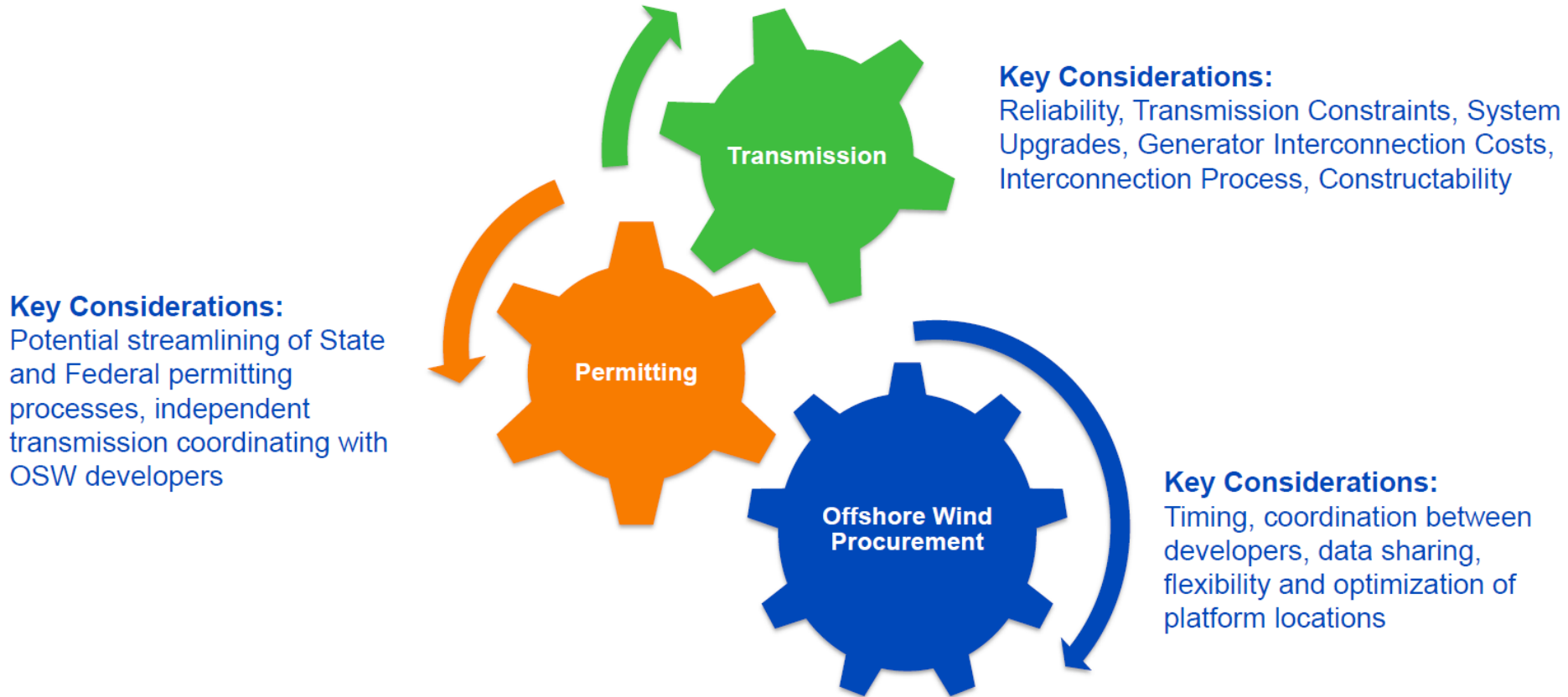
Offshore Transmission Planning

- **Competition and coordination brings significant cost savings and fewer impacts for offshore transmission**
 - Significantly reduces the number of cables and platforms needed to integrate offshore wind
 - 50% lower costs
 - 75% fewer environmental and community impacts
- **Approaches similar New Jersey's State Agreement Approach lessen interconnection risks for offshore developers**
 - Maximizes interconnection point capacity
 - Avoids costly band-aid approach to upgrading the system



Images based on actual proposals/projects

Offshore Transmission Development has complex interactions and processes



Development that addresses the different considerations will result in the best solution overall

Questions?



Please submit your questions in the chat box.
Reference the speaker or topic.

A dark-themed chat interface mockup. At the top, it says "Chat" with a dropdown arrow on the left and a close "X" button on the right. Below this is a "To:" label followed by a dropdown menu showing "Host" and a downward arrow. At the bottom is a large text input field with the placeholder text "Enter chat message here" and a send button (a right-pointing triangle) on the right.



BREAK

Coordinated Transmission Planning 101



Sam Salustro

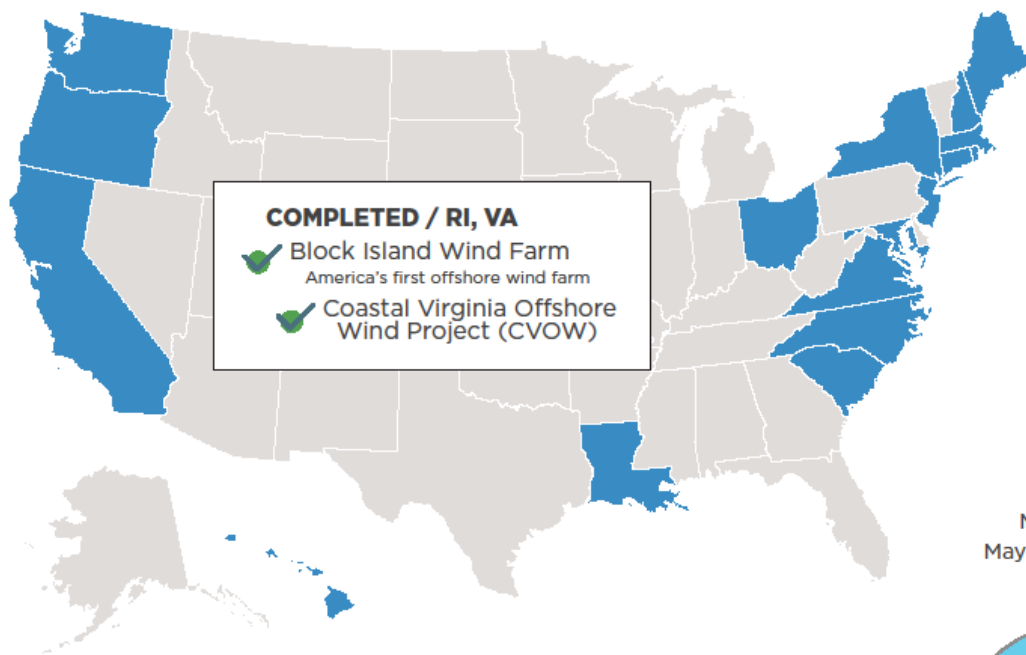
Director of Maryland Coalitions and Partnership
Business Network for Offshore Wind

OSW Coordinated Transmission Planning 101

Sam Salustro
Director of Coalitions and Strategic Partnerships
sam@offshorewindus.org

Business Network for Offshore Wind

- 1 Focus on developing US offshore wind industry and its supply chain
- 2 Not-for-Profit, Membership-Based
- 3 Provide: *Information, Education, Introductions*



17.6 GWs
present offtake agreements

30 GWs
by 2030



Massachusetts,
Mayflower Wind Price



Maryland offshore
wind price



New Jersey offshore
wind price

24

U.S. offshore wind lease areas
equalling potential

27 GWs

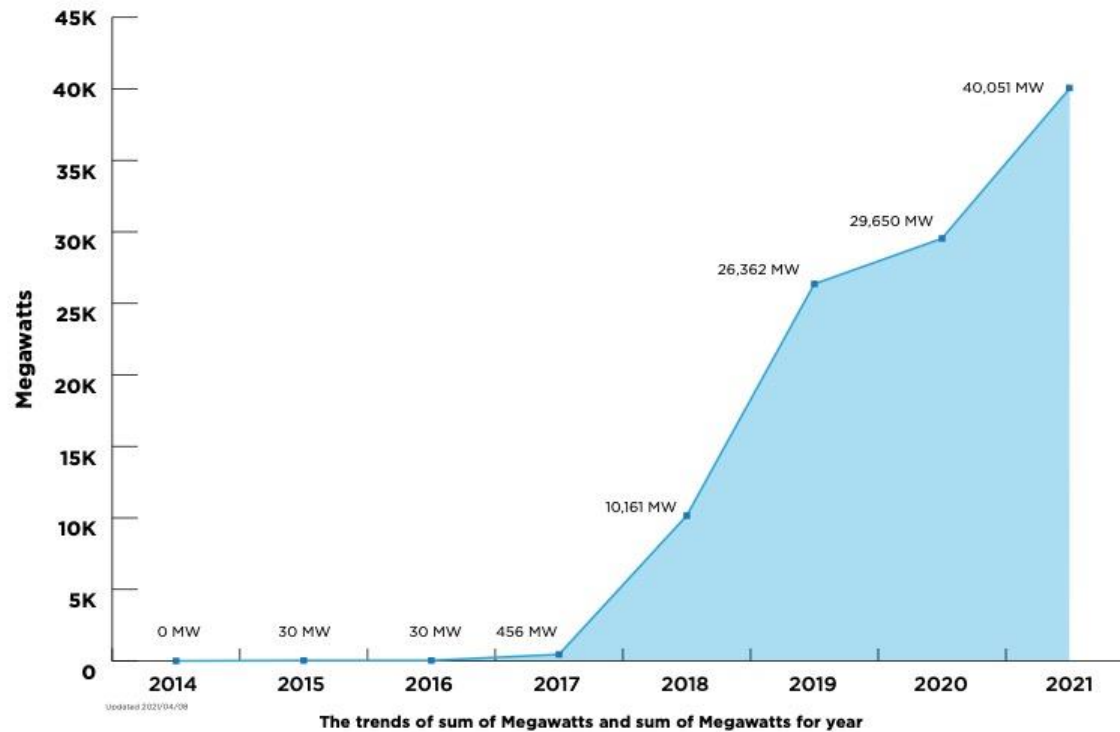


+

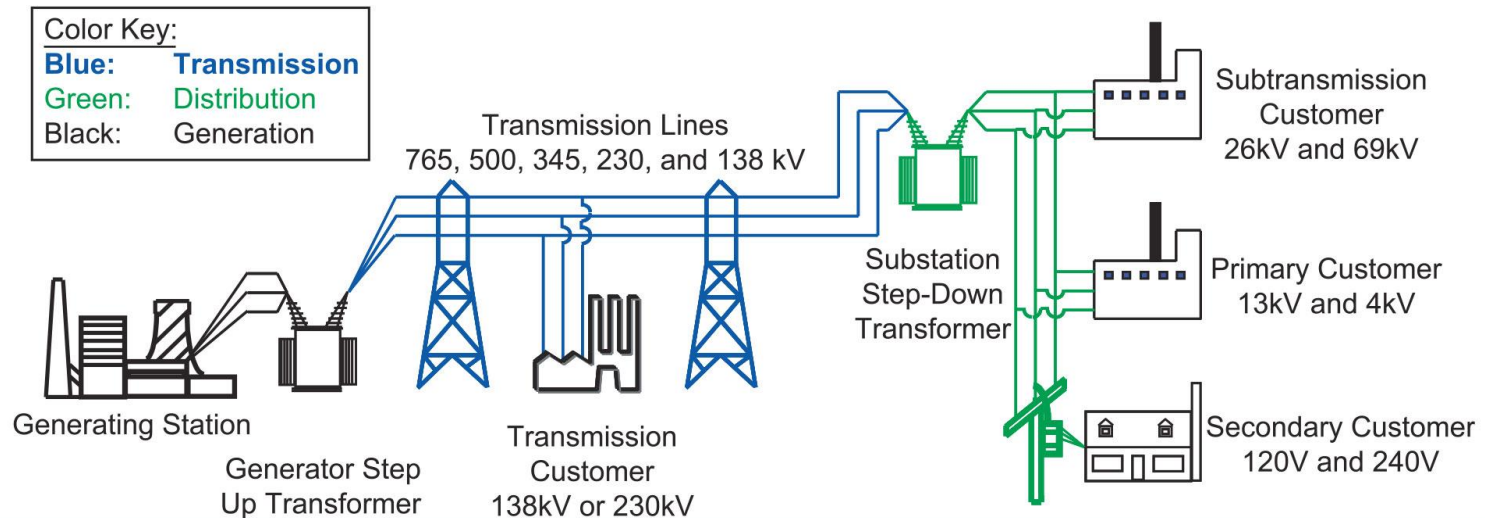


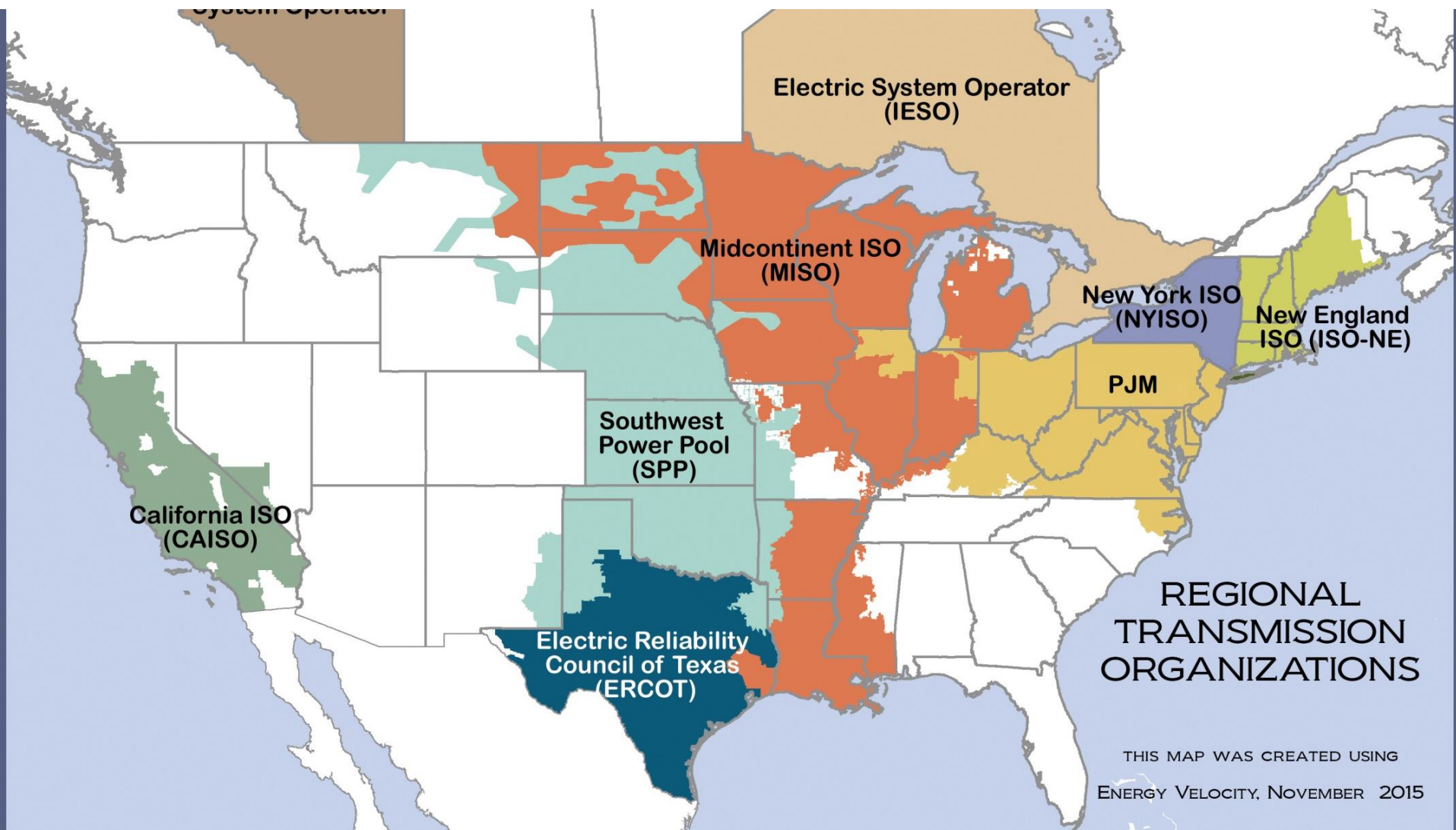
2022/03/31

State Commitments to OSW



Overview of a Transmission System





OSW Transmission System Topologies

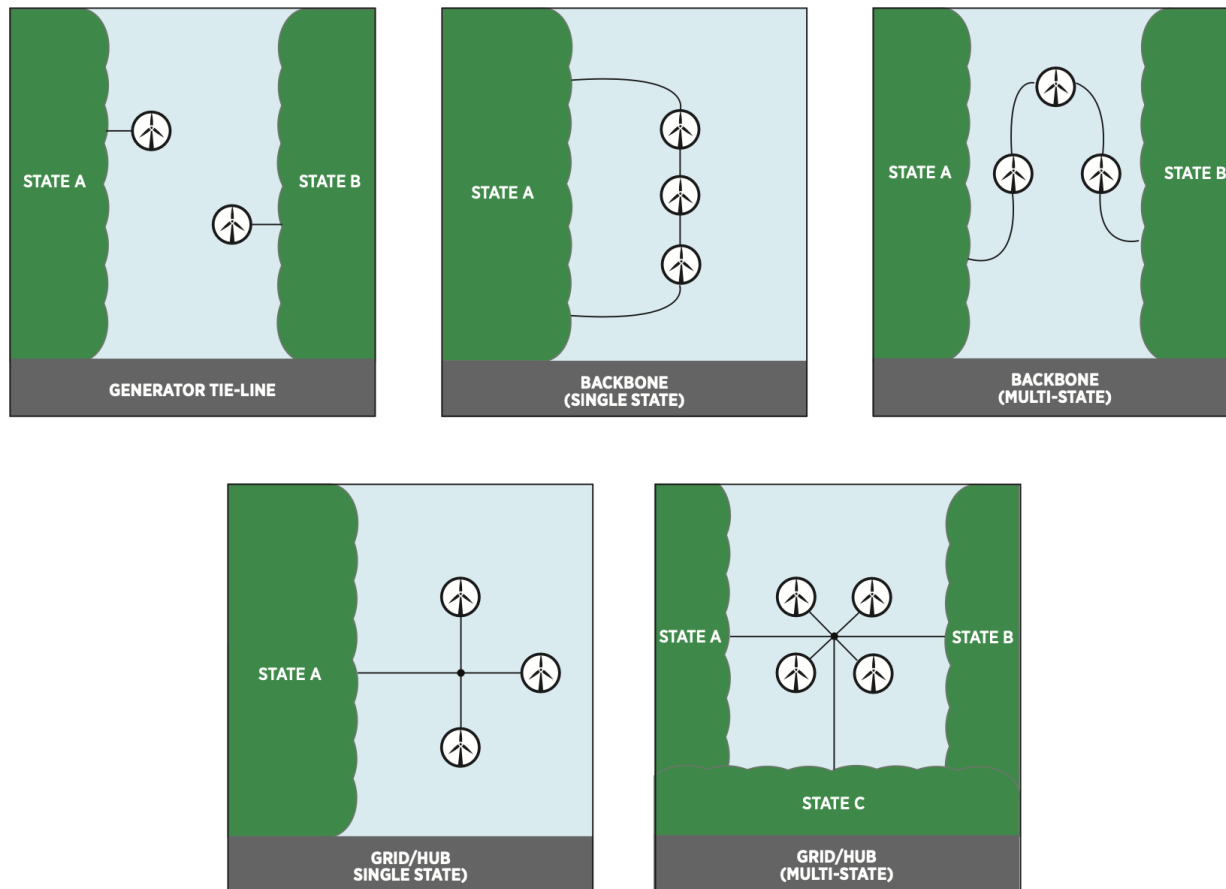


Figure 1: Offshore Wind Transmission System Topologies

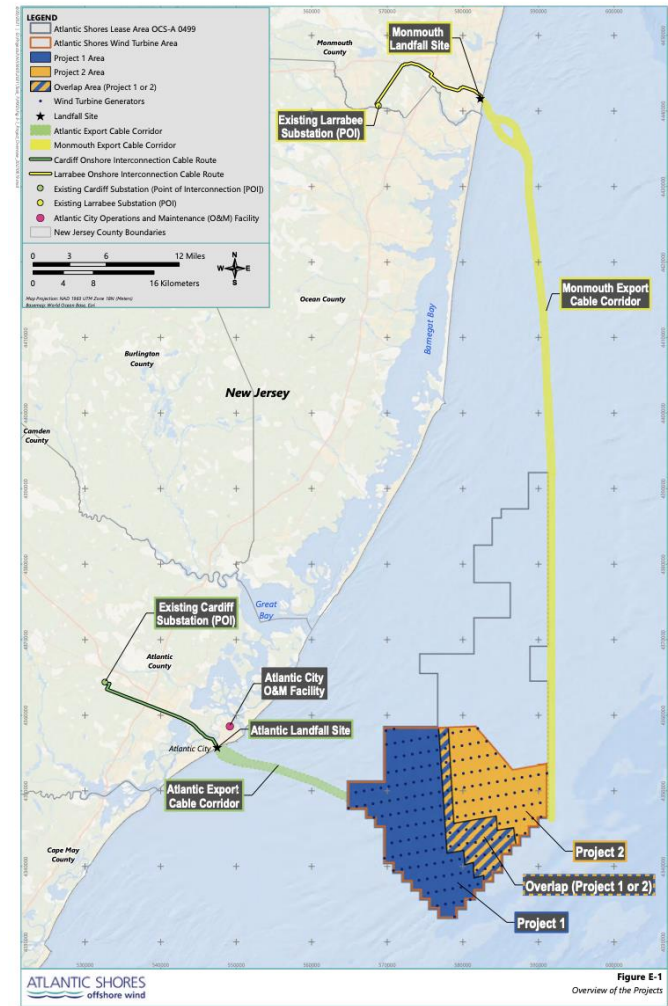
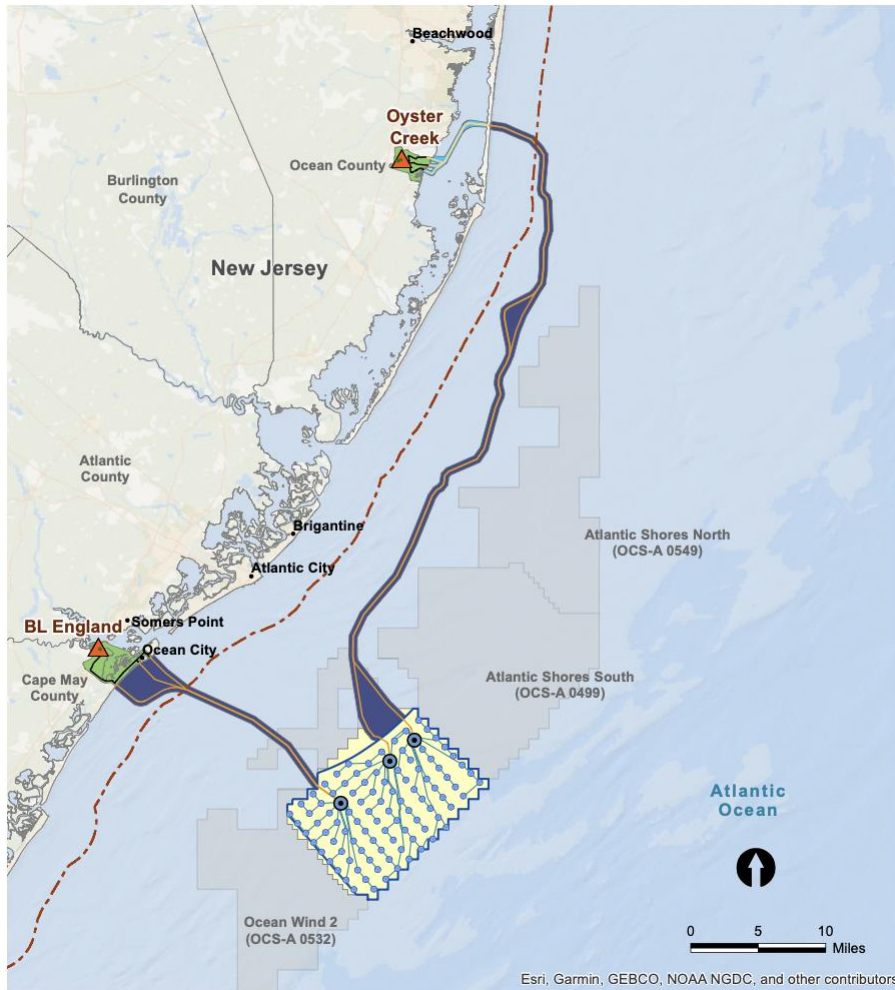


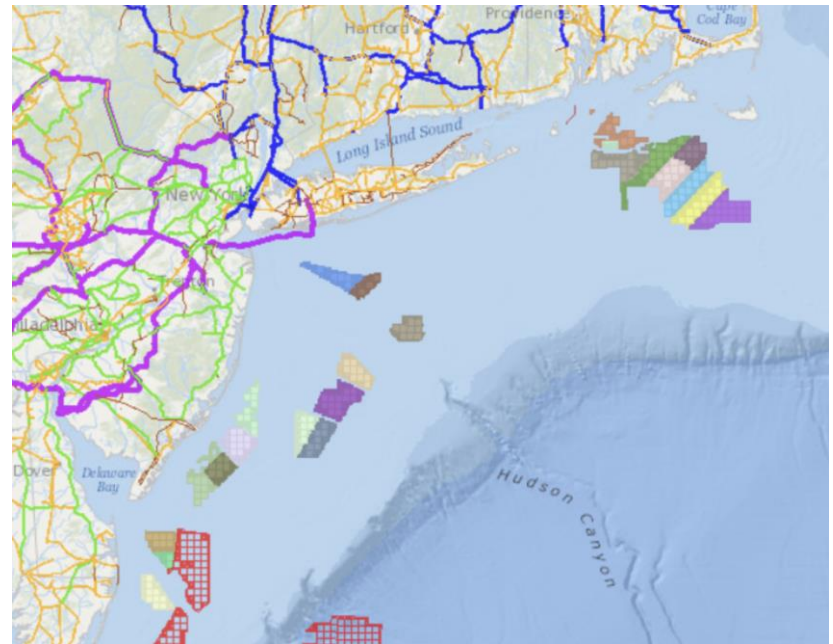
Figure E-1
Overview of the Projects

Radial/Generator Tie-Line

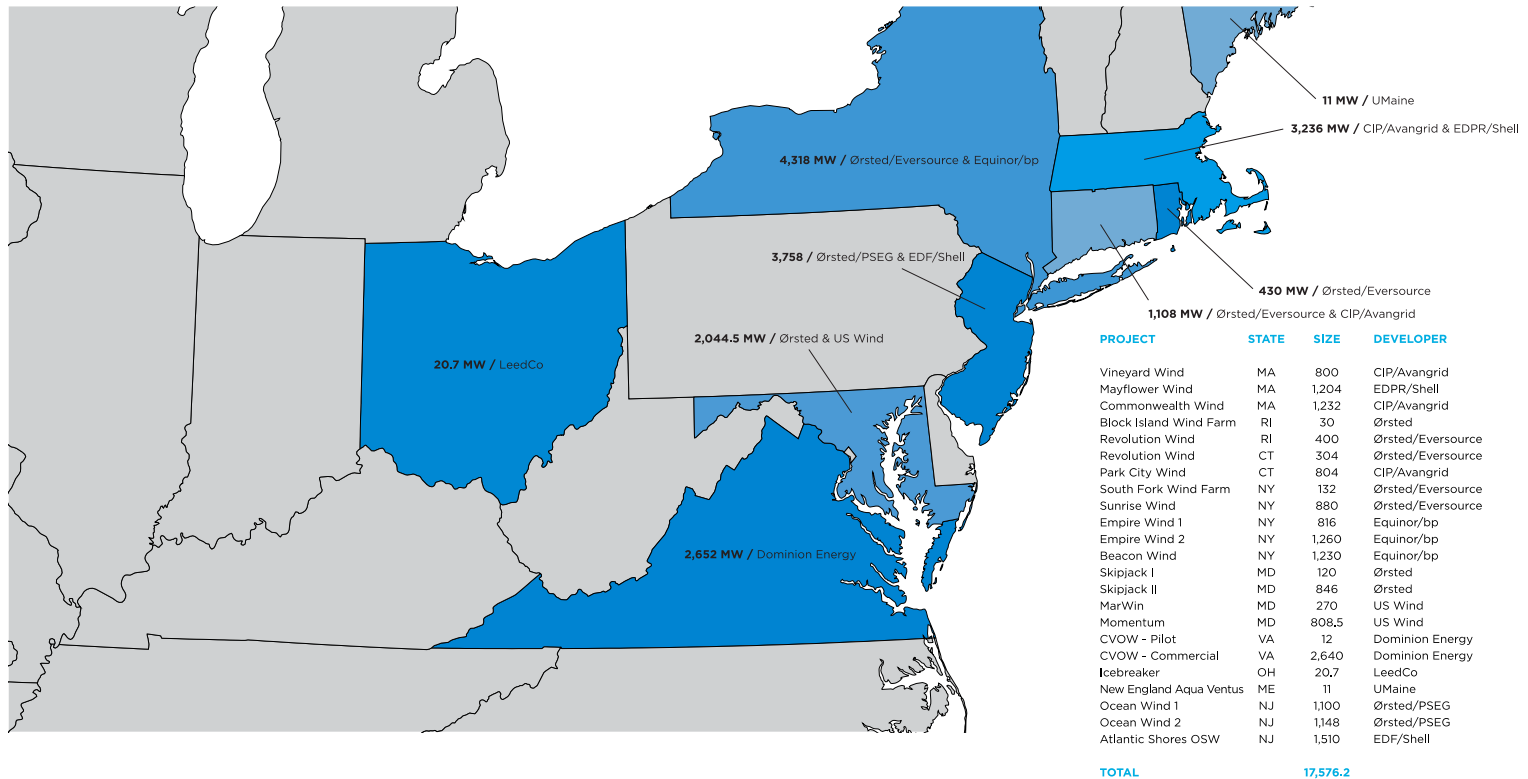
- Vast majority of domestic and global Projects
- Simplicity and Speed
- Risk isolated to individual projects...

Limitations

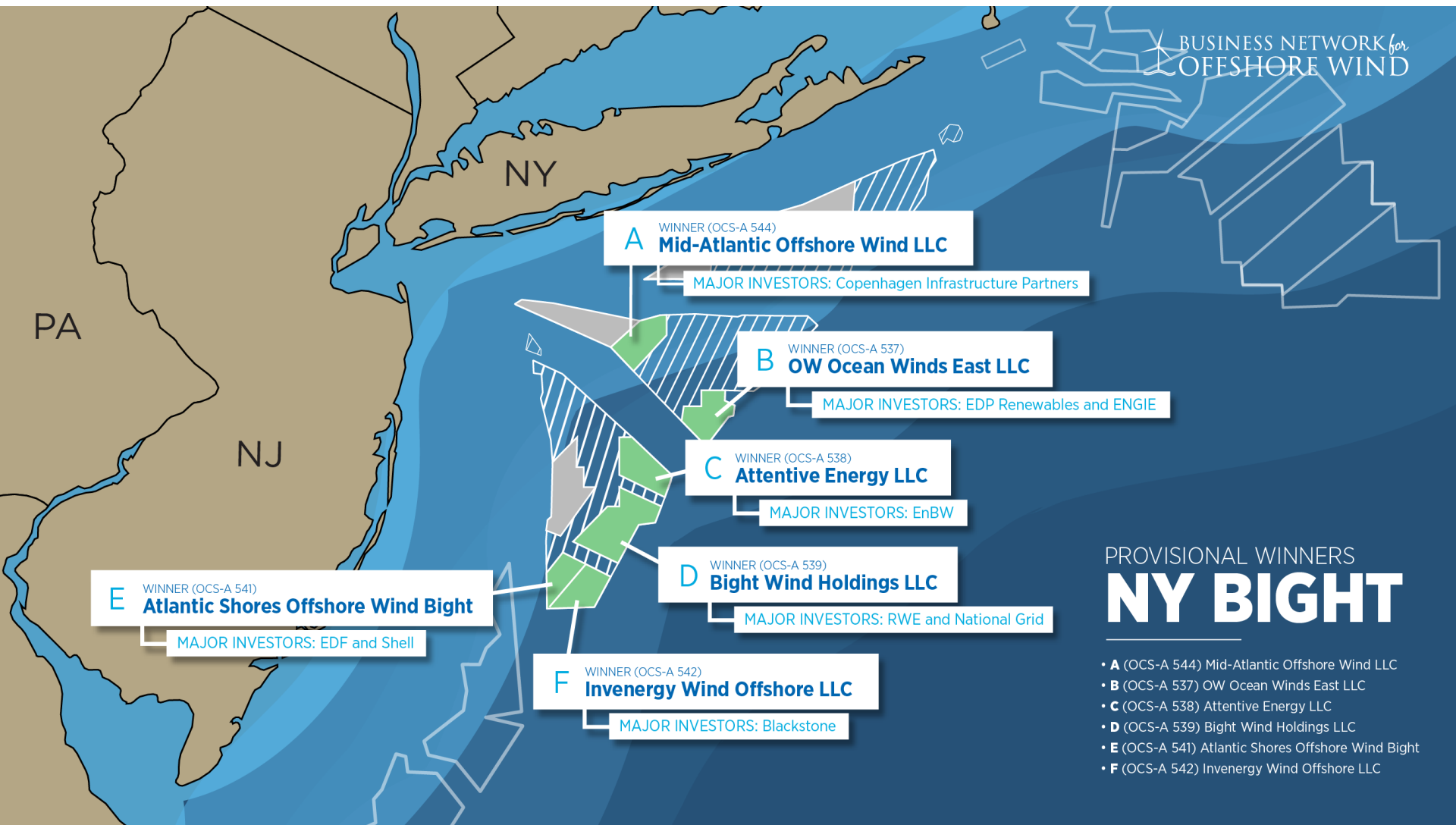
- ...But creates long-term system risk
- Less costly, but only at first
- Possible Inefficient use of Assets
- Risk of Energy Curtailment
- Does not capture “full benefits”



Offshore Wind Under Development

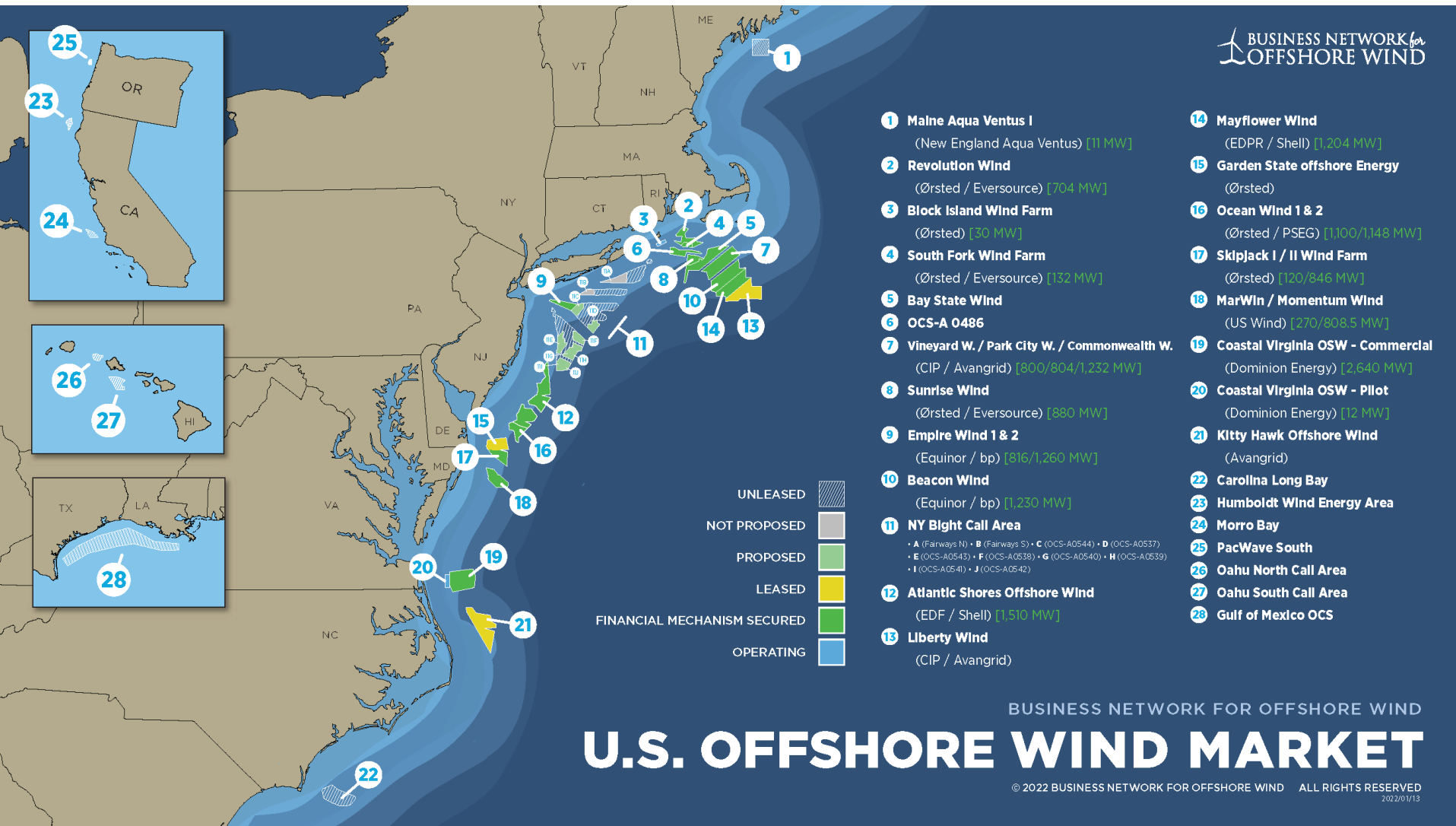


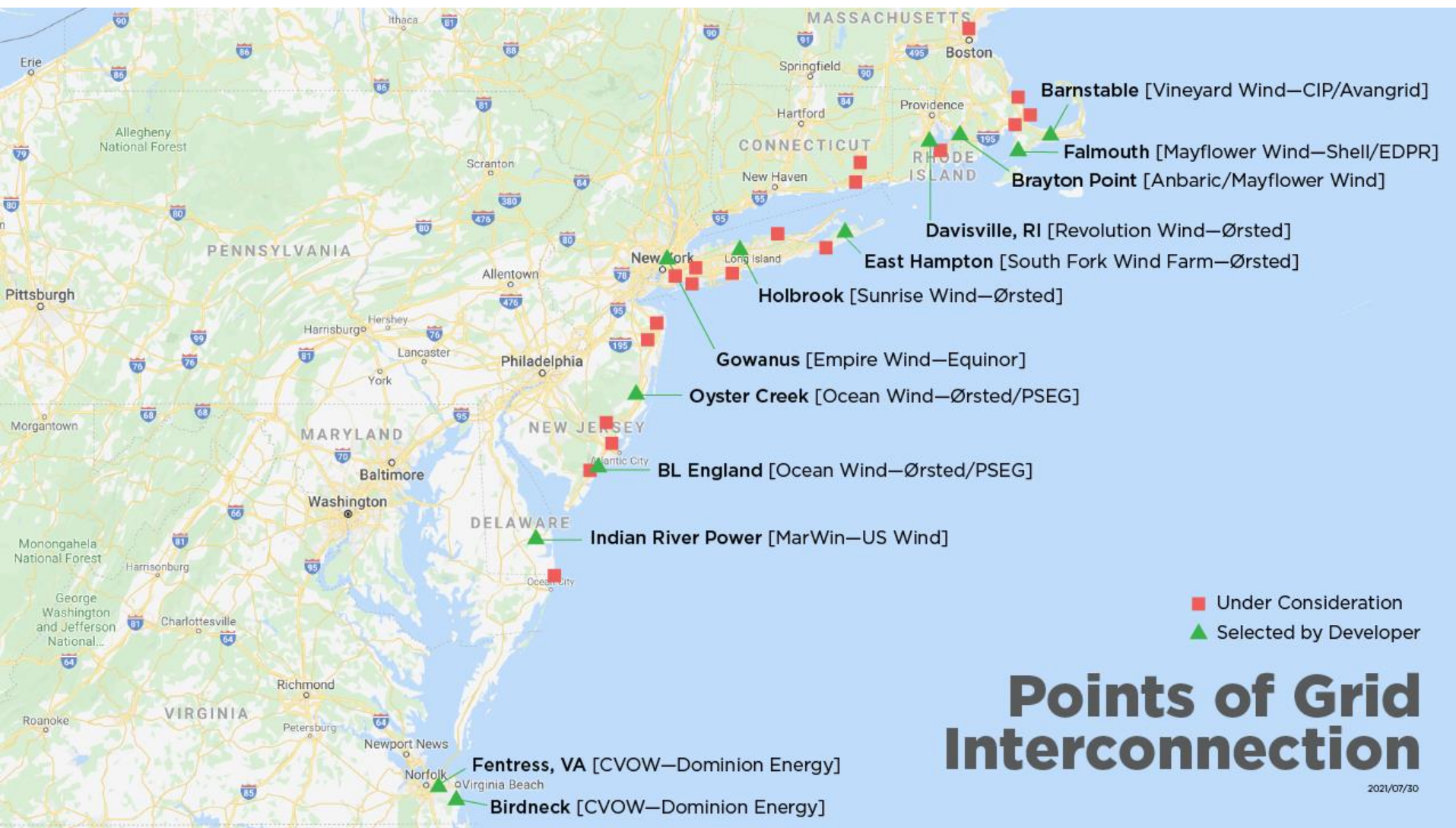
2022/01/13



PROVISIONAL WINNERS
NY BIGHT

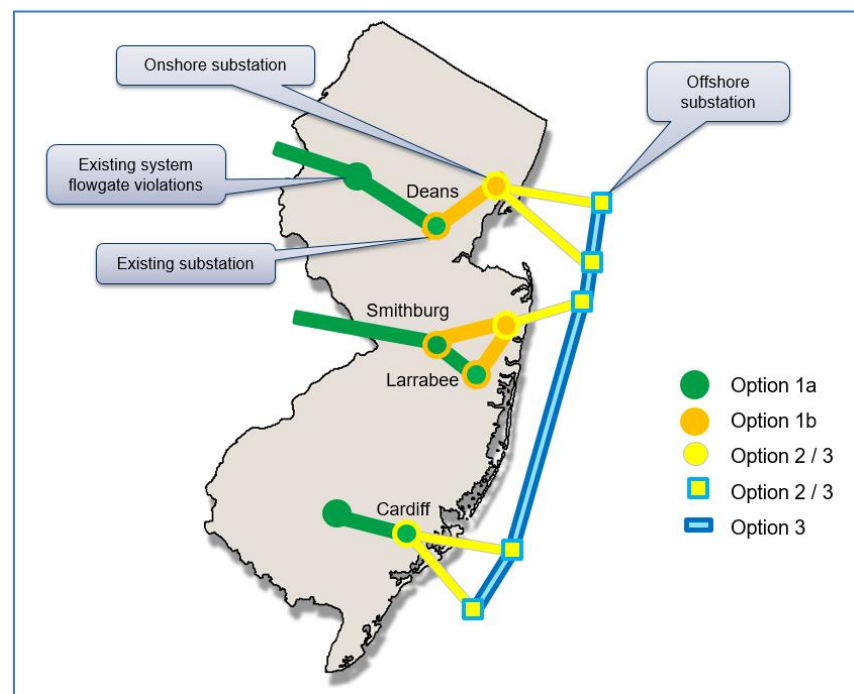
- **A** (OCS-A 544) Mid-Atlantic Offshore Wind LLC
- **B** (OCS-A 537) OW Ocean Winds East LLC
- **C** (OCS-A 538) Attentive Energy LLC
- **D** (OCS-A 539) Bight Wind Holdings LLC
- **E** (OCS-A 541) Atlantic Shores Offshore Wind Bight
- **F** (OCS-A 542) Invenergy Wind Offshore LLC



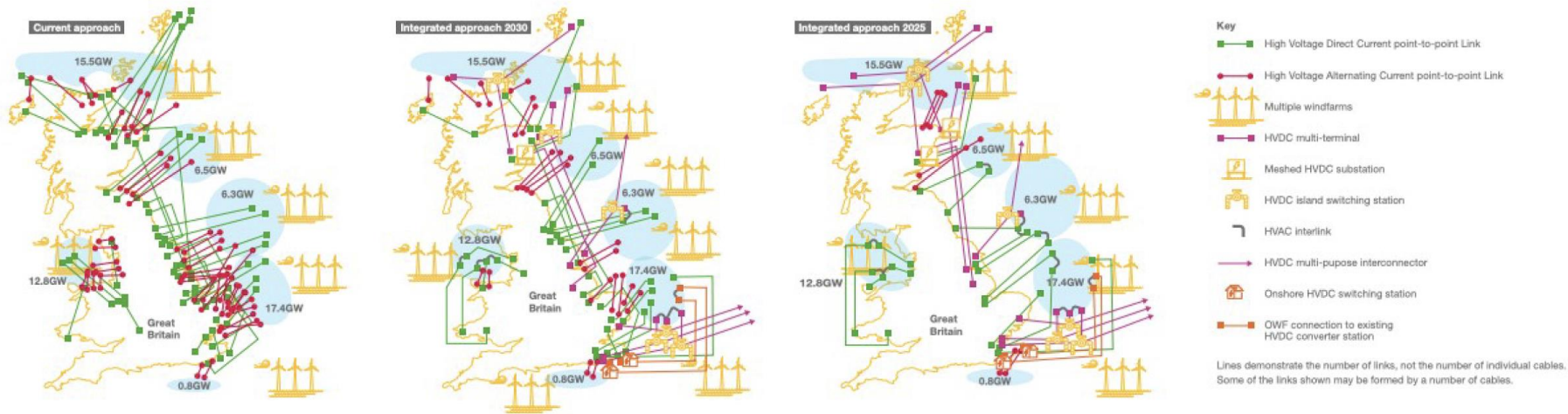


Planned Approach / Network Transmission Benefits

- Increased system reliability or durability
- Reduces overall asset need, leading to:
 - Capex cost savings (in billions)
 - Reduced environmental impacts
- Reduction in energy curtailment or system congestion
- Shift power based on demand, reducing ratepayer costs



UK Moving To Planned Approach



The modular Hub-and-Spoke concept is a technically feasible solution that can adapt to specific design requirements. The consortium is well placed to develop, build and operate Hub-and-Spoke projects.

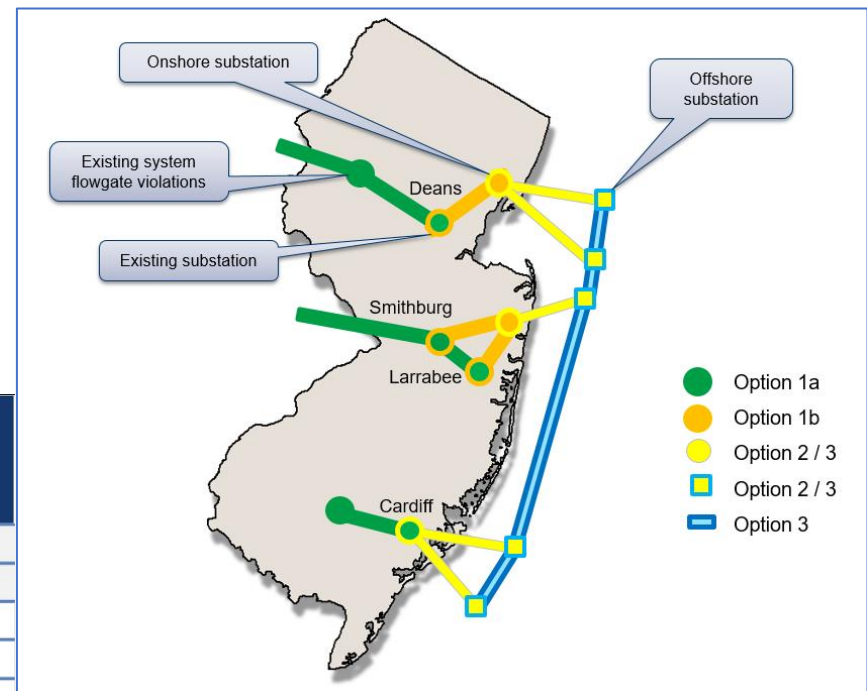
- Existing connection point
- New-to-generate connection
- End User
- Existing connection
- Planned connection
- FTS connection
- R2 connection



Planned Approach / Network Transmission Risks

- Timing and coordination risk
 - Generator & Transmission assets
 - State Policy Plans & System Upgrade
- Revenue risks for project developer
- Technology and engineering risk
- Cost Allocation Questions

Solicitation	Capability Target (MW)	Capability Awarded	Issue Date	Submittal Date	Award Date	Estimated Commercial Operation Date
1	1,100 ⁽¹⁾	1,100	Q3 2018	Q4 2018	Q2 2019	2024-25
2	1,200-2400 ⁽²⁾	2,658	Q3 2020	Q4 2020	Q2 2021	2027-29
3	1,200	N/A	Q1 2023 ⁽³⁾	Q2 2023	Q4 2023	2030
4	1,200	N/A	Q2 2024	Q3 2024	Q1 2025	2031
5	1,342	N/A	Q2 2026	Q3 2026	Q1 2027	2033



Projects already past design Phase

Offshore Wind Projects in U.S. Waters

■ 19 – UTILITY SCALE PROJECTS UNDER DEVELOPMENT

- Atlantic Shores Offshore Wind
- Beacon Wind
- Commonwealth Wind
- Coastal Virginia Offshore Wind – Commercial
- Empire Wind I
- Empire Wind II
- Kitty Hawk
- MarWin
- Mayflower Wind
- Momentum Wind
- Ocean Wind I
- Ocean Wind II
- Park City Wind
- Revolution Wind
- Skipjack Wind I
- Skipjack Wind II
- South Fork Wind
- Sunrise Wind
- Vineyard Wind

■ 2 – PILOT PROJECTS IN OPERATION

- Block Island Wind Farm
- Coastal Virginia Offshore Wind – Pilot

■ 4 – PILOT PROJECTS UNDER DEVELOPMENT

- CADEMO
- Icebreaker
- Ideol
- New England Aqua Ventus

Federal Permitting by the Numbers

■ 2 – PROJECTS WITH APPROVED RECORDS OF DECISION (ROD)

- Vineyard Wind
- South Fork Wind

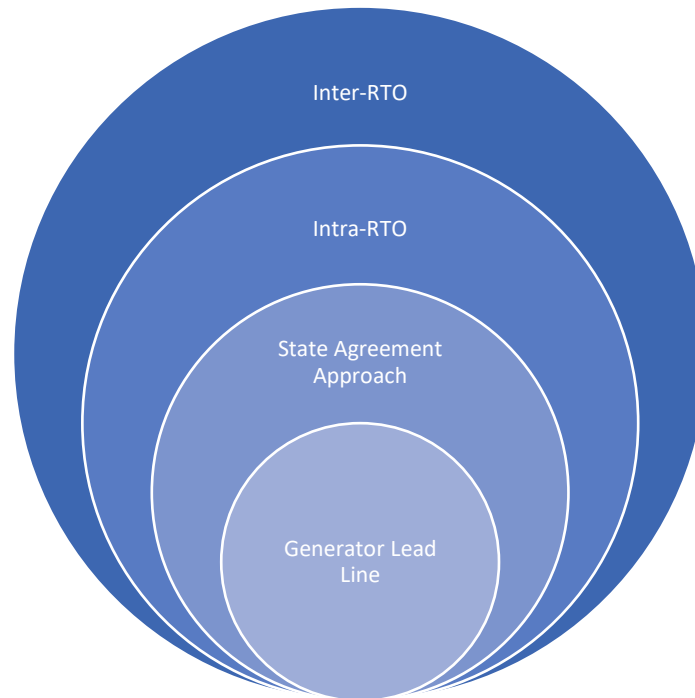
■ 9 – CONSTRUCTION AND OPERATIONS PLANS (COP) UNDER REVIEW

- Ocean Wind
- Revolution Wind
- Empire Wind
- New England Wind
- Coastal Virginia Offshore Wind – Commercial
- Kitty Hawk Offshore Wind
- Sunrise Wind
- Atlantic Shores Offshore Wind
- Mayflower Wind

■ 6 – SITE ASSESSMENT PLANS (SAP) APPROVED

- GSOE I, LLC
- Skipjack I & II
- US Wind Inc. (MarWin/Momentum Wind)
- Bay State Wind LLC
- Beacon Wind
- Liberty Wind

Moving to Full Regional Coordination



- Increasing in:
- complexity
- geographic scope
- level of coordination

OPTION	PROS	CONS
1. Private generator lead line. This is the transmission configuration that is being utilized for the first tranche of U.S. offshore wind projects. The transmission is bundled with generation in the same single project, with no open access to third parties.	<ul style="list-style-type: none"> - Quicker, simpler, and less risk for developers in the near-term, before network upgrade needs rapidly increase. 	<ul style="list-style-type: none"> - May utilize onshore interconnection points less efficiently, and smaller projects will not be able to capitalize upon economies of scale.
2. Proactively planned, regionally cost-shared open access transmission. Similar to MISO MVP, SPP priority projects, ERCOT CREZ. State policies would be accounted for in the regional transmission plans.	<ul style="list-style-type: none"> - Incorporates state and utility generation plans. Can incorporate interconnection queues. Can optimize the efficient amount and configuration, taking all purposes and benefits into account, including reliability, resilience, congestion cost reduction, and public policy. - Costs can be broadly allocated to beneficiaries, enabling realization of more efficient outcomes.⁴³ 	<ul style="list-style-type: none"> - Requires RTO stakeholder support to propose to FERC, and FERC support to approve it. - Stakeholders typically object to paying for “public goods” like regional shared transmission.
3. Proactively planned shared gen-tie, with risk-sharing by all RTO customers. Based on the CAISO Location Constrained Resource Interconnection Facilities (LCRIF) tariff. Current wholesale RTO customers finance the line but are paid back over time by generators as they interconnect in the future.	<ul style="list-style-type: none"> - Proactive planning for gen-ties facilitates interconnections, reduces costs and environmental footprint and promotes new resource development. 	<ul style="list-style-type: none"> - May not consider/capture all the reliability, economic, public policy, and other benefits of transmission. - A policy question for regulators is whether there is too much risk that the future generators will not seek interconnection, leaving existing wholesale customers saddled with costs.
4. Merchant offshore transmission with anchor tenant, no cost allocation. Early projects sign up for most of the capacity on the transmission line, leaving capacity open for others.	<ul style="list-style-type: none"> - Enables larger scale and greater efficiencies than the project-by-project generator tie-line approach. 	<ul style="list-style-type: none"> - May not achieve the broader efficiencies of a regionally planned network.
5. Regionally planned onshore grid, with merchant offshore. The onshore connection points would be upgraded, with costs allocated to existing customers in a “beneficiary pays” approach. Could be used in tandem with the merchant anchor tenant model offshore.	<ul style="list-style-type: none"> - Can achieve savings in the use of transmission interconnection points on land. In the Brattle Group’s NY study, one-third of the transmission costs were onshore, and two-thirds offshore, yet almost all of the savings were from more efficient utilization of onshore points of interconnection. 	<ul style="list-style-type: none"> - May leave efficiencies offshore untapped.
6. Inter-regionally planned and cost allocated transmission. A plan across two or three ISOs would jointly plan and reach a cost allocation agreement for a network among them. The transmission could increase reliability, resilience, and efficiency of each of the grids in ways unrelated to offshore wind.	<ul style="list-style-type: none"> - Captures efficiencies and provides reliability and resilience to all three regional grids. 	<ul style="list-style-type: none"> - Very hard to achieve cost allocation agreements within regions, let alone across three. Each RTO would have to agree and make their own filing to FERC, and FERC would have to approve the cost allocation (the “triple hurdle”).
7. Transmission at least partially funded by the federal government. Large transmission lines, and particularly inter-regional lines, could be eligible for some cost-sharing from the federal government. Federal money can help grease the skids for each region to contribute a share of costs. Under almost any of the options in this table, U.S. DOE could assist with stakeholder engagement and funding for technical studies.	<ul style="list-style-type: none"> - Federal support recognizes large and broadly spread benefits of transmission, particularly offshore transmission, and helps get over parochial fights regarding which region benefits more and should pay more. - History of federal support for transmission through the Power Marketing Agencies, TVA, and New Deal programs. Analogous to federal highway funding. - Federal investment or financing can reduce risk and the cost of capital. 	<ul style="list-style-type: none"> - Requires building Congressional support and finding funding. - Using non-refundable tax credits requires entities with sufficient tax liability or tax equity investors, and Congress does not typically support refundable tax credits. - Any federal government discretion to select or decide on lines would trigger a programmatic EIS review, which can take considerable time.
8. Individual state approach. An individual state could procure, plan, and/or finance independent transmission to enable interconnection of offshore wind, and subsequently procure offshore wind generation connecting to the state-procured independent transmission.	<ul style="list-style-type: none"> - Can be undertaken expeditiously using existing state-level authorities - Massachusetts deemed that this approach could provide benefits to “accommodate future expansion of offshore wind energy, including beyond the next 1,600 MW.” - States can typically access low-cost capital. 	<ul style="list-style-type: none"> - Falls short of full regional coordination

Offshore Wind Transmission Publications



10 KEY RECOMMENDATIONS:

- Integrated transmission planning should weigh all benefits
- Transmission planning should incorporate public policy requirements
- Plan proactively
- Plan for a longer time horizon
- Qualify all benefits
- Better synchronize inter-regional planning
- Government investment to maximize capacity of cable landfalls will pay off exponentially.
- The Outer Continental Shelf is uniquely federal jurisdiction and lends itself to holistic transmission planning
- FERC and BOEM can build on existing Memorandum of Understanding
- Federal highway system funding model for a holistic upgrade to the electricity grids across all three Northeast grid operators that facilitates the deployment of a minimum of 30 GW of offshore wind by 2030

Thank you!

Sam Salustro

Director of Coalitions and Strategic Partnerships

- Business Network for Offshore Wind
- Sam@offshorewindus.org

Questions?



Please submit your questions in the chat box.
Reference the speaker or topic.

A dark-themed chat interface mockup. At the top left is a dropdown arrow followed by the word "Chat". At the top right is a close button (X). Below this is a "To:" label followed by a dropdown menu showing "Host" and a downward arrow. At the bottom is a large text input field with the placeholder text "Enter chat message here" and a send button (paper plane icon) on the right.

Environmental Benefits and Considerations of Coordinated Offshore Wind Transmission



Avalon Bristow

Program Director,
Mid-Atlantic Regional Council on the Ocean

REGIONAL OCEAN PLANNING FOR OFFSHORE WIND TRANSMISSION

Avalon Bristow, Program Director, Mid-Atlantic
Regional Council on the Ocean

June 2022: U.S. Department of Energy and U.S.
Department of the Interior - Atlantic Offshore
Wind Transmission Stakeholder Workshop



MARCO
MID-ATLANTIC REGIONAL
COUNCIL ON THE OCEAN





SHARED REGIONAL PRIORITIES

- **Protect important habitat and sensitive and unique offshore areas**
- **Support the sustainable development of offshore renewable energy**
- Prepare the region's coastal communities for the impacts of climate change
- Promote coastal water quality improvements

REGIONAL OCEAN PLANNING IN THE MID-ATLANTIC

- MARCO is a state-led Regional Ocean Partnership
- Mid-Atlantic Committee on the Ocean – MARCO's Ocean Planning Committee
- Collaborative Work Groups
- Mid-Atlantic Ocean Data Portal



MID-ATLANTIC COMMITTEE ON THE OCEAN



- Inter-agency coordination
- Steering Committee:
 - 3 Mid-A States: DE, NJ, NY
 - BOEM
 - US ACE
 - NOAA
 - Shinnecock Indian Nation
 - Mid-A Fishery Management Council





COLLABORATIVE WORK GROUPS

- Mid-Atlantic Coastal Acidification Network
- Marine Debris Work Group
- Ocean Mapping & Data Team
- Non-Consumptive Recreation
- Maritime Commerce and Navigation
- **Offshore Wind Regional Collaboration**



This Photo by Unknown Author is licensed under CC BY

MID-ATLANTIC OFFSHORE WIND REGIONAL COLLABORATION (OWRC)

- Chaired by NYSDOS, NJDEP, NOAA, and BOEM
- Inter-agency information exchange
- Stakeholder outreach
- Coordination with other regional offshore wind groups
- [OWRC Work Plan](#)



The Mid-Atlantic Ocean Data Portal Team

The Portal is maintained by a team consisting of the Monmouth University Urban Coast Institute, Rutgers University Center for Remote Sensing and Spatial Analysis, Duke University Geospatial Ecology Lab, The Nature Conservancy and Ecotrust under the guidance of MARCO.

It was developed with grant support from the Gordon and Betty Moore Foundation, National Oceanic and Atmospheric Administration, and the states of Virginia and New York.

What's on the Portal?



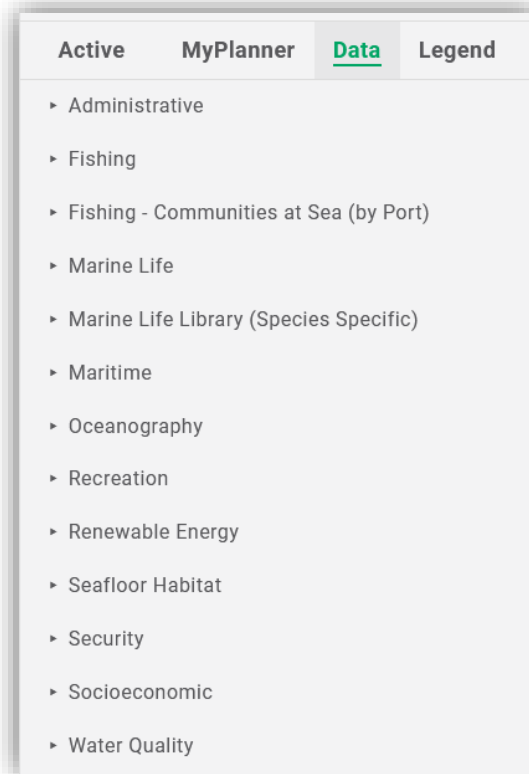
5,000+ map layers organized under 13 themes



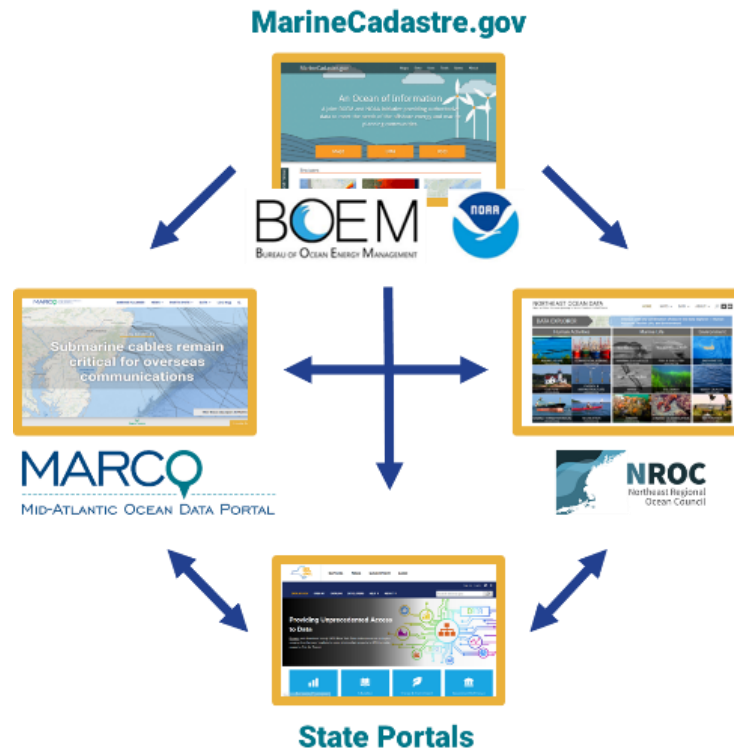
Instructional and educational resources: Portal blog, “Ocean Stories,” calendar, webinars



Tools for users to share maps and collaborate in groups



Mid-Atlantic Ocean Data Portal



OWRC TRANSMISSION SUBCOMMITTEE

- [Transmission webinar series](#) hosted by NROC and MARCO in early 2021
- Covered general information about transmission processes and stakeholder considerations
- Illuminated need for a regional approach



OWRC TRANSMISSION SUBCOMMITTEE

- Members include:

- **Federal**

- NOAA
- DOE
- USACE

- **State**

- NJDEP
- DNREC
- NYDOS



OWRC TRANSMISSION SUBCOMMITTEE

- Transmission siting is complicated and costly
- Variety of existing minimization & mitigation measures
- Key is identifying & refining significant challenges
- Need good data to do this effectively



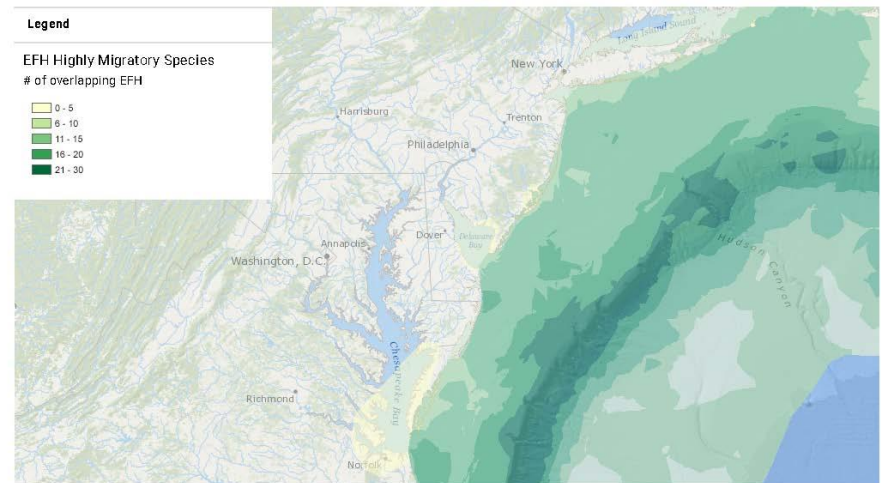
OWRC TRANSMISSION SUBCOMMITTEE

Subcommittee Goals:

- Create a curated list of existing spatial datasets on the MARCO Portal
- Identify key data gaps important for siting cables

Benefits:

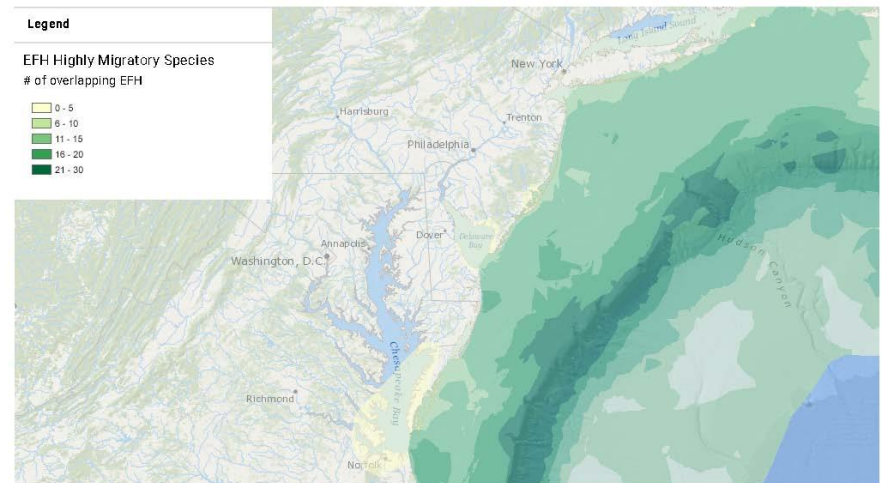
- Foster understanding on key cable siting considerations
- Raise awareness on regional cable siting issues
- Evaluate opportunities to address data gaps
- Empower outreach & engagement w/ stakeholders & public



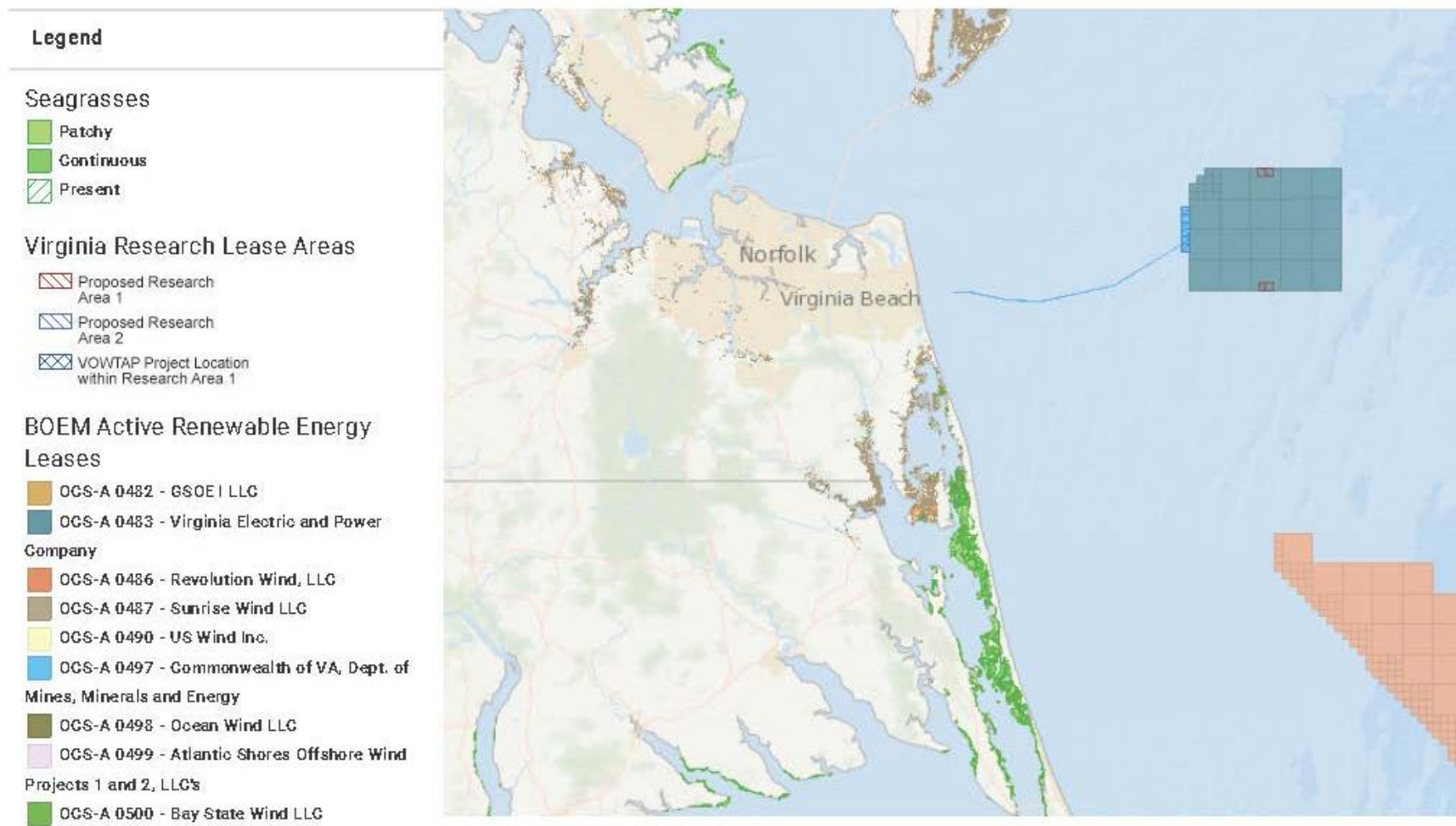
OWRC TRANSMISSION SUBCOMMITTEE

Meeting 1 (June 2022)

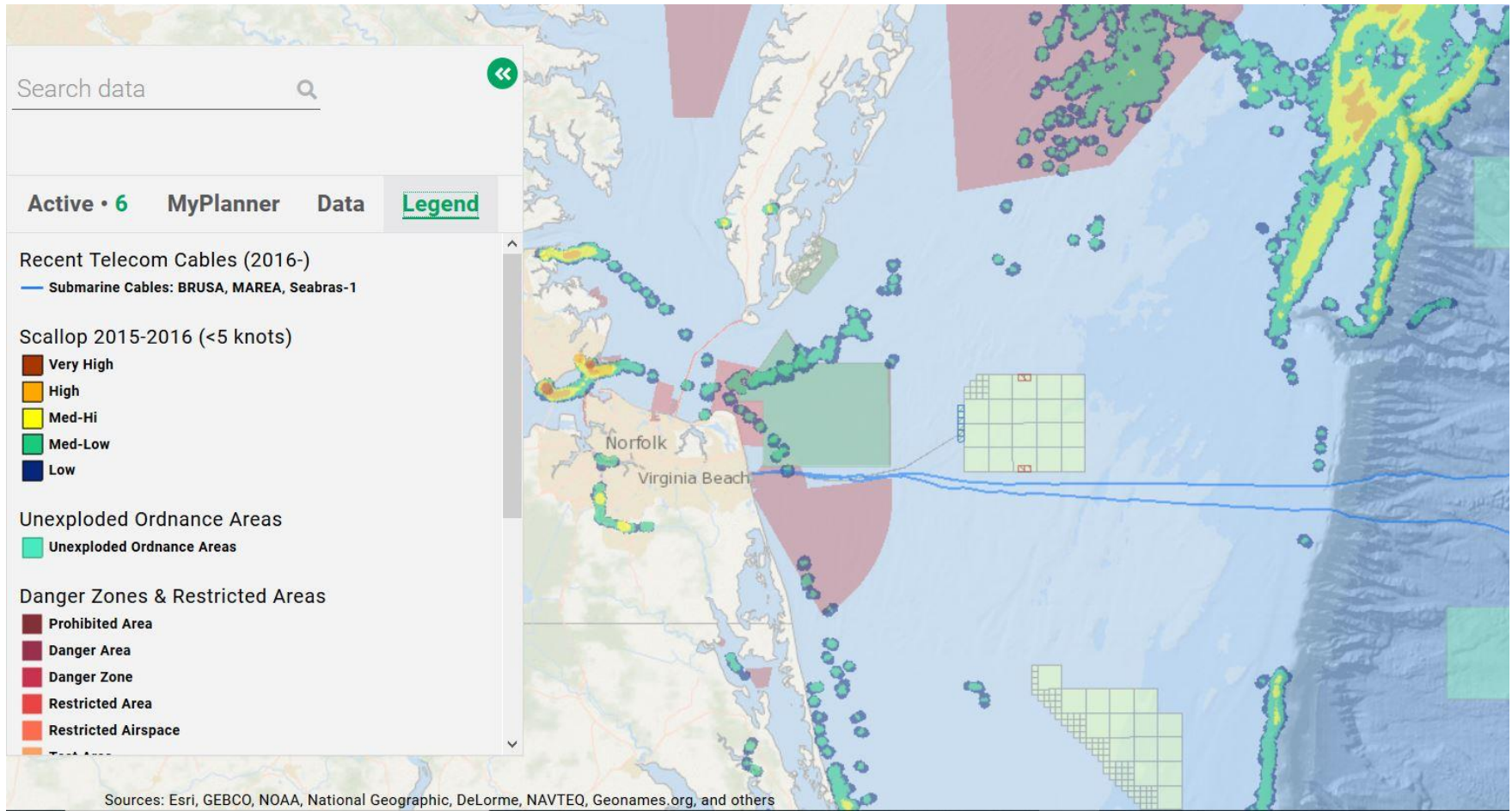
- Discussed and agreed upon study area
- Looked at transmission siting challenges in the following categories:
 - Physical
 - Biological
 - Socio-economic



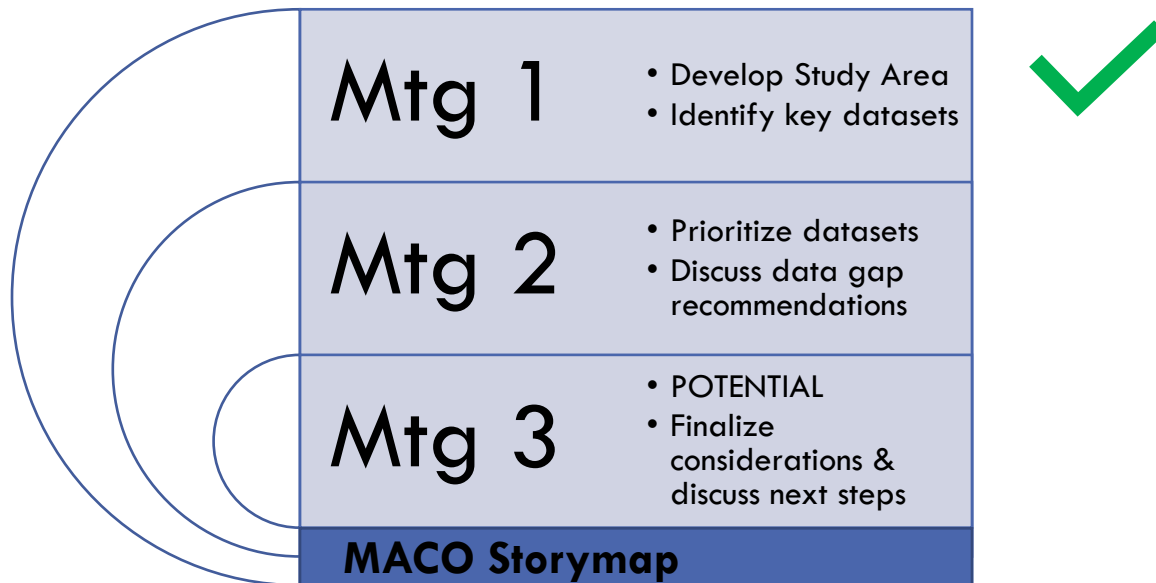
Portal Use Example: Estuarine Wetlands



Portal Use Example: Submarine Cables



OWRC TRANSMISSION SUBCOMMITTEE – MEETING OUTLOOK





THANK YOU!

Avalon Bristow
abristow@midatlanticocean.org

Questions?



Please submit your questions in the chat box.
Reference the speaker or topic.

A dark-themed chat interface mockup. At the top left is a dropdown arrow and the word "Chat". At the top right is a close button (X). Below this is a "To:" label followed by a dropdown menu showing "Host" and a downward arrow. At the bottom is a large text input field with the placeholder text "Enter chat message here" and a send button (paper plane icon) on the right.

Chat

To: Host

Enter chat message here

Social Benefits and Considerations of Coordinated Offshore Wind Transmission



Kris Ohleth

Executive Director,
Special Initiative on Offshore Wind



Special Initiative on
Offshore Wind

Social Benefits and Considerations of Coordinated Offshore Wind Planning

Atlantic Offshore Wind Stakeholder
Workshop
June 28, 2022



Special Initiative on
Offshore Wind

About the Special Initiative on Offshore Wind (SLOW)

- Rely on fact-based research and multi-sector collaboration to provide expertise, analysis, information sharing, and strategic solutions to advance the responsible and sustainable development of US offshore wind
- Guided by a Steering Committee of diverse interests
- Not a trade organization - funded by private foundations, which supports our objectivity and unique approach to our work

Goal of this session



A deep dive into the social impacts, benefits, and opportunities of coordinated offshore wind transmission

Topical Highlights:

- Local community benefits and challenges
- Energy justice opportunities

Benefits: increased level of coordination



- Announce-and-defend model for project development
- Coordinated planning – if done well – could offer stakeholder the opportunity to help shape the system from the beginning

Benefits: reduced cost



- The cost of offshore wind has been falling across all markets
- Shared transmission can further contribute to reduced costs
- Submarine cable supply chain constraints
- Raw materials are expensive and could be a bottleneck

Benefits: less conflict for existing ocean users



- Fishermen
- Shipping and navigation
- Other ocean users

Benefits: reduced cost



- The cost of offshore wind has been falling across all markets
- Shared transmission can further contribute to reduced costs
- Submarine cable supply chain constraints
- Raw materials are expensive and could be a bottleneck

Challenges: points of interconnect



- On the Atlantic Coast, transmission systems have been designed to provide power from the west to east
- There are limited points of interconnect into the grid in coastal areas

Challenges: local opposition to cable landfall



- Nearly every landfall location for offshore wind projects has been challenged by local communities
- Reducing the number of cable landfalls can reduce opportunities for opposition and points of conflict

Stakeholder fatigue is a real thing



- Numerous projects and leases in the pipeline, with an increasing trend
- Not giving strong voice and ample opportunity to stakeholders only delays the opposition – potentially delaying offshore wind deployment

Energy and environmental justice



- Offshore wind represents an opportunity for energy and environmental justice
- Reduction in number of landfalls could reduce the amount and nature of coastal community impacts



Special Initiative on
Offshore Wind

Keep in touch!

Kris Ohleth

(201) 850-3690

kris@offshorewindpower.org

Questions?



Please submit your questions in the chat box.
Reference the speaker or topic.

A dark-themed chat interface mockup. At the top left is a dropdown arrow and the word "Chat". At the top right is a close "X" button. Below this is a "To:" label followed by a dropdown menu showing "Host" with a downward arrow. At the bottom is a large text input field with the placeholder "Enter chat message here" and a right-pointing arrow button.

DOE Funding Efforts



Jigar Shah

Director, Loan Programs Office,
U.S. Department of Energy



Michelle Manary

Acting Deputy Assistant Secretary,
Energy Resilience Division, Office of
Electricity

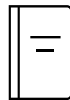
U.S. Department of Energy

Building A Better Grid



Engagement and collaboration

- States
- Tribal nations
- Stakeholders



Enhanced transmission planning

- Transmission Needs Study
- National Transmission Planning Study
- Atlantic Offshore Wind Transmission Study



Federal financing tools (\$20+B)

- Transmission Facilitation Program (\$2.5B)
- Smart Grid Investment Grant Program (\$3B)
- Grid resilience



Transmission permitting process

- Streamline of permitting with federal agencies
- Public private partnerships
- Designation of corridors



Transmission-related R&D

- “Next generation” electricity delivery technologies
- Supporting activities

BIL Funding Program Highlights:

Delivering Reliable, Clean, and Affordable Power to More Americans

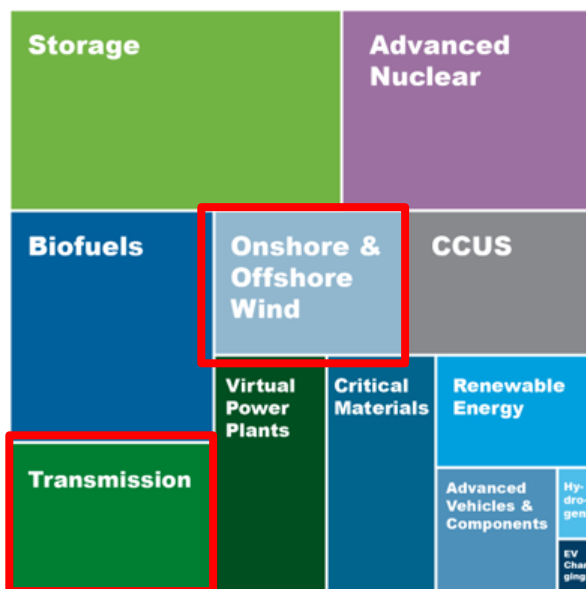
Program Name (DOE)	Funding Amount	Next Milestones
Preventing Outages and Enhancing the Resilience of the Electric Grid / Hazard Hardening (Grid Hardening Grants)	\$5 billion	<ul style="list-style-type: none">• NOI/RFI for state, territory and tribal formula grant program; released in mid-April• NOI/RFI for utilities and industry competitive program expected to be released in Summer 2022
Program Upgrading Our Electric Grid and Ensuring Reliability and Resiliency (Grid Resilience Demos)	\$5 billion	<ul style="list-style-type: none">• NOI/RFI expected to be released in Summer 2022
Deployment of Technologies to Enhance Grid Flexibility (Smart Grid Grants)	\$3 billion	<ul style="list-style-type: none">• NOI/RFI expected to be released in Summer 2022
Transmission Facilitation Program	\$2.5 billion	<ul style="list-style-type: none">• NOI/RFI released in May 2022 for phased approach

Role of LPO in OSW transmission deployment

LPO Application Activity for May 2022

\$78.8 BILLION

TOTAL AMOUNT OF LOANS REQUESTED
BROKEN DOWN BY LPO TECH SECTORS



- OSW transmission challenged by need to get steel in the water, while also positioning for scale to meet 30 GW goal
- LPO well positioned to support integrated transmission projects (e.g., HVDC backbone with mesh, landfall capacity) by region and inter-regionally
- Innovative Clean Energy title with \$2.5B eligible for OSW supply chain including transmission
- Active and preliminary applications in onshore transmission and across the OSW supply chain (e.g., wind farm development, factories for tower, monopile, blade manufacture, WTIVs, CSVs)

Notes

All data updated through May 31, 2022. For more details and a list of technology areas of interest within each LPO tech sector, see: [Energy.gov/LPO/MAAR](https://www.energy.gov/lpo/maar)

- 1) Active applications are defined as completed submissions through LPO's online application portal.
- 2) Individual requested loan amounts are estimated and potential, subject to change, and not necessarily representative of final financing terms. Requested loan amounts in current active applications do not affect available LPO loan authority. Figure rounded down to the nearest \$0.1 billion.
- 3) Current rolling average of new active applications per week over the previous 24 weeks. Figure rounded down to the nearest 0.1 application per week.





U.S. DEPARTMENT OF
ENERGY

BOEM
Bureau of Ocean Energy
Management



Thank you for your contributions today.

Connect with us:

OSWTransmission@hq.doe.gov