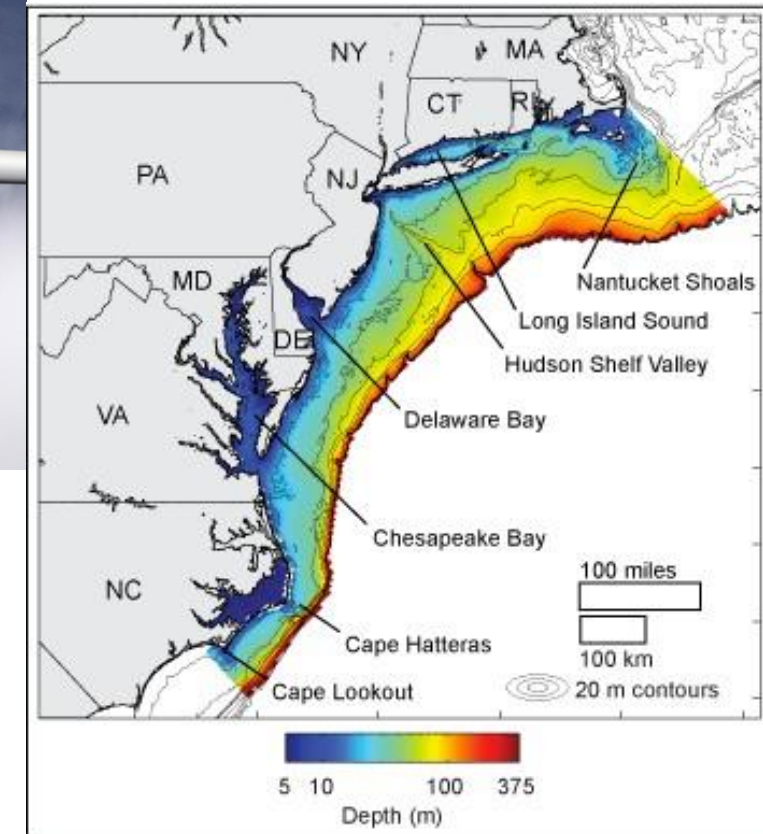


OFFSHORE WIND POWER BRIEFING for A.C.T. *Bonnie Ram*



University of Delaware
***CENTER FOR RESEARCH IN
WIND***
Knowledge Exchange (zoom)
October 14, 2020

Agenda

- ❖ **Background and Motivations**
- ❖ **The MD/DE Electricity System**
- ❖ **Federal Planning Process**
- ❖ **Status of the Proposed Offshore Wind Projects**
- ❖ **MD-PSC recent decision (August 2020)**

Background

- ❖ **Three Month Research grant --- First State Marine Wind, University of Delaware**
 - ❖ Climate change urgencies and low-carbon energy transitions
 - ❖ Strong cluster of subject matter experts (Center for Research in Wind)
 - ❖ Create informal opportunities for local engagement
- ❖ **Partners: DE Sea Grant and CReW**



Motivations for Our Research

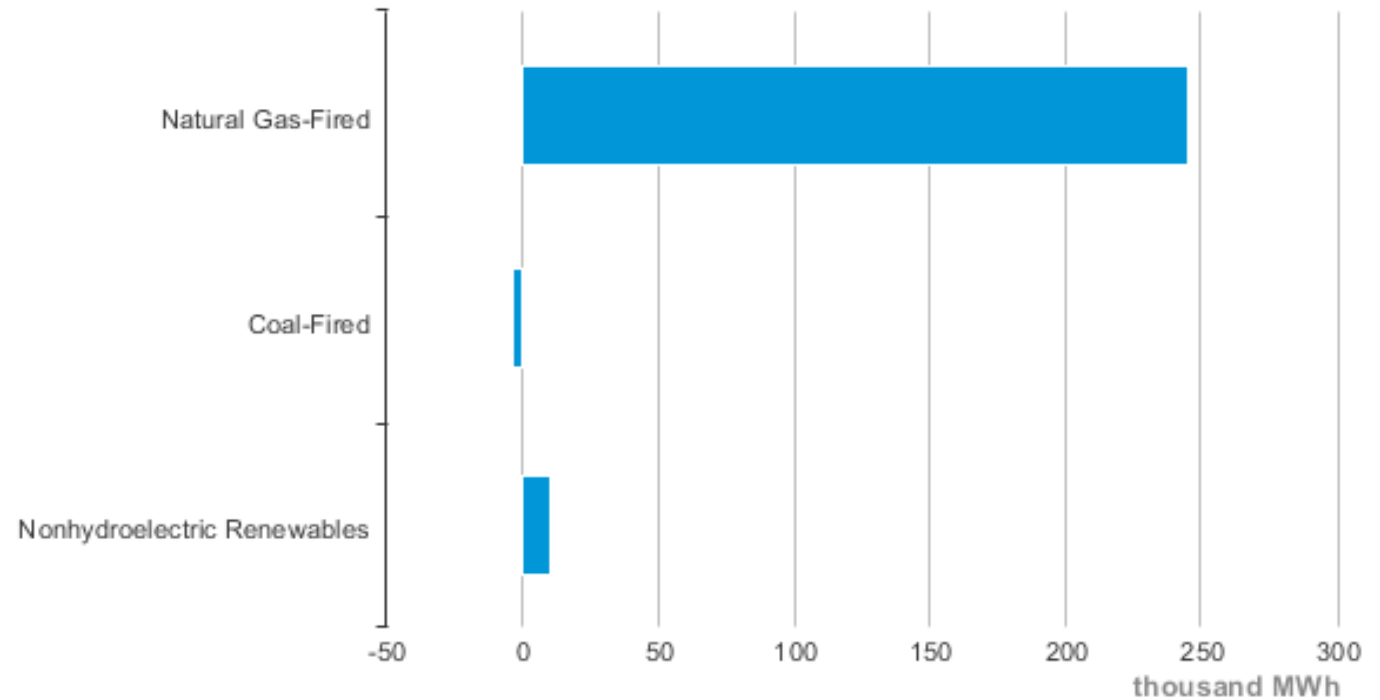
- ❖ **Climate change urgencies to reduce CO₂ and other GHGs**
- ❖ **Offshore wind = one of the only utility scale low-carbon electricity sources available now**
- ❖ **Establish an independent, science-based voice on siting challenges, benefits, and uncertainties**
- ❖ **Highlight how local communities can engage in the decision process – “early and often”**

Delaware ELECTRICITY PROFILES

A transition over the last decade:

- **Imported** natural gas replaced coal
- The share of electricity generated by renewable energy is about 2%
- Electric Power = 3rd largest source of GHG emissions (after industrial #2 and transportation #1)
- Consumes almost 100 times more energy than it produces

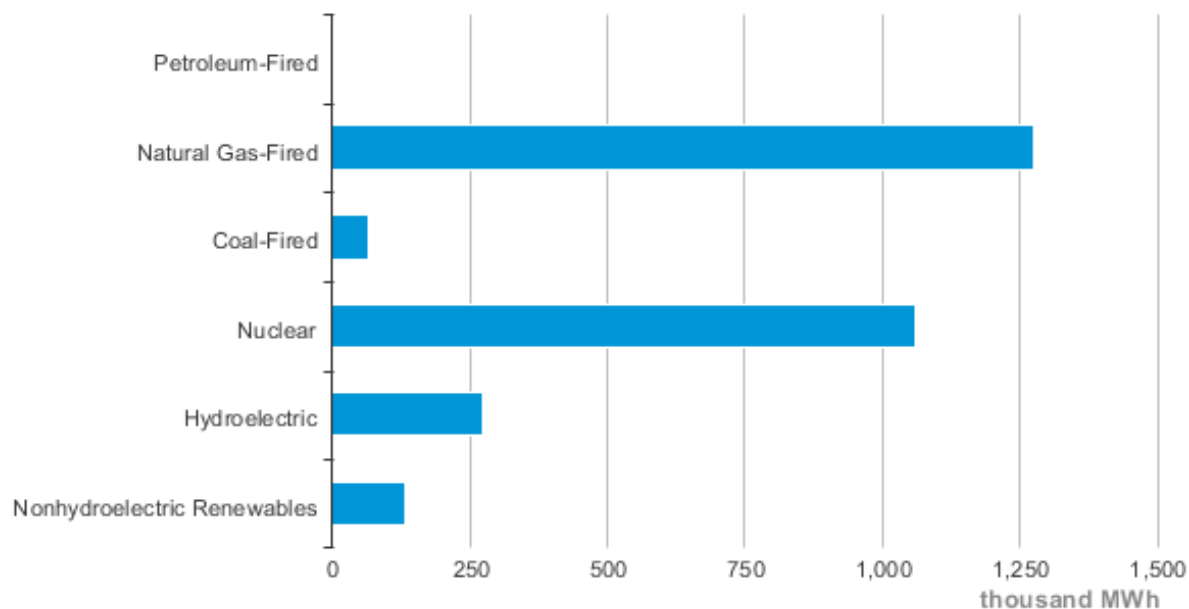
Delaware Net Electricity Generation by Source, Mar. 2020



Source: Energy Information Administration, Electric Power Monthly

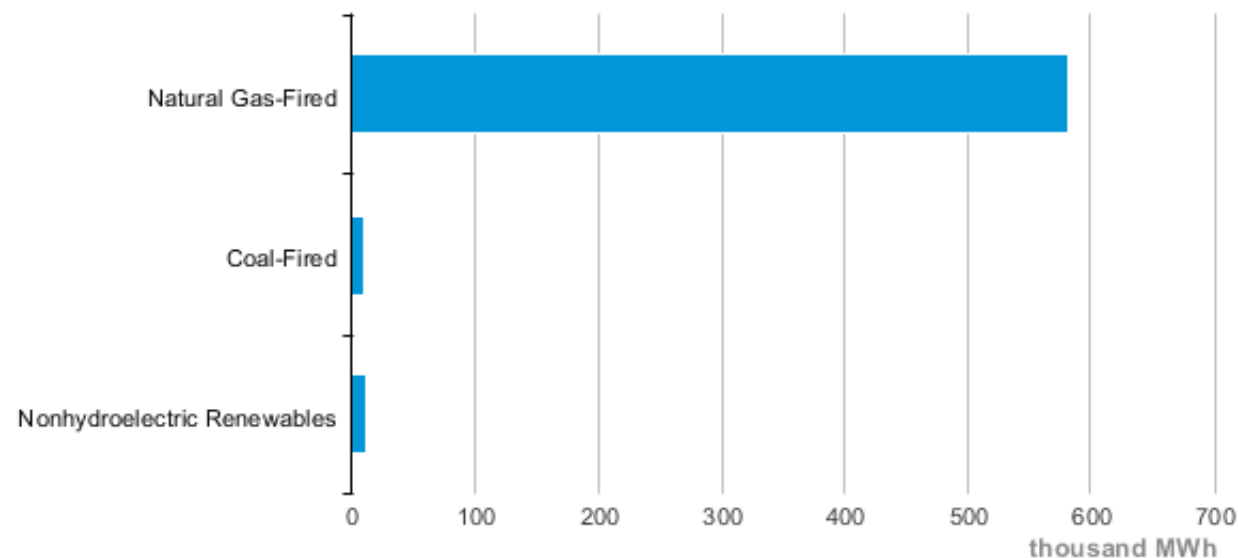
MARYLAND and Delaware ELECTRICITY PROFILES

Maryland Net Electricity Generation by Source, Mar. 2020



 Source: Energy Information Administration, Electric Power Monthly

Delaware Net Electricity Generation by Source, May. 2017



 Source: Energy Information Administration, Electric Power Monthly

DE Legislation -- Renewable Requirements

- Renewable Portfolio Standard = 25% of electricity retail sales from renewable resources by 2025
- Passes in 2005 and increased in 2010
- Key elements include:
 - 3.5 % carve-out for PV solar
 - Encouraging energy-efficient



LOW CARBON Electricity CHOICES?

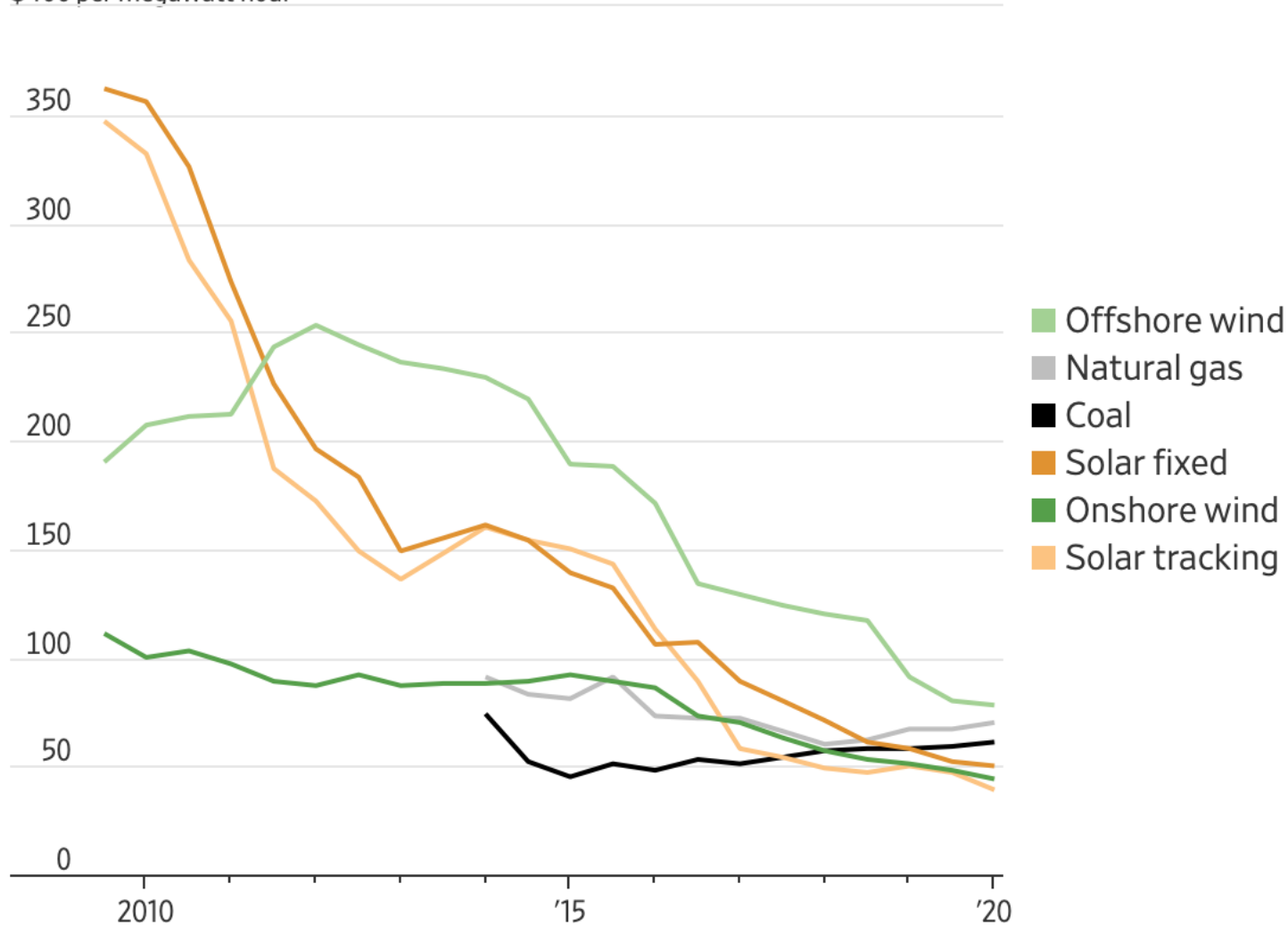
- ❖ **Need to consider ALL viable technology options**
 - ❖ Utility-scale and community solar
 - ❖ Rooftop solar
 - ❖ Geothermal
- ❖ **Offshore wind is one of the only utility scale low-carbon electricity sources available now**
 - ❖ Near huge coastal electricity loads
 - ❖ Large offshore wind resource
 - ❖ Buildable continental shelf
 - ❖ Can be cost competitive with today's electricity

BUT.....

- Doesn't it cost too much? What about natural gas?
- Will it reduce our CO₂ and address sea level rise?
- What happens when the wind doesn't blow?
- Will offshore wind supply make our grid more resilient?
- How will this effect coastal communities?
- What does Delaware get out of this?

Levelized Cost of Electricity

\$400 per megawatt hour



*2019 prices; Price needed to cover required investment returns after all capital, operating, financing and tax costs, excluding subsidies

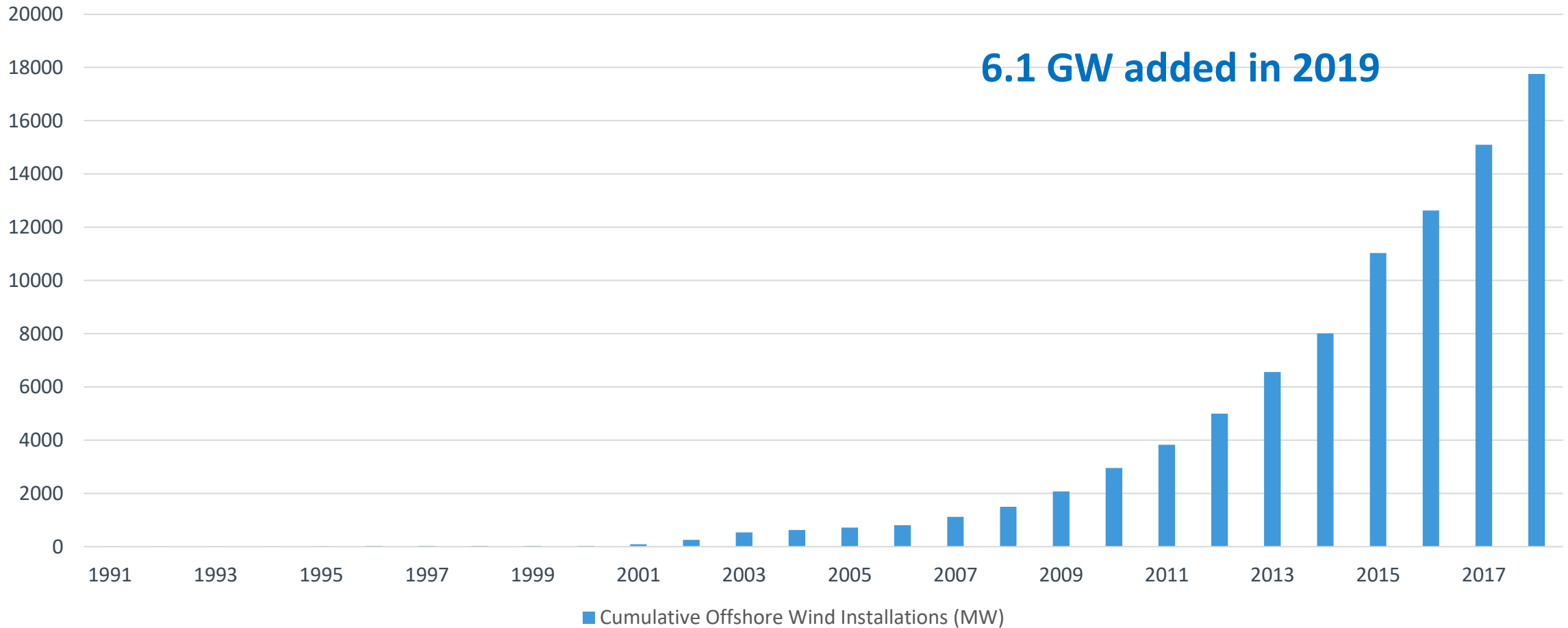
Source: BloombergNEF

Source: Cited in WSJ July 6th, 2020.

https://www.wsj.com/articles/why-investors-have-learned-to-love-wind-and-solar-power-11594027941?st=3qpkkhabjsta9wh&reflink=article_email_share

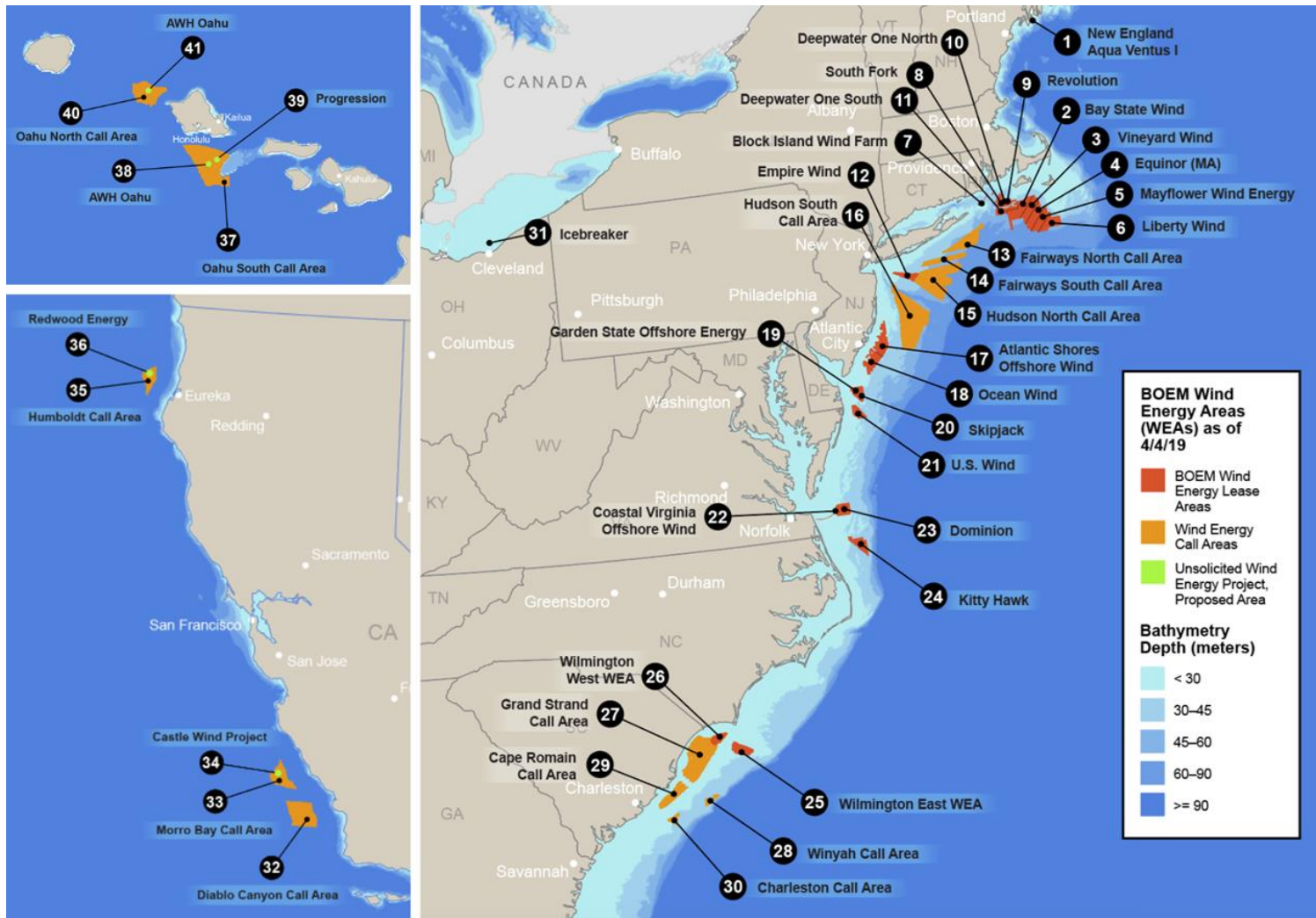
Growth of Offshore Wind Globally

22GW in operation and > 5000 turbines spinning



U.S. Offshore Wind Industry Regulatory Activity

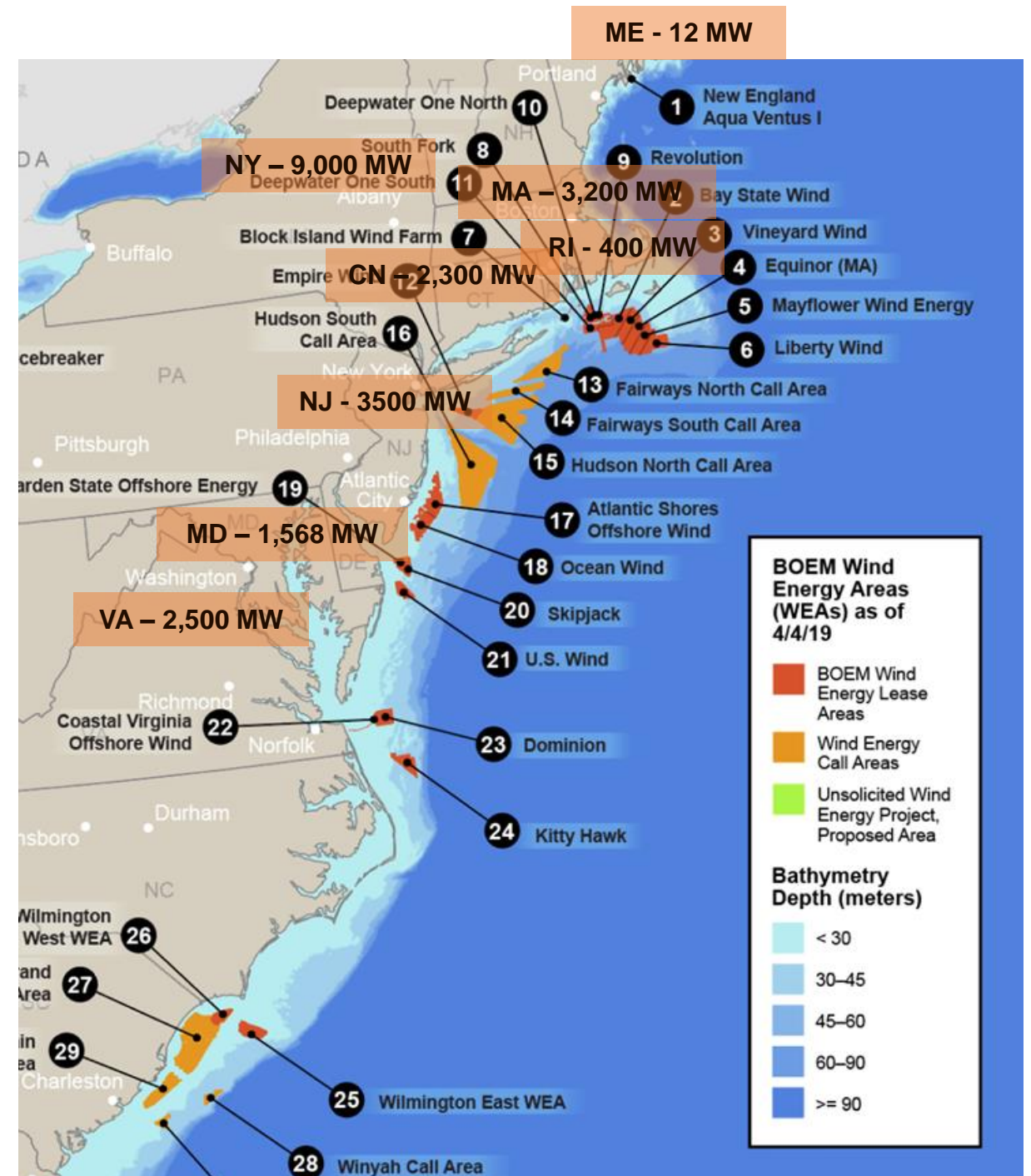
- Bureau of Ocean Energy Management (BOEM) given authority under EPOA 2005
- 30 CFR 585 released in 2009 provides regulatory framework for federal waters
- Offshore wind lease sales began in 2011
- BOEM works with state task forces prior to lease area designation
- 16 lease areas have been sold in public auctions
- ***Call areas (13)*** are nascent ocean tracts under consideration for possible leasing



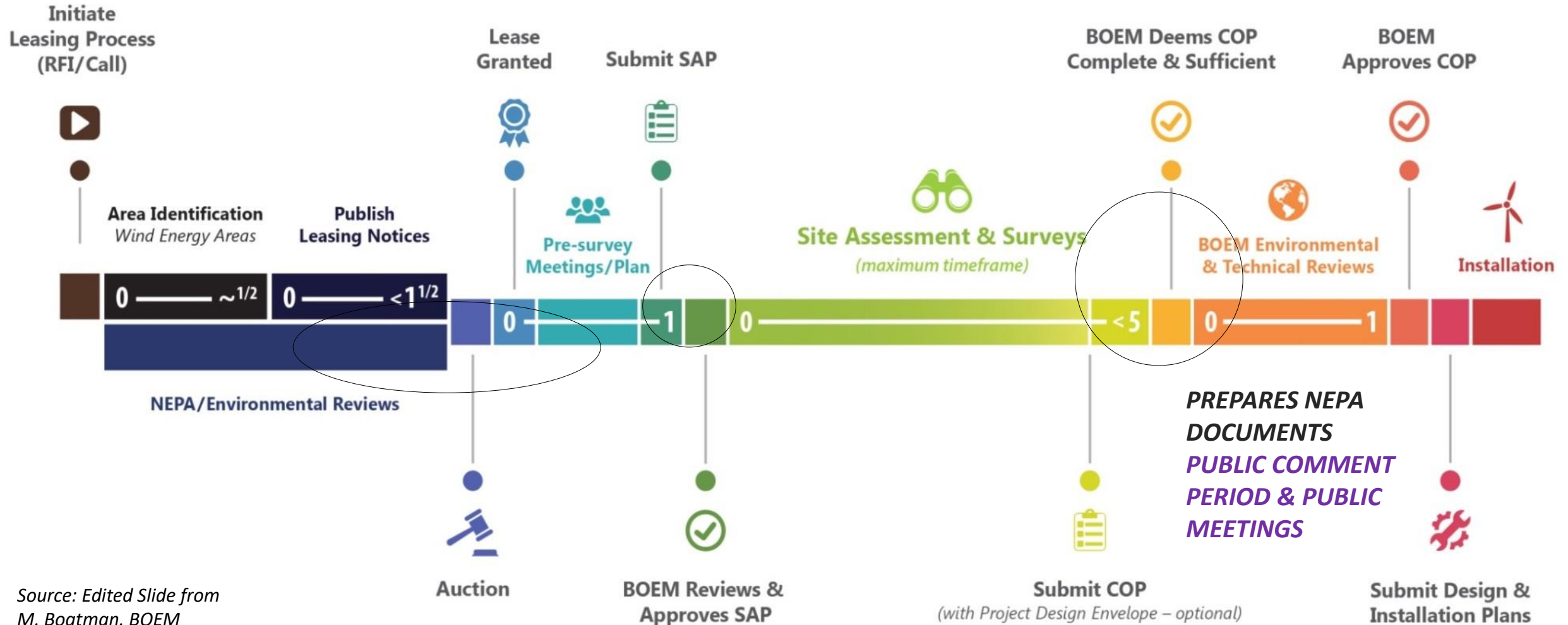
U.S. State Offshore Wind Policy Commitments

- Over 22,000 MW committed by 2035
- Almost 14,000 MW committed by 2030
- 8 states
- \$80 Billion in gross revenue possible
- Global forecasts predict 154 to 193 GW of Offshore Wind by 2030 and 500 GW by 2050
- Regulatory project pipeline for U.S. is calculated at 25,824 MW.

Slide source courtesy of NREL. Walt Musial.



BOEM Planning Process – Public engagement opportunities



Estimated Decision Timeline



STATE AND LOCAL PLANNING PROCESSES

- Cable connections
- Land-based O&M and training facilities
- Redevelopment of port facilities
- Coastal Zone Management Act, etc.

Estimated Construction & Operation > 30 years



2 years of construction



25 years of operation



2 years of decommissioning

*Slide adapted from
Offshore Wind Energy
Class. University of DE*



Stakeholder Engagement



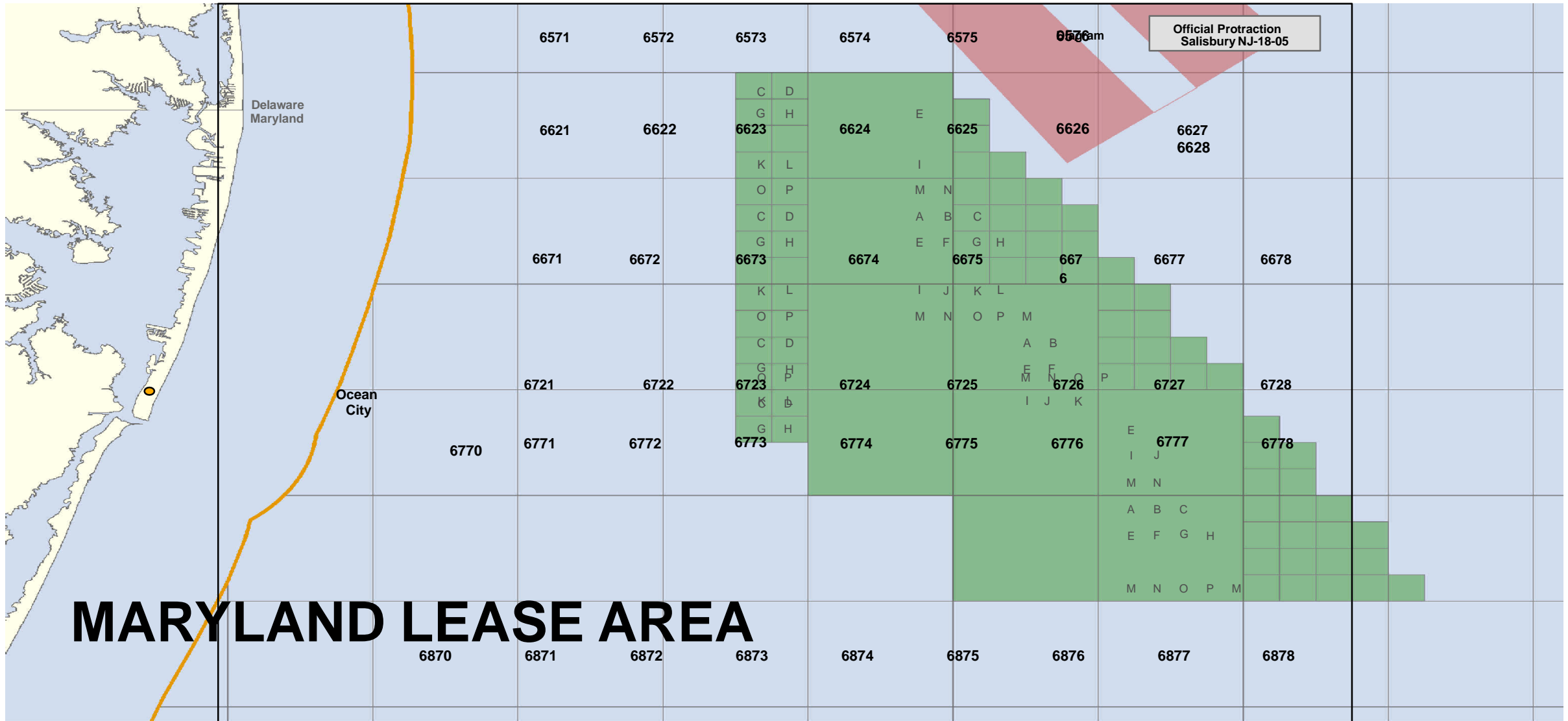
Delaware and Offshore Wind Working Group

- Gov. Carney established the group (Aug. 2017)
- Submitted a report with recommendations (Aug. 2018)
- Eight formal meetings and four public comment workshops
- Recommended no immediate procurement of offshore wind from a project already approved by another state (Maryland).

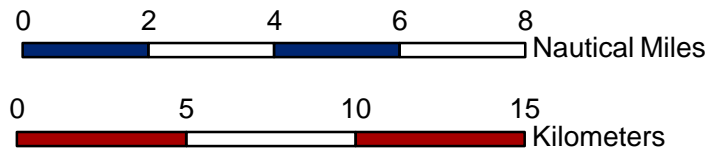
Sources: <https://dnrec.alpha.delaware.gov/climate-coastal-energy/renewable/offshore-wind-working-group/> and <http://www.dnrec.delaware.gov/energy/Documents/Offshore%20Wind%20Working%20Group/Offshore%20Wind%20Working%20Group%20Report%20June%2029%202018.pdf>

Maryland PSC Decision – May 2017 Approved two Offshore wind projects

- Maryland offshore wind target 1568 MW
- Procured by the state so far = 368 MW
- Supported by Offshore Renewable Energy Credits (ORECs) --- bought by utilities
- Delaware & Maryland Wind Energy Areas (leases)
- Ratepayer bill increase by 1.4% or \$1.40/month.



- Fed/State Boundary
- Traffic Separation Scheme
- Maryland Call Area
- OCS Lease Blocks
- Official Protraction Diagram



Maryland PSC Decision --- May 2-17

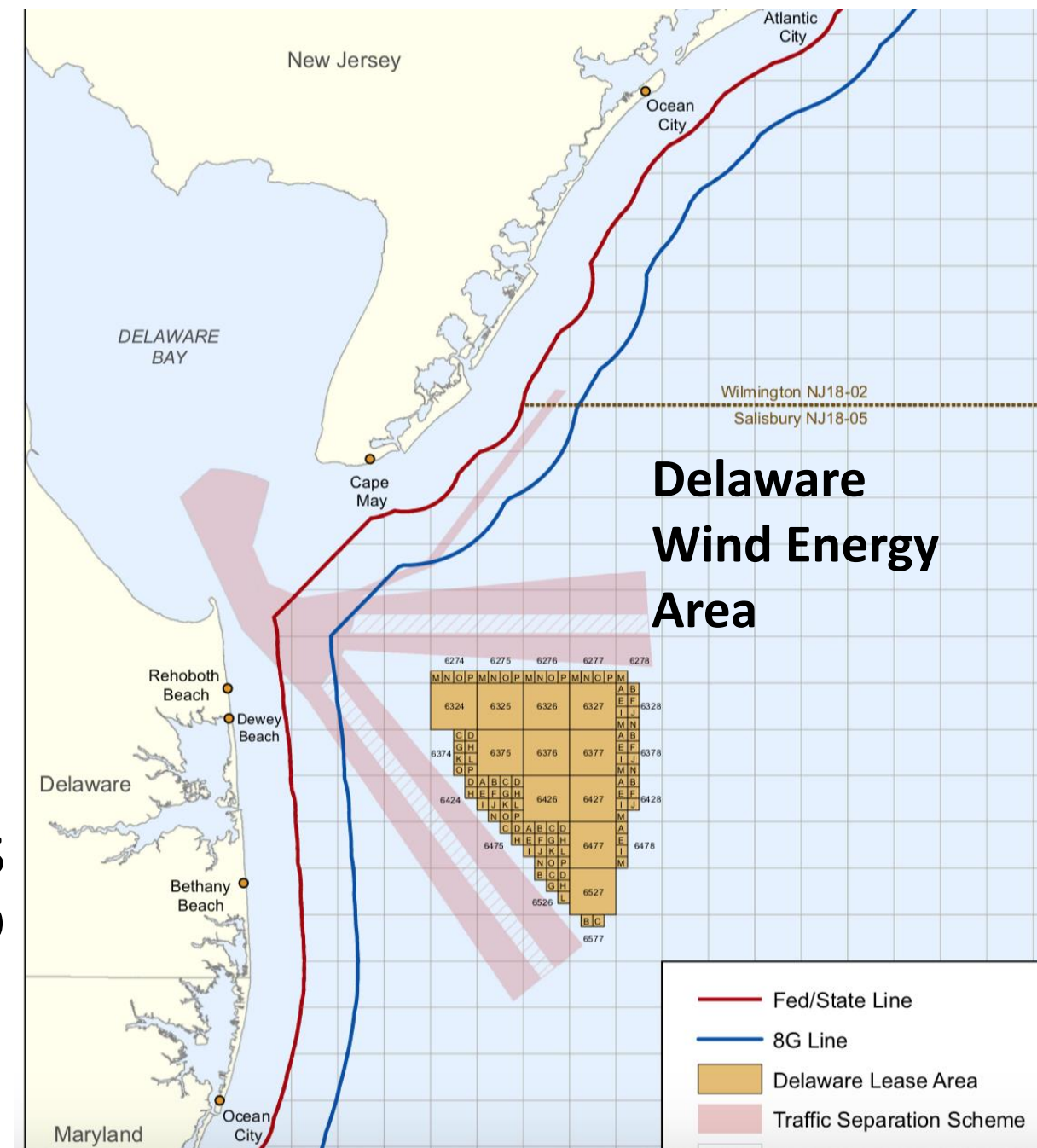
US Wind - Maryland Wind Energy Area

- Off of Ocean City and as far north as Fenwick Island
- 248 MW --- **Either** 30 - 8 MW or 20 -- 12 MW
 - Turbine size TBD
- Could provide power to an ~ 76,000 homes
- Proposed distance to shore has varied from 12 – 17m
- Italian Developer (Toto Construction) with an office in Baltimore

Maryland PSC Decision – May 2017

Delaware Wind Energy Area

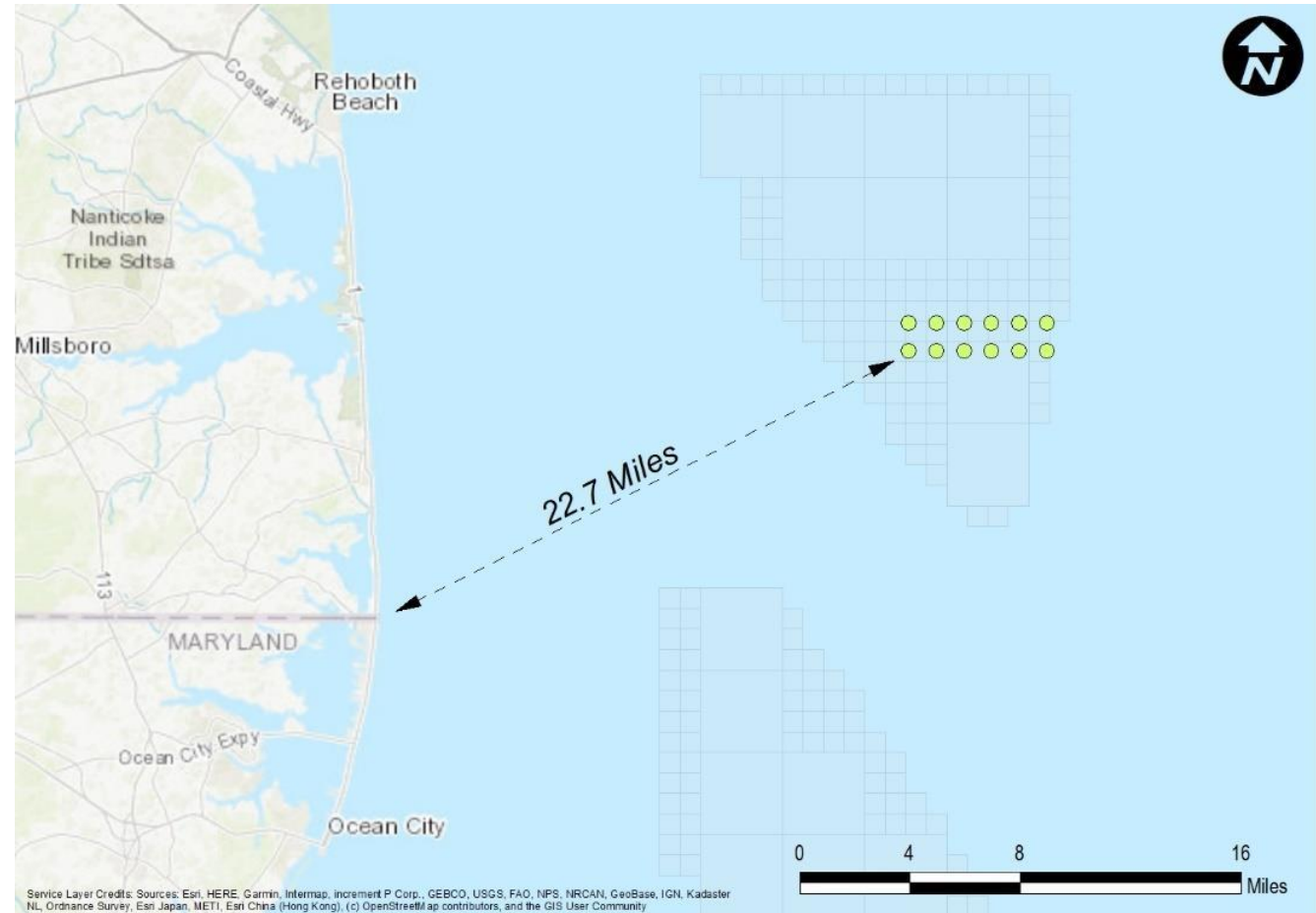
- Danish Developer Ørsted (Skipjack project)
- 120 MW = Ten -- 12 MW turbines
- Powers 35,000 homes
- 20 year contract @ 2023 Price is \$171.30/MWh rising 1%/year to \$206.95 in 2042



Maryland PSC Decision – May 2017

Delaware Wind Energy Area

- Closest point to the DE coast estimated at 19m
- Underground cable to shore proposed in Fenwick Island State Park – **now cancelled**
- Installation & commercial operation projected – 2023



Source: Skipjack Offshore Energy. Direct Testimony of Gordon W. Perkins. 4/17/20

MD-PSC Process

- January 18th Hearing, Ocean City
- June Evidentiary Hearing (see Rosemary's excellent summary)
 - Approved GE 12MW Turbine
 - Reduces total number of turbines (15 to 12?)
 - This could modify visual impact
 - Stakeholder engagement was "deficient" & now will be documented

STATUS OF THE PROJECTS

Skipjack --- Developer, Ørsted

- Submitted construction and operation plan (COP)
- Selected & approved 12 MW turbine
- Committed \$13.2 million infrastructure investment (thus far)



GE 12-MW Wind Turbine Nacelle – Haliade –X

US Wind (Marwin) --- Developer, Toto Construction

- Propose using a FLiDAR (MET tower cancelled)
- Turbine not selected and COP not submitted



Picture from AXYS Technologies

How can Delaware reap some of the potential benefits?

- Reduce greenhouse gas (GHG) emissions & other pollutants
- Reduce regional water consumption
- Reduce electricity transmission congestion in Delmarva Peninsula
- **Realize economic development commitments**
 - Port developments
 - Community financial benefits
 - Suppliers



L-R

Mayor Becker (Lewes), Bonnie, Former Mayor Kuhns (Rehoboth), Dr. Jame McCray (DE Sea Grant), Jen McCann (RI Sea Grant)

How can the DE community address the potential challenges?

- Understanding the dynamic public & political process of clean energy options
 - Legal processes
 - Local social & traditional media
 - Sensitivities to local perceptions of being marginalized
- “Early and often” engagement essential
- Participating in public engagement opportunities & NEPA decision points

How can the DE community address the potential challenges?

- Building the knowledge base quickly and with transparency
 - Trust in science & the NEPA process
 - Recognize uncertainties
- Exploring the prospects of community benefit packages with the developers
 - The experience of East Hampton (Ørsted's project)
 - <https://southforkwind.com/about-south-fork-wind>
 - **PART 2 – November 6th**

What are some future activities to watch?

- Existing MD commitments cover 368 MW, but their goal is 1568 MW (400MW by 2026)
- Alternative substation and cable connect locations on the DE shore
- Location of Operation and Maintenance (O&M) facility (now obligated in Ocean City)?
- Additional state/utility purchases and turbine installations in the existing MD lease areas
 - 750 MW potential for lease = > 62 turbines (US Wind)
- Additional Wind Energy Areas and leases?



Thank you for your attention!

- FAQs link:
[https://bit.ly/UD Offshore Wind FAQ](https://bit.ly/UD_Offshore_Wind_FAQ)
- BOEM website:
<https://www.boem.gov/renewable-energy>
- MD Public Service Commission Order (August 2020) <https://www.psc.state.md.us/wp-content/uploads/Order-No.-89622-Case-No.-9629-Order-Approving-Turbine-Selection-1.pdf>



WHERE ARE WE NOW?

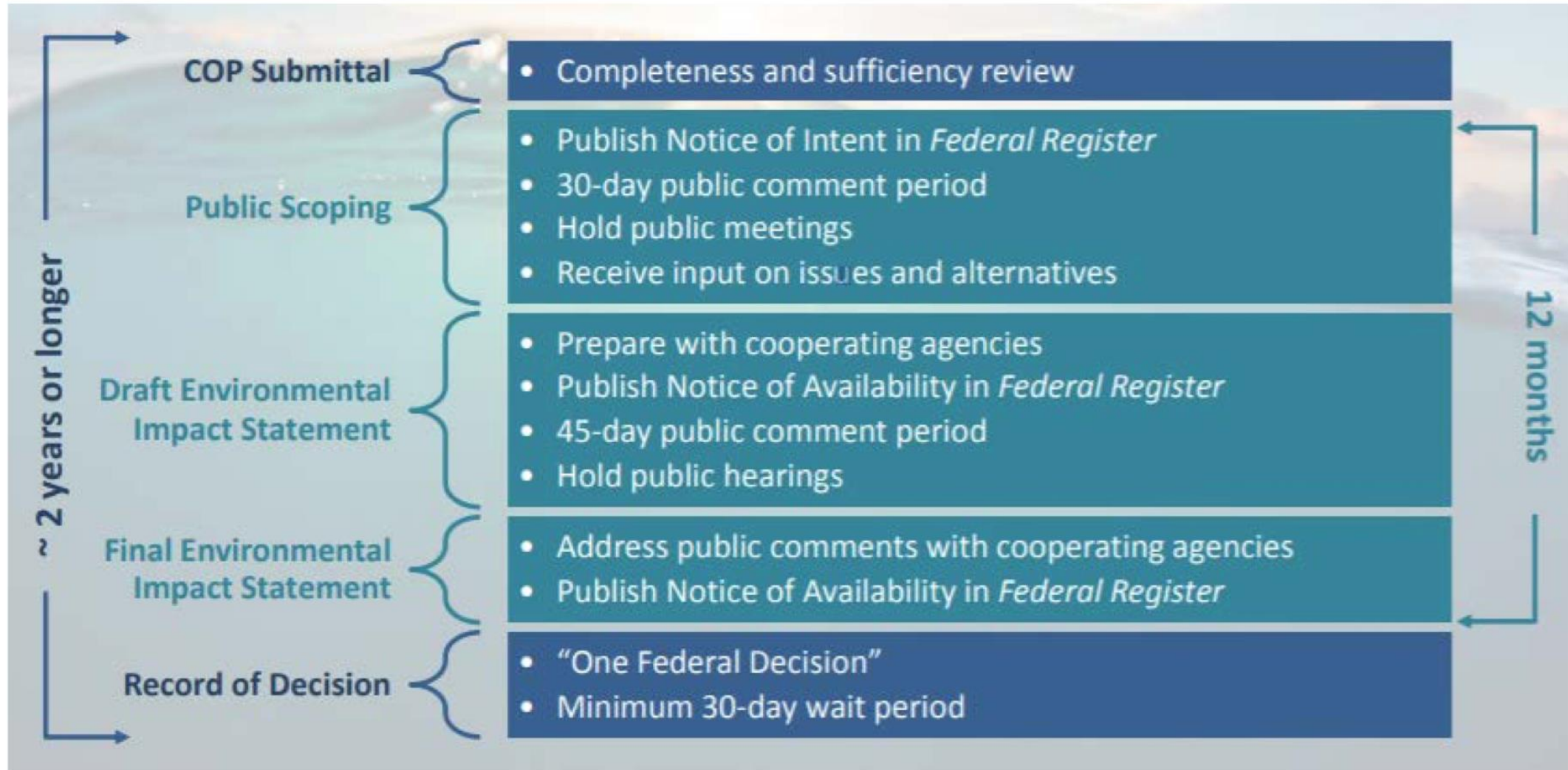


Figure 5: Timeline of NEPA process and steps for each stage of the process.