U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Atlantic Offshore Wind Transmission ~~Study~~ Effort

Jian Fu
Wind Energy Technologies Office
U.S. Department of Energy

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Wind Office Overview

Offshore Wind Deployment Status and Goals

U.S. Pipeline Status	Approximate Total
Operating	42 MW
Under Construction	1 GW
Permitting	19 GW
Site Control	16 GW
Unleased Wind Energy Area	5 GW
	~ 40 GW

~39 GW Current State Commitments

Current Levelized Cost of Energy

$86/MWh (fixed-bottom)

$135/MWh (floating)

Federal Goals

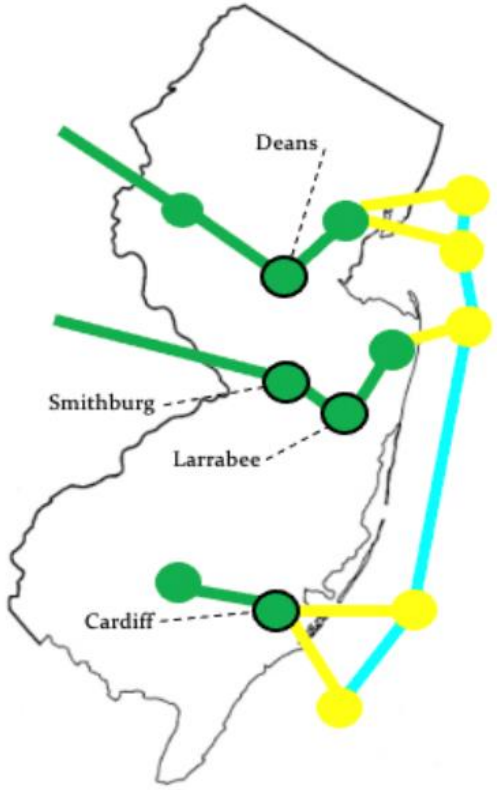
- 3/2021: 30 GW by 2030
  110 GW or more by 2050
- 9/2022: 15 GW of floating offshore wind by 2035

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Floating Offshore Wind™

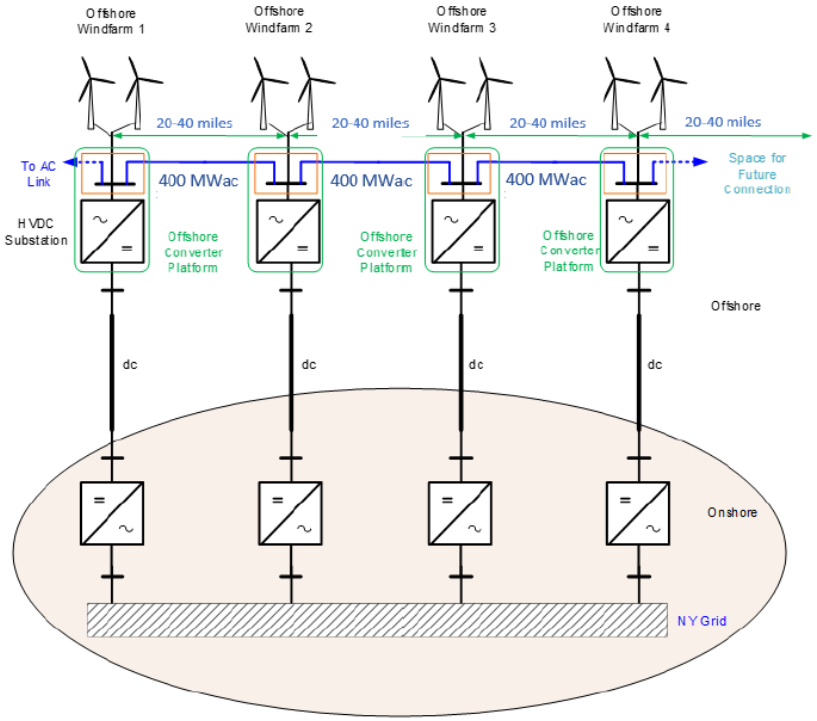
>70% Reduction

2035

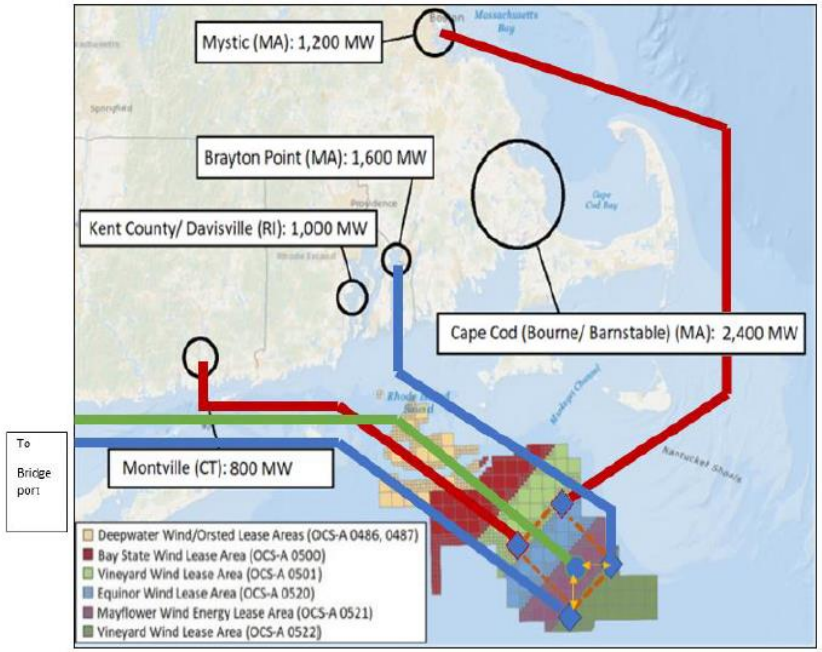
U.S. Offshore Wind Transmission – State Efforts



New Jersey SAA
Apr 2021



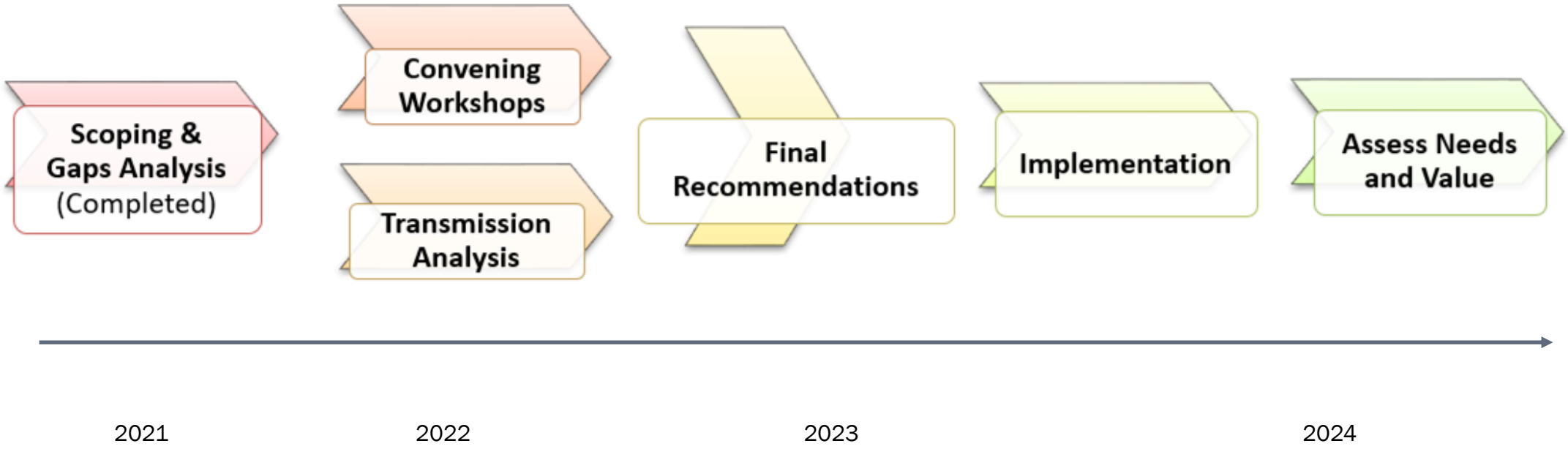
New York Mesh-Ready
July 2022



New England Five State
Modular Plan
Sept 2022

DOE & BOEM Coordinated OSW Transmission Effort

PURPOSE: To identify a proposed planned approach for Atlantic offshore wind transmission and interconnection that will achieve the Administration's goal of 30 GW 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.



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 & Gaps Analysis October 2021

Near-term

1. Initial development may limit potential. First movers may constrain future development. There may be opportunities to maximize the throughput of cable routes, which includes maximizing the capacity of onshore interconnections, onshore upgrades, and siting corridors. Developers may need incentives to build for interconnection capacity to be utilized in the future and permitting changes may be necessary to accommodate.
2. Coastal grid has limited capacity. 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.

Atlantic Offshore Wind Transmission Literature Review and Gaps Analysis (energy.gov)

DOE & BOEM Convening Workshops

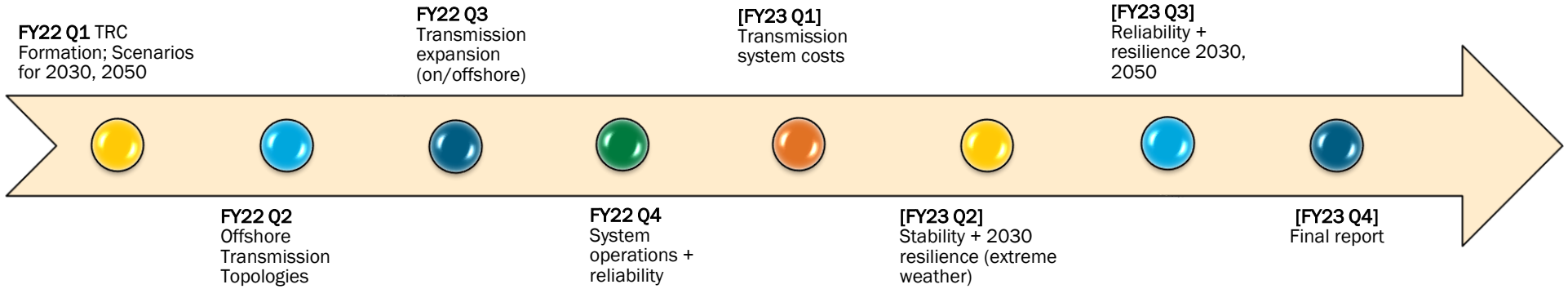
DOE and BOEM are leading a series of convening workshops, in consultation with FERC and other federal agencies, to **develop a set of recommendations** for OSW transmission development, planning policy, and permitting policy. Tribal Nations, states, regional transmission operators, developers, ocean users, and other stakeholders are being 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, in early 2023.

Atlantic Offshore Wind Transmission 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 have been informing the convenings.*

LEAD: NREL and PNNL

OBJECTIVES:

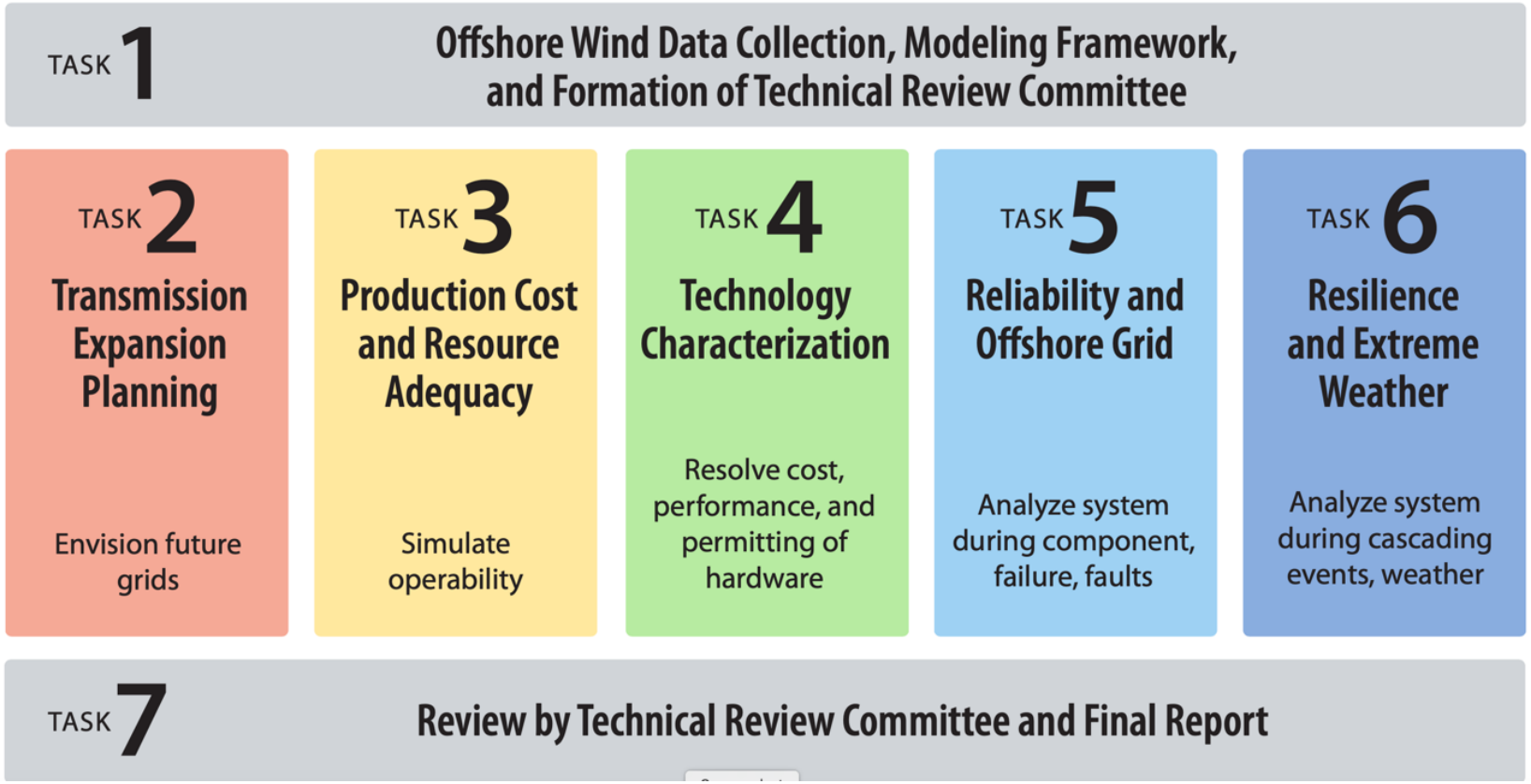
Through multiple scenarios of inter-state, inter-regional transmission topologies (including meshed networks and backbones) evaluate multiple pathways for OSW deployment across the Atlantic coast in support of the national 30 GW by 2030 & 110 GW by 2050 goal.

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.

Dudgeon Offshore Wind

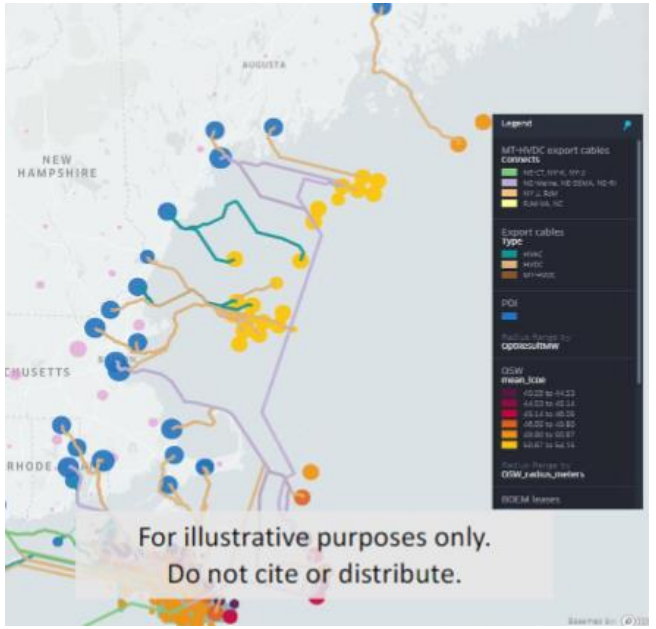
Atlantic Offshore Wind Transmission Study - Tasks



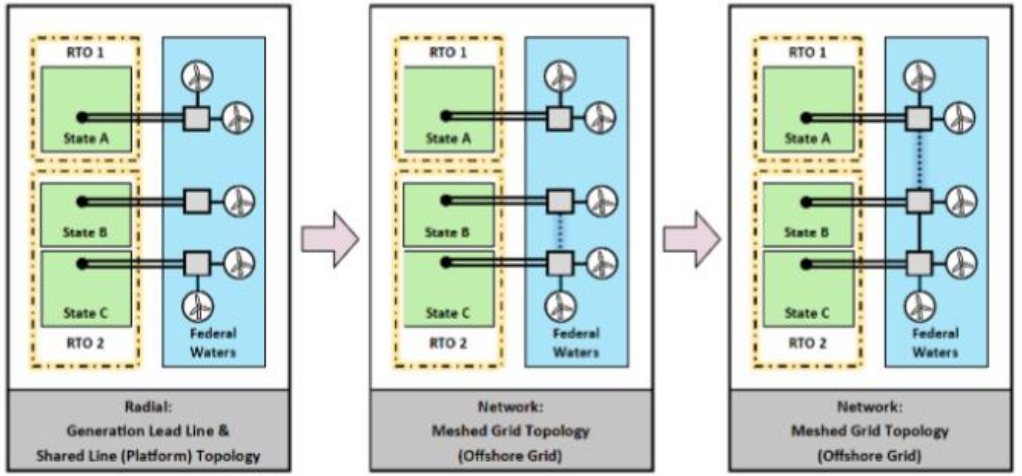
https://www.nrel.gov/wind/atlantic-offshore-wind-transmission-study.html

Current Status

- Identified 2 core capacity expansion scenarios
- Collected 27 layers of offshore siting data
- Developed 1 optimal cable routing mechanism
- Collected costs of subsea cables (AC and DC), HVDC converter stations
- Identify 4 offshore transmission topologies (all have HVDC lines, some have multi-terminal meshed grid)



- Working on production cost modeling
- Working on contingency analysis
- Working on stability evaluation
- Working on extreme events identification to prepare for resilience analysis



Thank you!

Contact: jian.fu@ee.doe.gov

Image source: Equinor