

Floating Offshore Wind Study

Kick-Off Meeting

January 20, 2022



OREGON
DEPARTMENT OF
ENERGY



OREGON DEPARTMENT OF ENERGY

Leading Oregon to a safe, equitable, clean, and sustainable energy future.

Our Mission

The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do

On behalf of Oregonians across the state, the Oregon Department of Energy achieves its mission by providing:

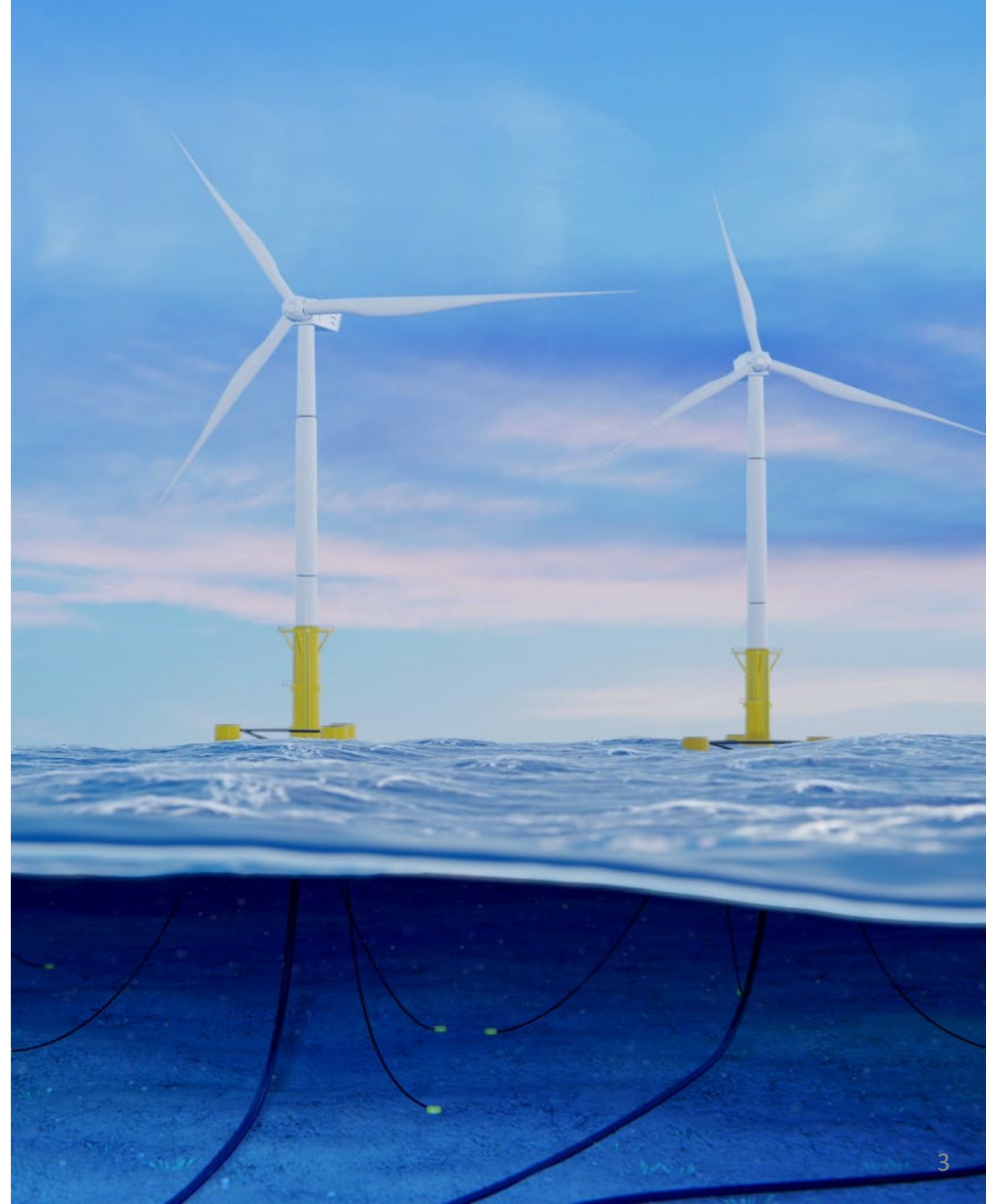
- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

Agenda

- Welcome & Logistics
- HB 3375 & ODOE Study Process
- Background on Floating Offshore Wind (with Q&A)
- Literature Review & Key Topics (with Q&A)

Break

- Key Topics & Prompting Questions for Feedback (with Q&A)
- Next Steps & Comment Portal
- Closing/Q&A



HOW THIS MEETING WILL BE FACILITATED

Panelists and Attendees

- Panelists – ODOE Staff
- Attendees – There will be time reserved at the end of each agenda item & at the end of the agenda for Q & A

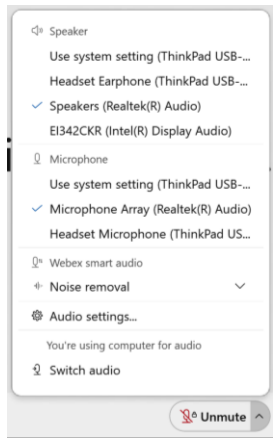
Community Agreements: designed to foster inclusive and respectful meeting

- Be present and ready to learn
- Be respectful to others
- Learning happens outside of our comfort zones
- Listen to learn and not to respond
- Thank you for being flexible and patient around any technology needs or changes
- If you need something at this meeting, please ask for it!
 - Technical issues or questions: Contact **Sheila Alicar** in the chat



USING WEBEX

Audio Options



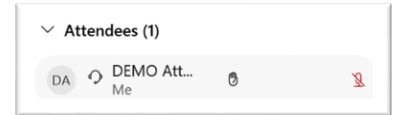
You can check Speaker and Microphone settings by clicking the arrow next to Mute/Unmute.



Second Raise Hand Option

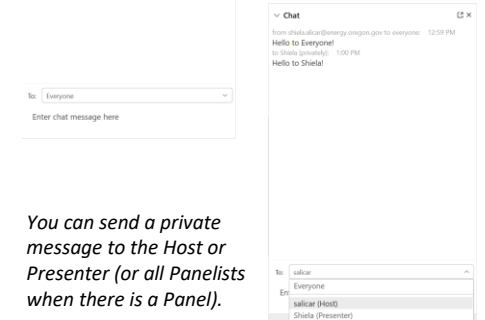
You can also click on the hand next to your name in the Participant list to raise your hand.

Click on Lower hand when you are done.



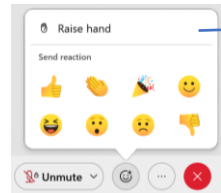
Chat

You can chat to Everyone in the meeting.

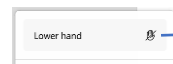


You can send a private message to the Host or Presenter (or all Panelists when there is a Panel).

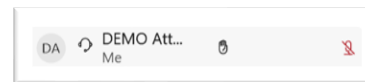
Reactions



Click to Raise your hand.



Click on Lower hand when you are done.



HB 3375 & ODOE Study Process

(10 minutes)



WHAT IS HB 3375?

- “Whereas statements” - Recognize the merits of studying FOSW
 - Vast potential, BOEM activity, decarbonization, other benefits & challenges
- Describes Oregon goal to plan for up to 3 GW of FOSW by 2030
 - “Goal to plan” only – doesn’t direct how to plan
 - Directs ODOE to report on benefits & challenges
- Does not commit to deployment targets
 - Unlike NY
 - State commitment to a target of 9 GW by 2035
 - Unlike CA
 - AB 525 directs CEC to develop a state plan
 - CEC plan will identify a capacity target



ODOE'S CORE ELEMENTS OF HB 3375

1. Literature Review

- Review studies and reports relevant to benefits & challenges of FOSW

2. Stakeholder Feedback

- Several state, regional and national entities listed in bill
- Additional stakeholders identified by ODOE, including those from BOEM Task Force
- Develop topical questions based on lit. review to prompt stakeholder feedback

3. Public Remote Meetings

- Convene at least two public remote meetings with stakeholders

4. Report to Legislature by 9/15/2022

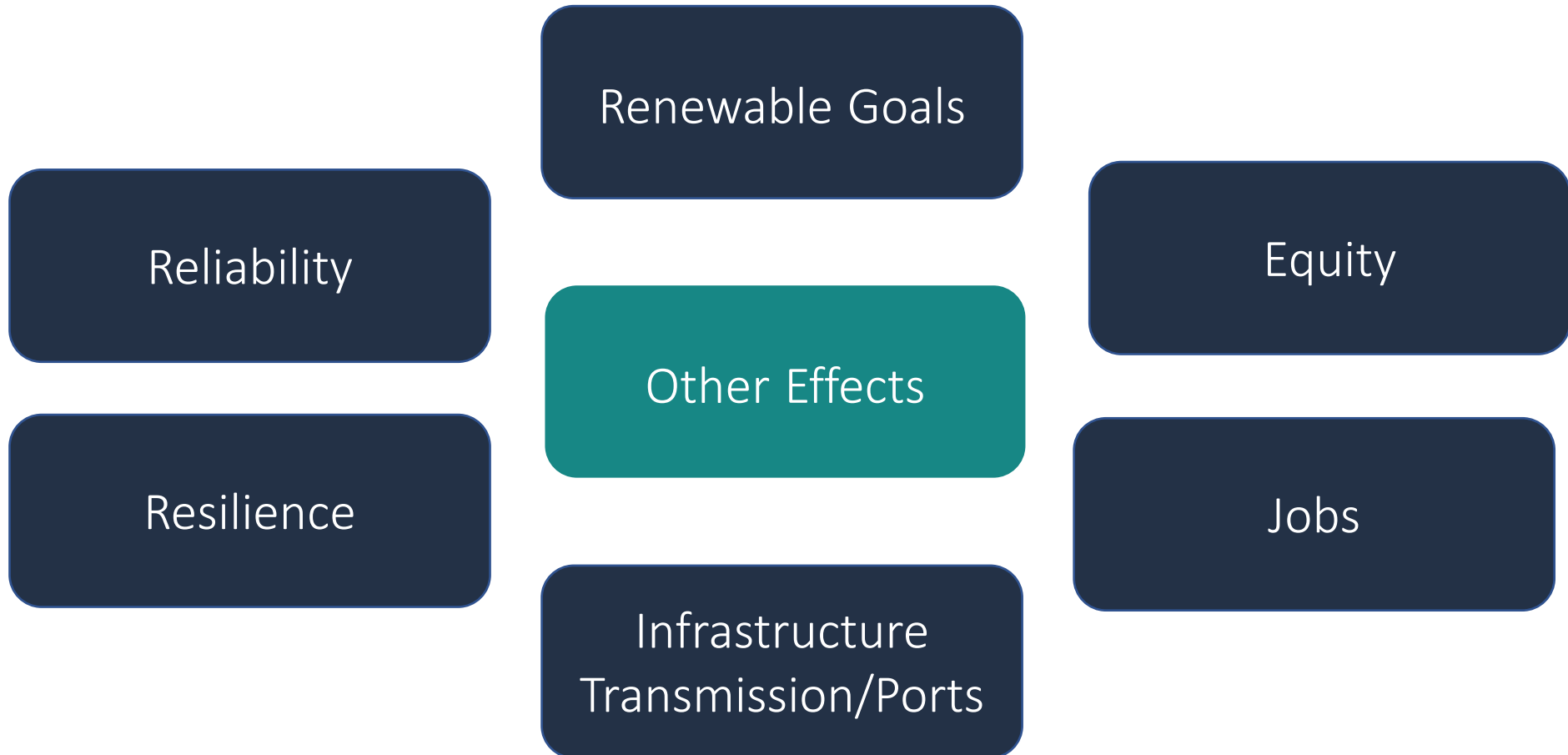
- Summarize key findings from literature review and stakeholder feedback, including opportunities for future study and engagement

<https://www.oregon.gov/energy/energy-oregon/Pages/fosw.aspx>



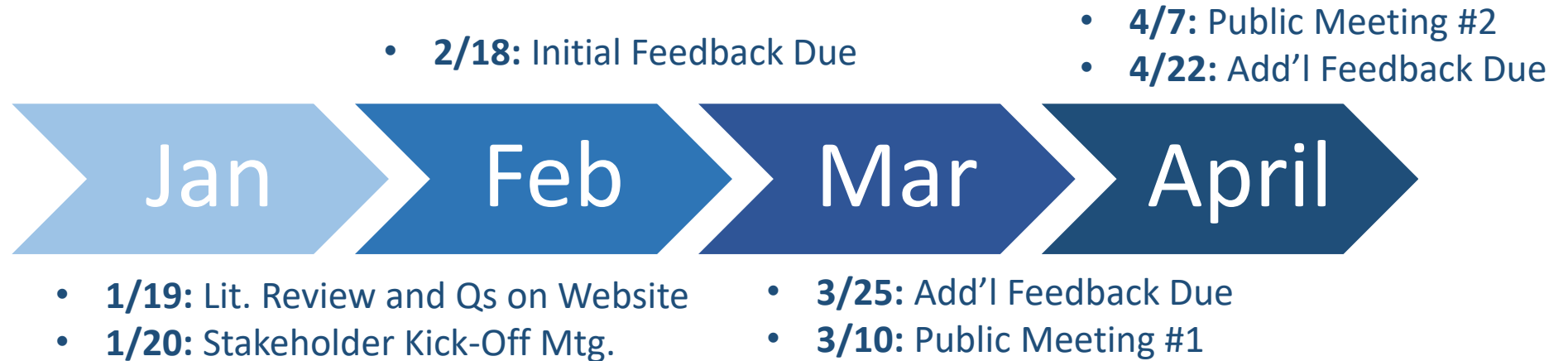
ODOE'S OBJECTIVES

Gather and synthesize a range of perspectives on the effects, including benefits and challenges, of integrating up to 3 GW of floating offshore wind energy into Oregon's electric grid by 2030.



TIMELINE FOR IMPLEMENTATION

Data Gathering & Engagement



Report Drafting & Submission



Background on Floating Offshore Wind with Q & A

(15 minutes)

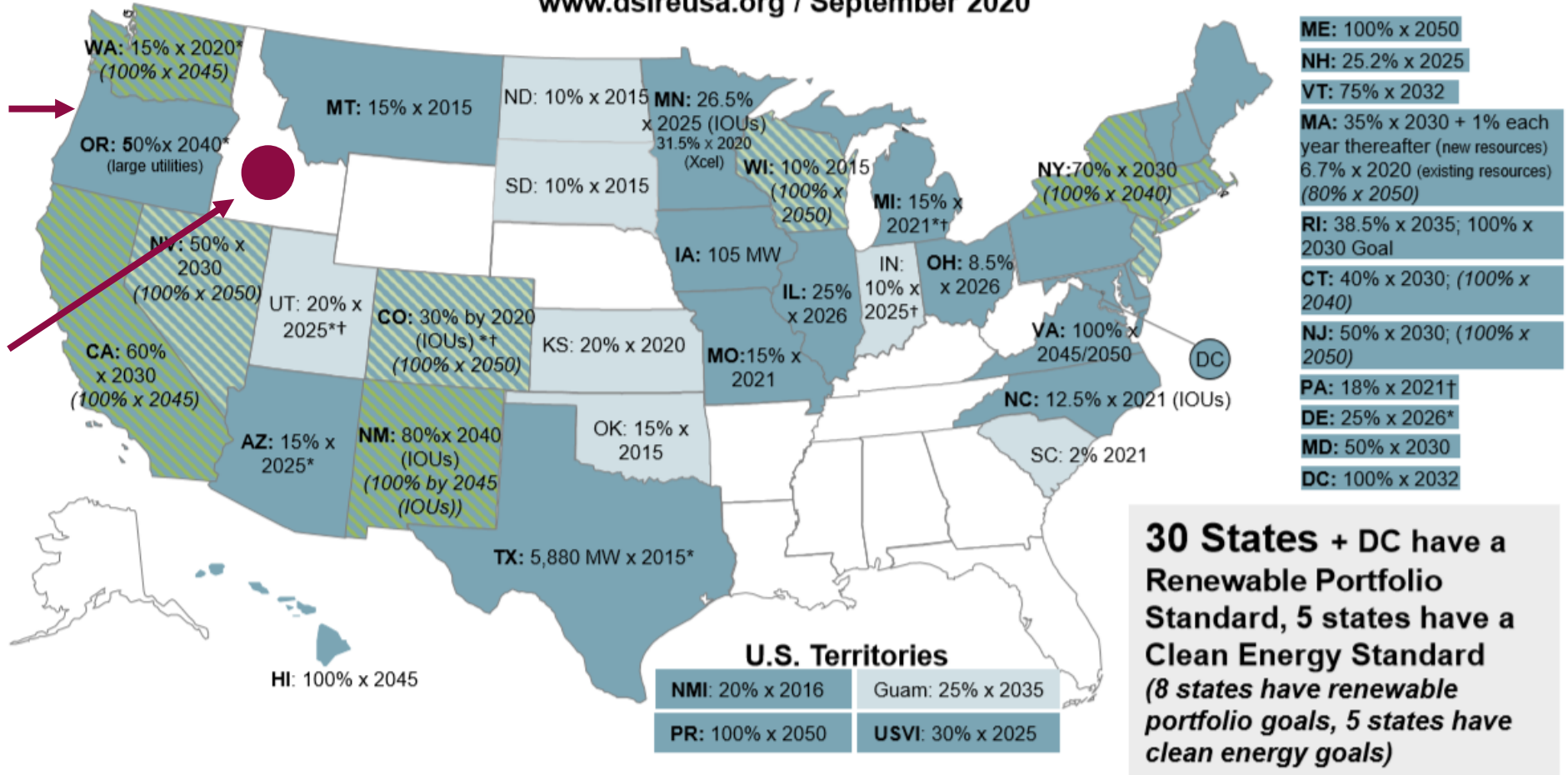


Renewable & Clean Energy Standards

www.dsireusa.org / September 2020

Oregon now
100% Clean by 2040
HB 2021 (2021)

Idaho Power & Avista
100% Clean by 2045

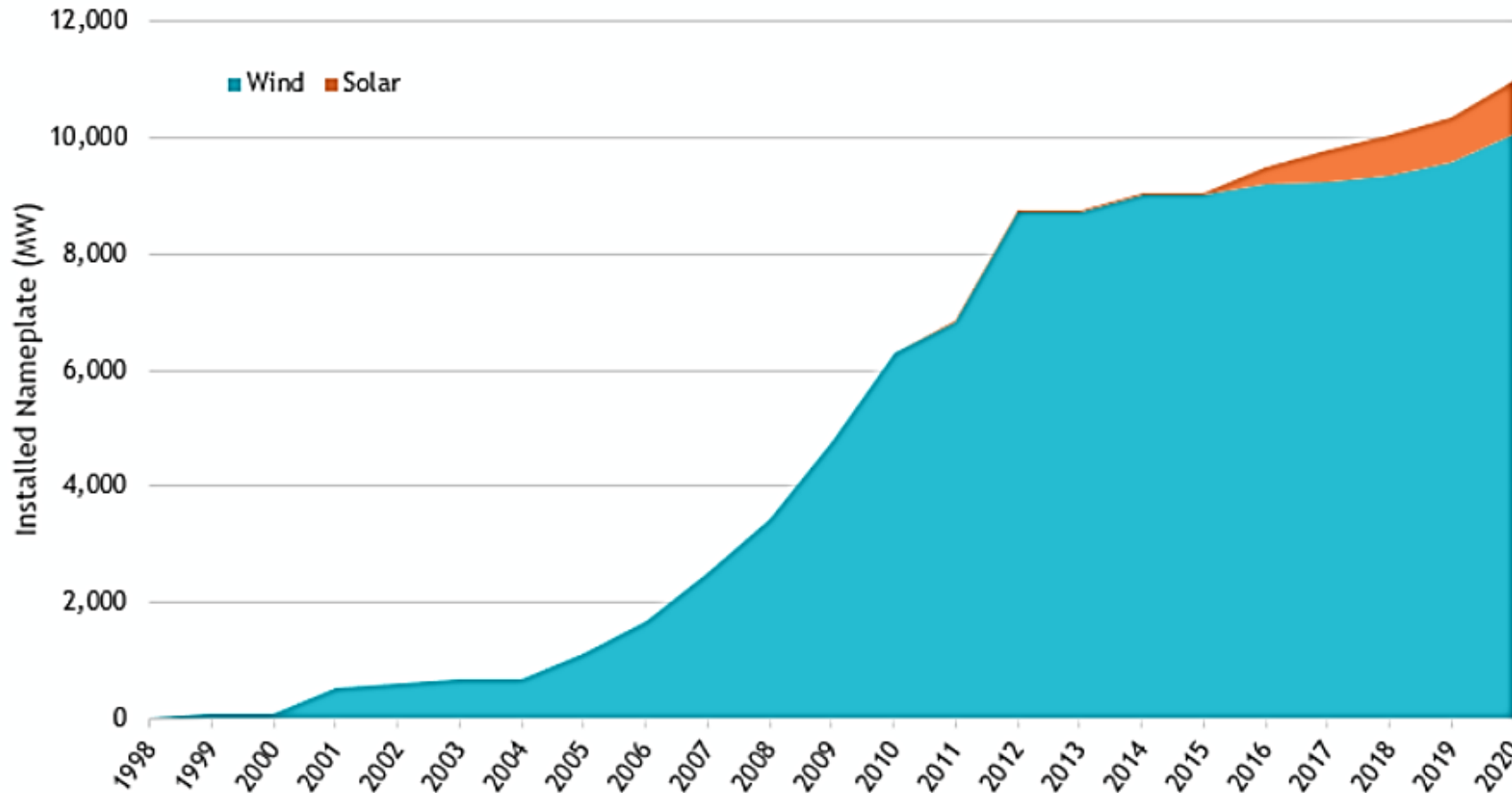


Renewable portfolio standard
 Clean energy standard
 * Extra credit for solar or customer-sited renewables
 Renewable portfolio goal
 Clean energy goal
 † Includes non-renewable alternative resources

➡ Oregon and many other states are looking for clean energy.

SCALE OF EXISTING RENEWABLES: PNW

Wind and Solar Development in the Region



Wind & Solar in the PNW Developed to date:

Approximately 10,000 MW
of wind, with solar increasing
in recent years.

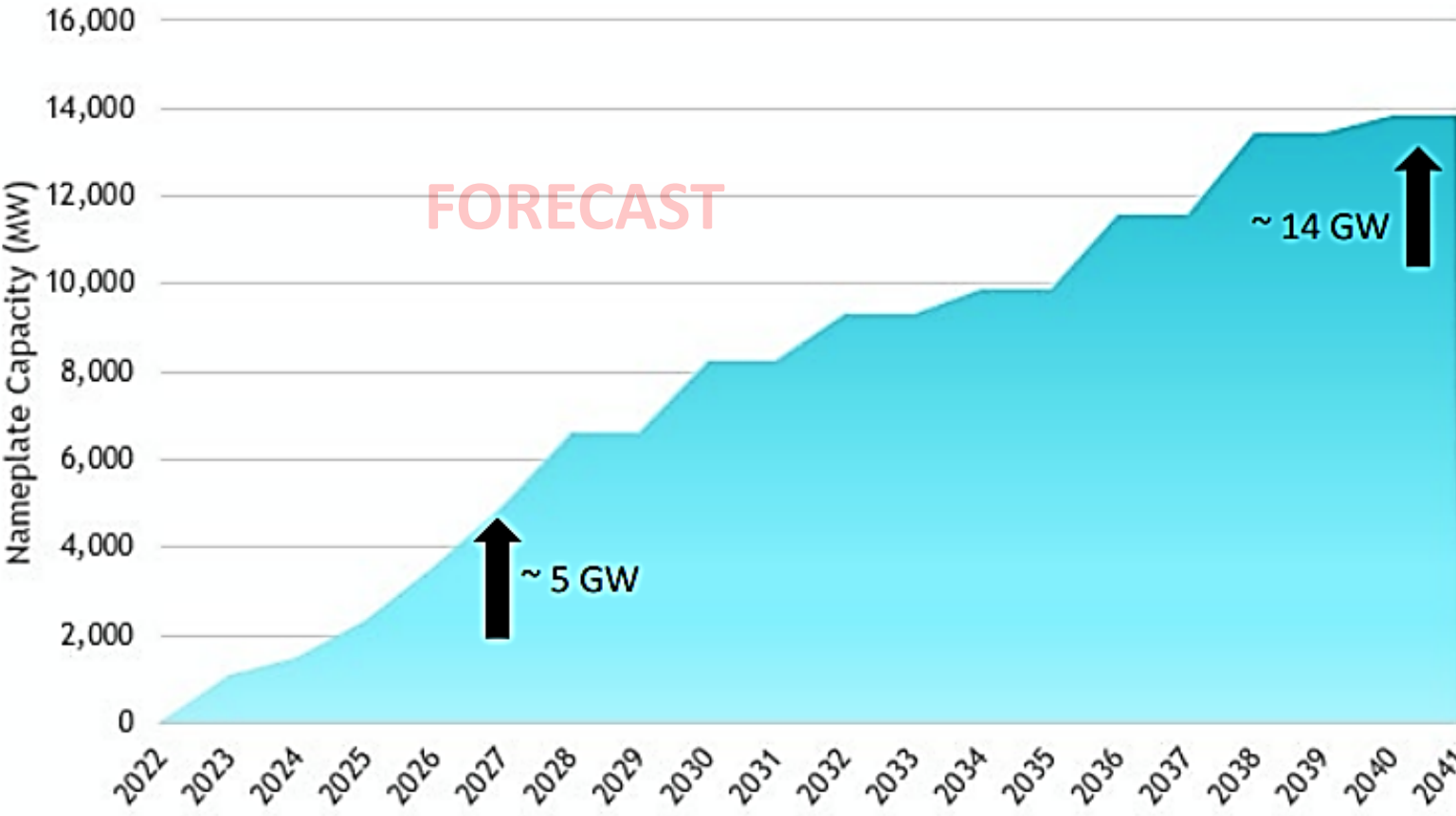
[Source](#), Slide 3



Lots of Onshore Wind, How Much More?

SCALE OF NEED FOR NEW RENEWABLES: PNW

Average Renewable Build in the Region - Baseline Conditions



Draft 2021 Power Plan: Baseline Conditions

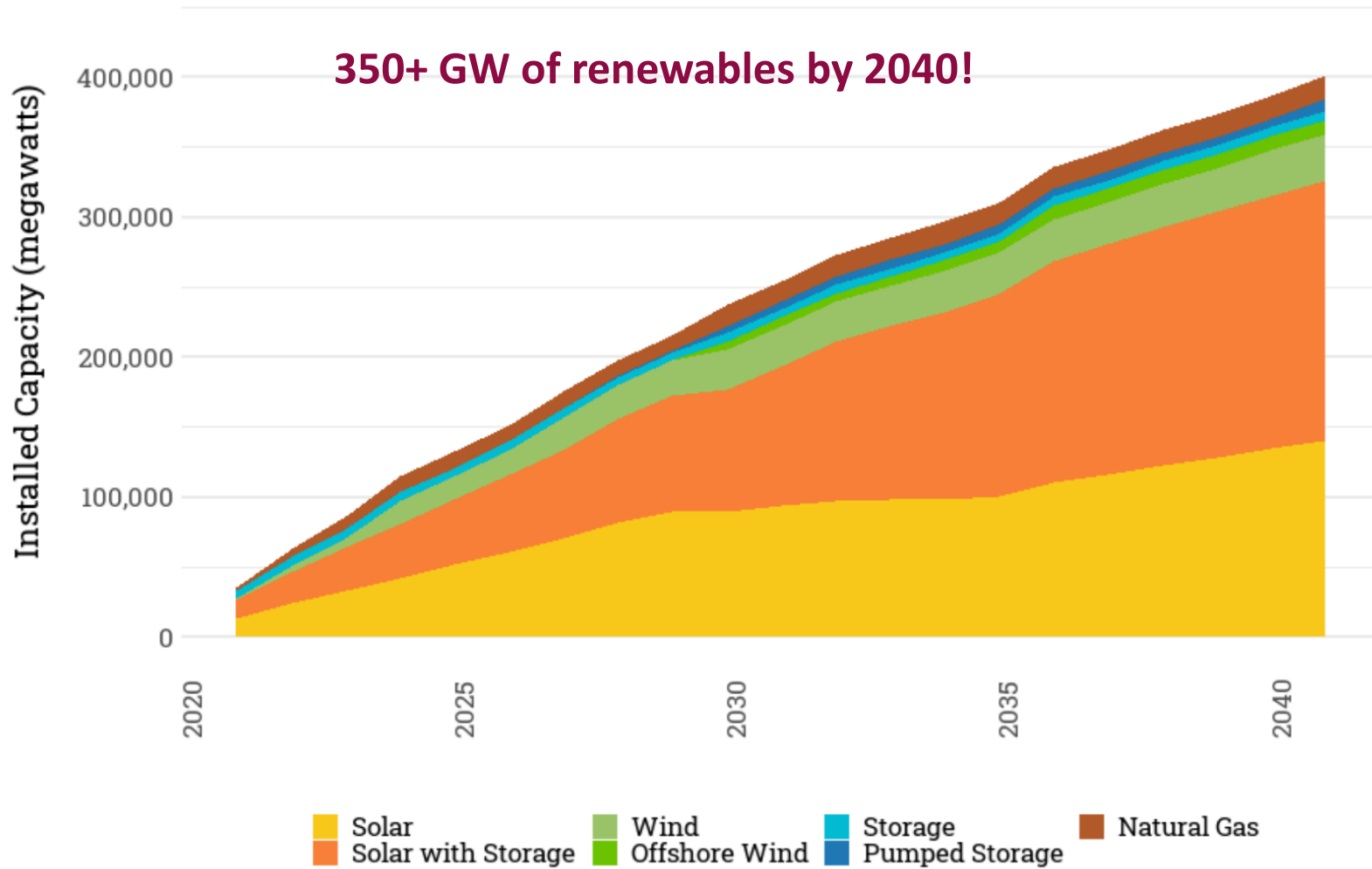
Average build of additional new renewables in the Pacific Northwest over the next 20 years.

Source; Slide 3



➡ Can It All Get Built In Time?

SCALE OF NEED FOR NEW RENEWABLES: WEST-WIDE



West-wide Projection:
Baseline projection for what will be required across western states to meet clean energy targets

Source: [Draft 2021 Plan](#), p. 6-45

 **Can It All Get Built In Time?**

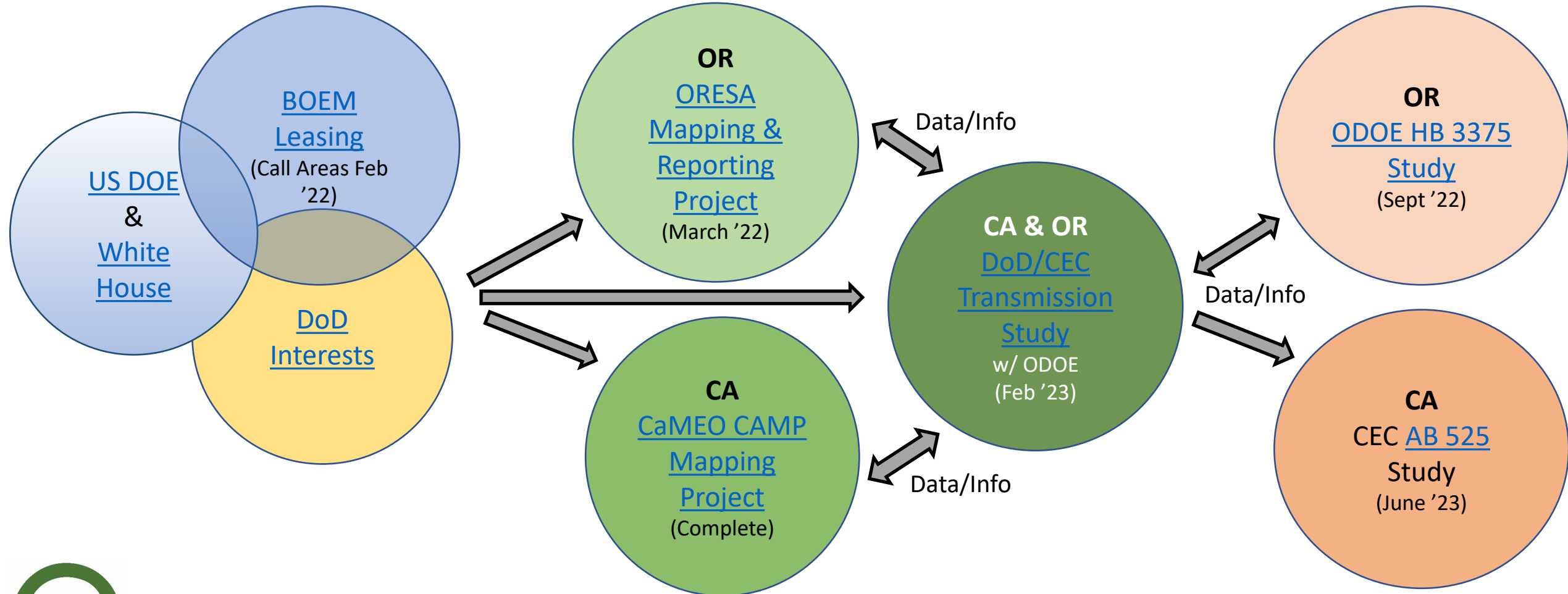


OFFSHORE WIND LANDSCAPE – OREGON CONNECTIONS

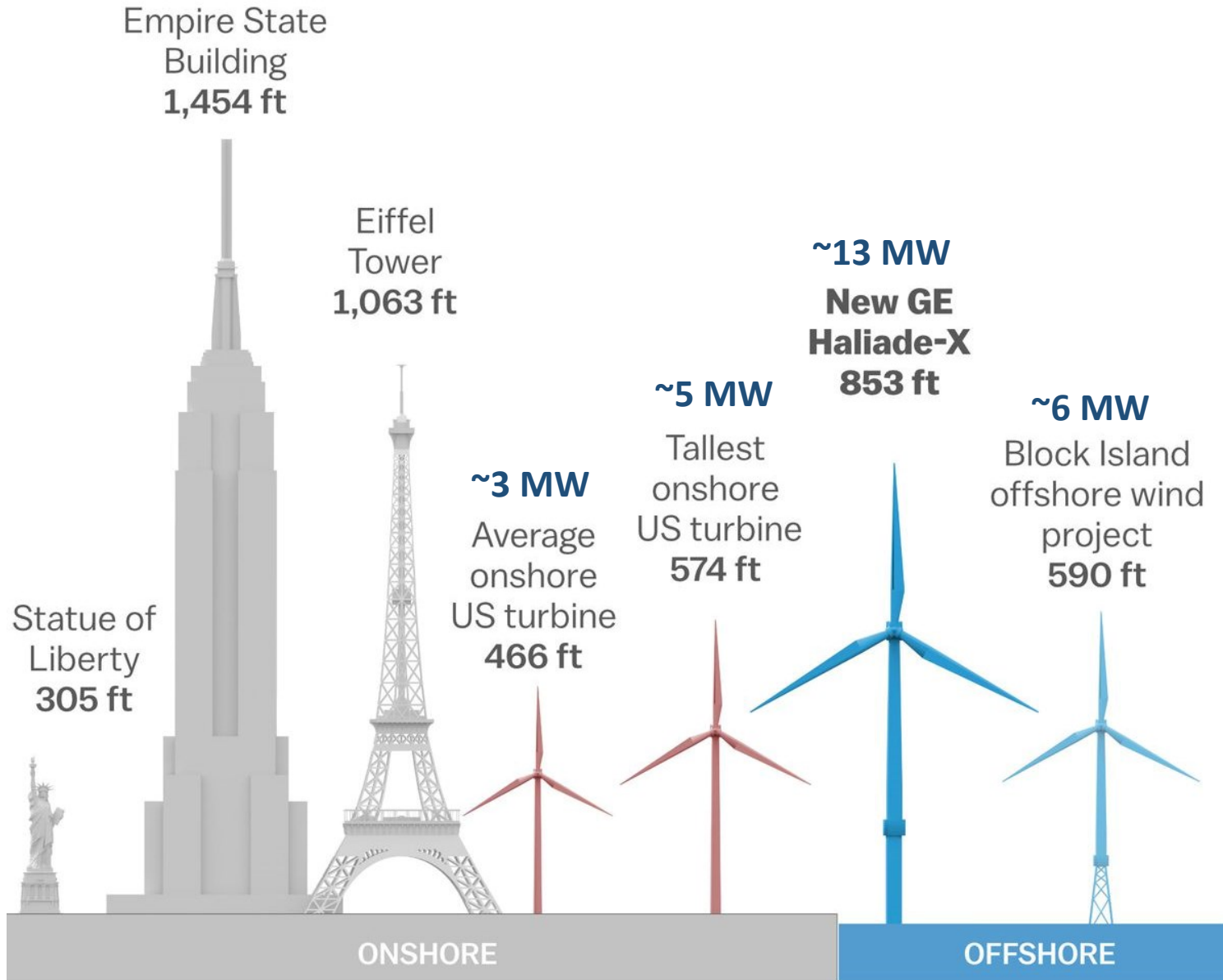
Federal Interests

State/DoD Mapping Projects

State Interests & Studies



WHAT IS OFFSHORE WIND (OSW)?



It's BIG!

But Why?

- Open ocean allows larger scales
- Economies of scale drive lower production costs

What does this Mean?

- Energy costs go down



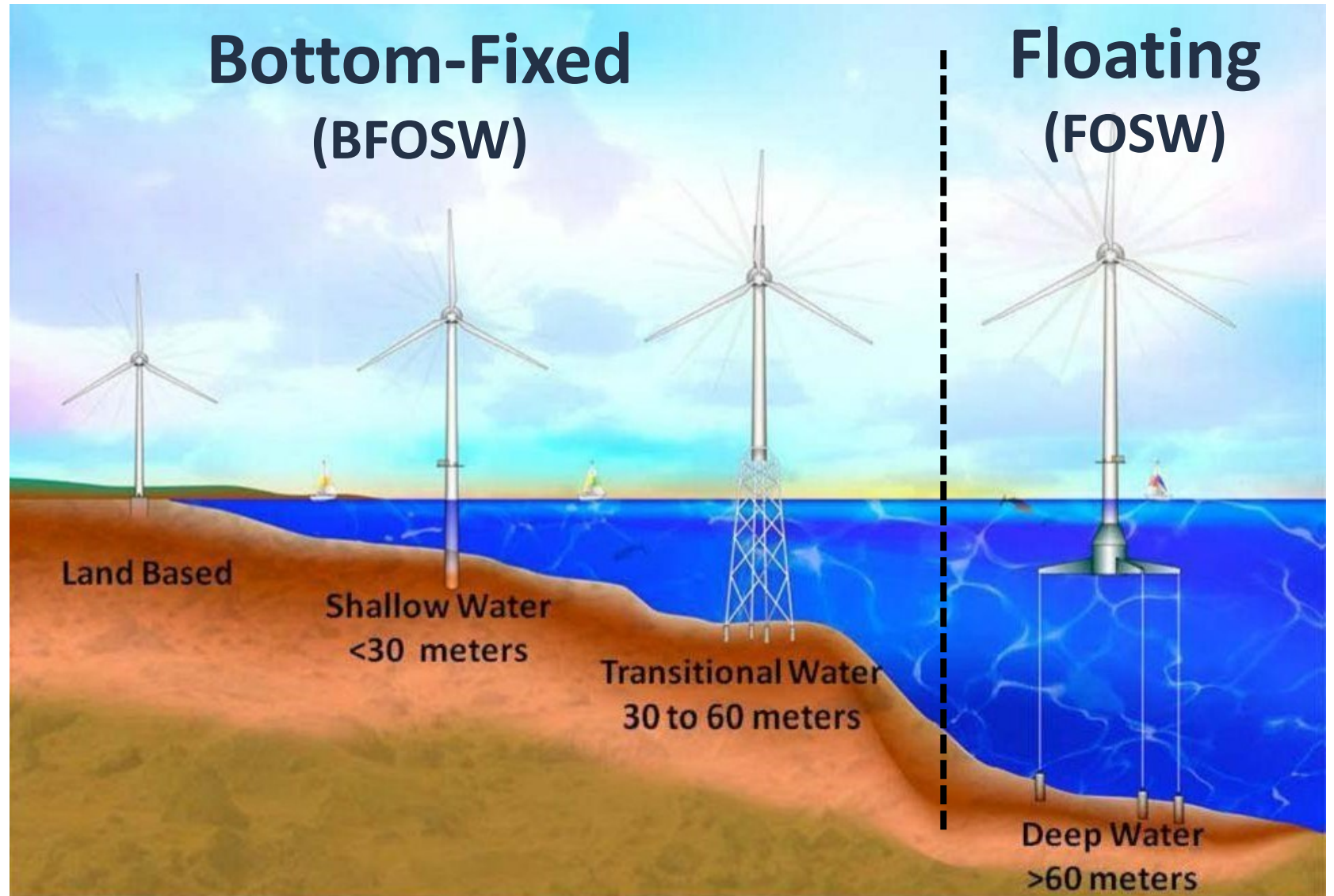
WHY OSW?

1 Bigger

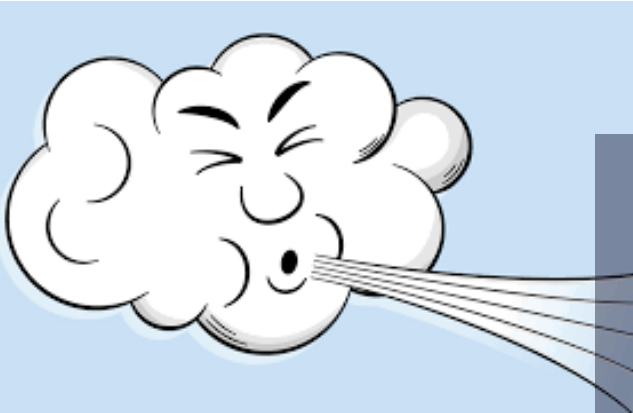
2 Stronger Winds

3 More Consistent

more wind energy further out at sea

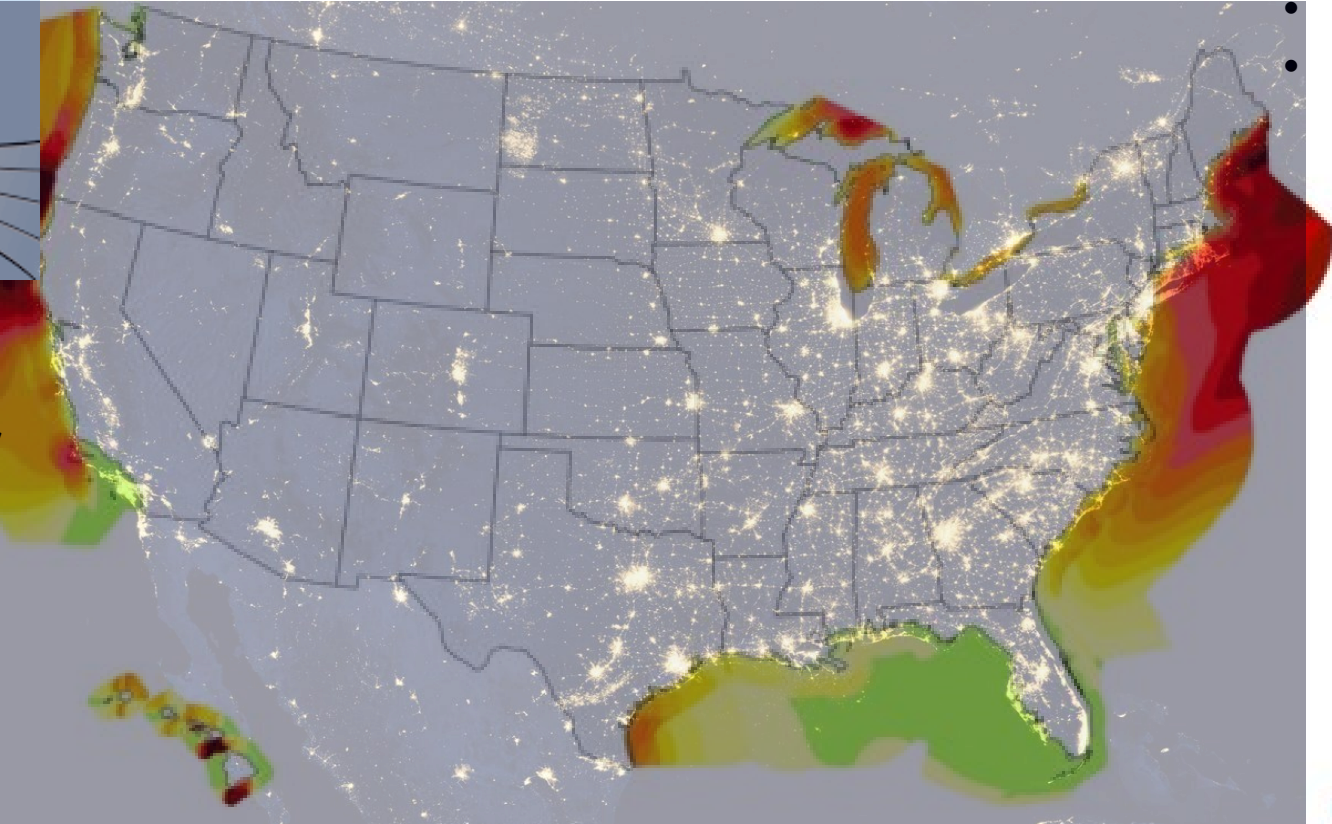


U.S. OSW MARKET



West Coast

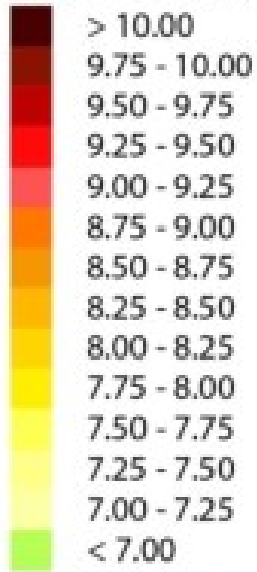
- S. Oregon & N. California w/ Strongest U.S. Winds ***BUT...***
- More, Low-cost Hydro
- Less, Coastal Loads
- Less, Shallow Water
- No State OSW Targets (yet)
- **No OSW Development (yet)**



East Coast

- Less, Low-cost Hydro
- More, Coastal Load
- More, Shallow Water
- Yes, State OSW Targets
- **Yes, OSW Development**

Wind Speed (m/s)



West Coast faces key challenges...



1) Transmission & 2) Floating Platforms



GLOBAL WIND MARKETS IN CONTEXT

Types of Wind	New Capacity Added in 2020	Cumulative Global Capacity as of 2020
Land-Based	~87 GW	~707 GW
Bottom-Fixed Offshore (BFOSW)	~6 GW	~35 GW Most in N. Europe, 0.042 in U.S.
Floating Offshore (FOSW)	~0.025 GW	~0.08 GW Single Largest Project = 50 MW



FOSW is still very nascent, but emerging...lots of ambition with several larger projects in the global pipeline...



GLOBAL OSW MARKET

Bottom-Fixed (BFOSW) is Dominant - Why?

- Mature & low-cost fixed anchoring, like land-based wind
- Feasible for shallow waters < 60 m, near shore
- Shallow and shorter reach = less complex install
- Limited siting potential

Floating (FOSW) is Emerging - Why?

- New & high-cost floating anchoring
- Reaches into deeper waters > 60 m, far from shore
- Deeper and longer reach = more complex install
- Expansive siting potential & strong, consistent winds



FOSW = Challenging reaches can yield lots of great fruit!

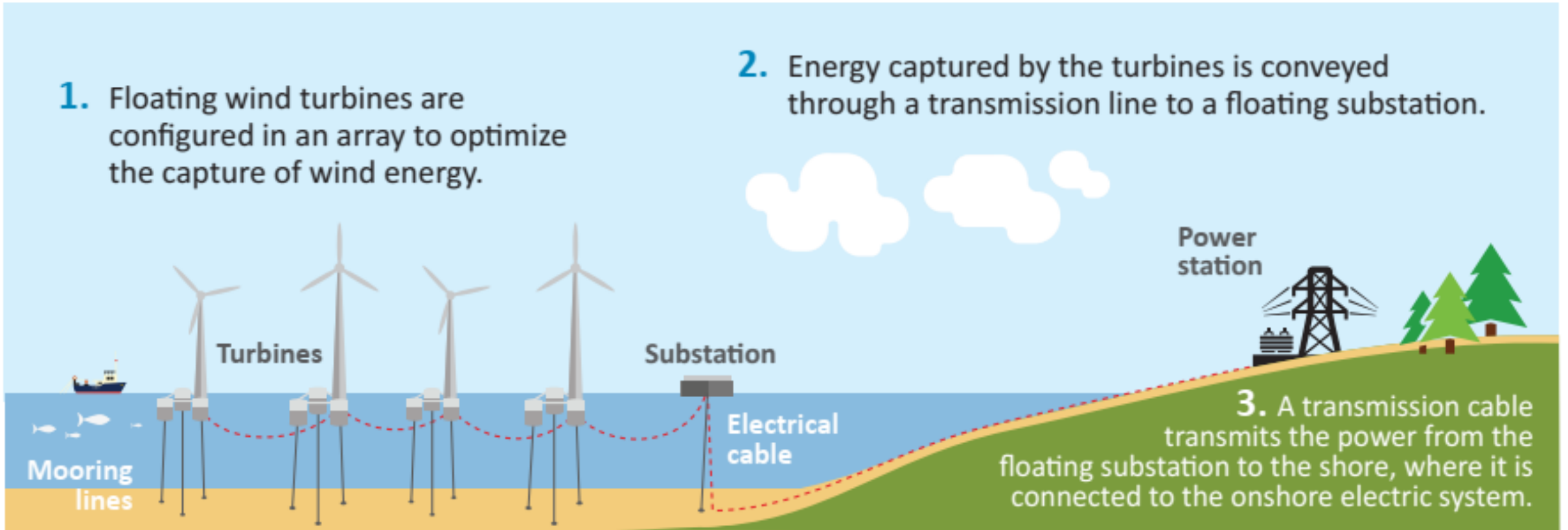


HOW DOES FOSW WORK?

1. Floating wind turbines are configured in an array to optimize the capture of wind energy.

2. Energy captured by the turbines is conveyed through a transmission line to a floating substation.

3. A transmission cable transmits the power from the floating substation to the shore, where it is connected to the onshore electric system.

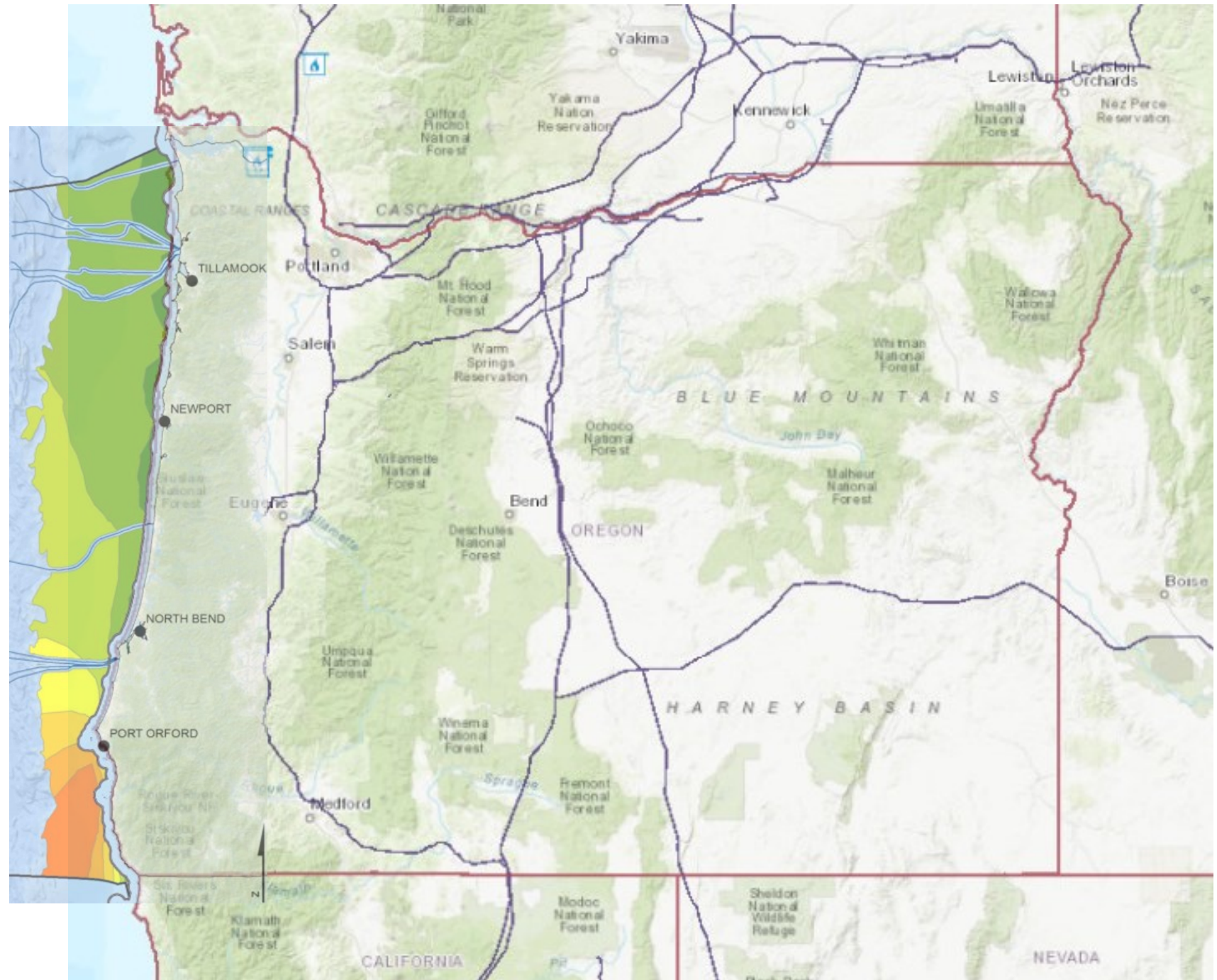


**Installation Requires Offshore & Onshore
Transmission Infrastructure**

[Link to National Geographic Video](#) on World's First Floating Offshore Wind facility in Scotland

TRANSMISSION

- Lines > 345 kV
- None to Coast



Sources: BOEM, Oregon Task Force Meeting Presentation, <https://www.boem.gov/BOEM-OR-TF-9-27-Presentation/>
OROWindMap, West Coast Ocean Data Portal, <https://portal.westcoastoceans.org/>
EIA, U.S. Energy Mapping System, <https://www.eia.gov/state/maps.php>



TRANSMISSION

- Lines < 345 kV
- 5 Pathways to Coast



[Source](#)



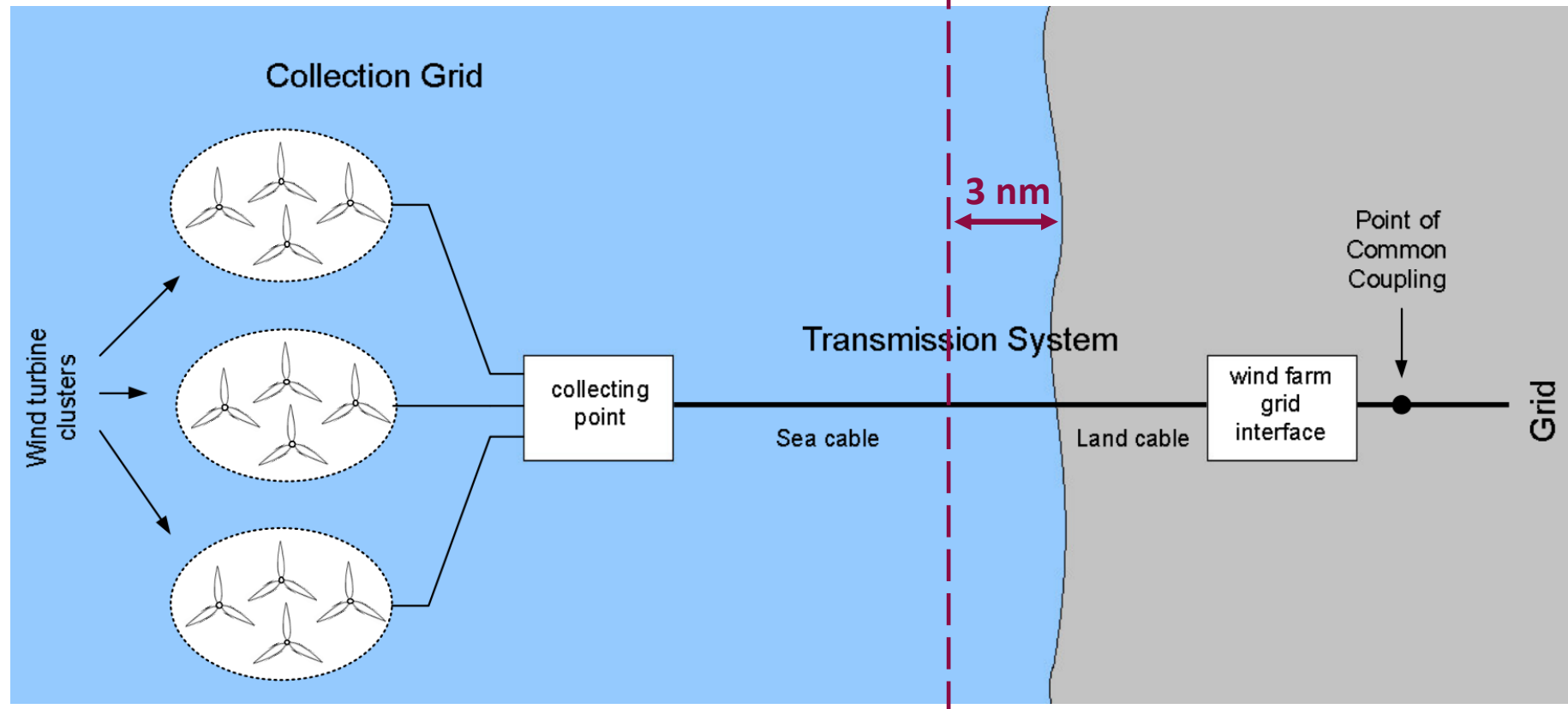
SITING & PERMITTING

Offshore Federal Waters

- Federal Jurisdiction – BOEM
- State Territorial Sea Plan - DLCD

State Waters & Onshore

- DSL & JART (Fed., State, Local)
- State, County, City Jurisdictions

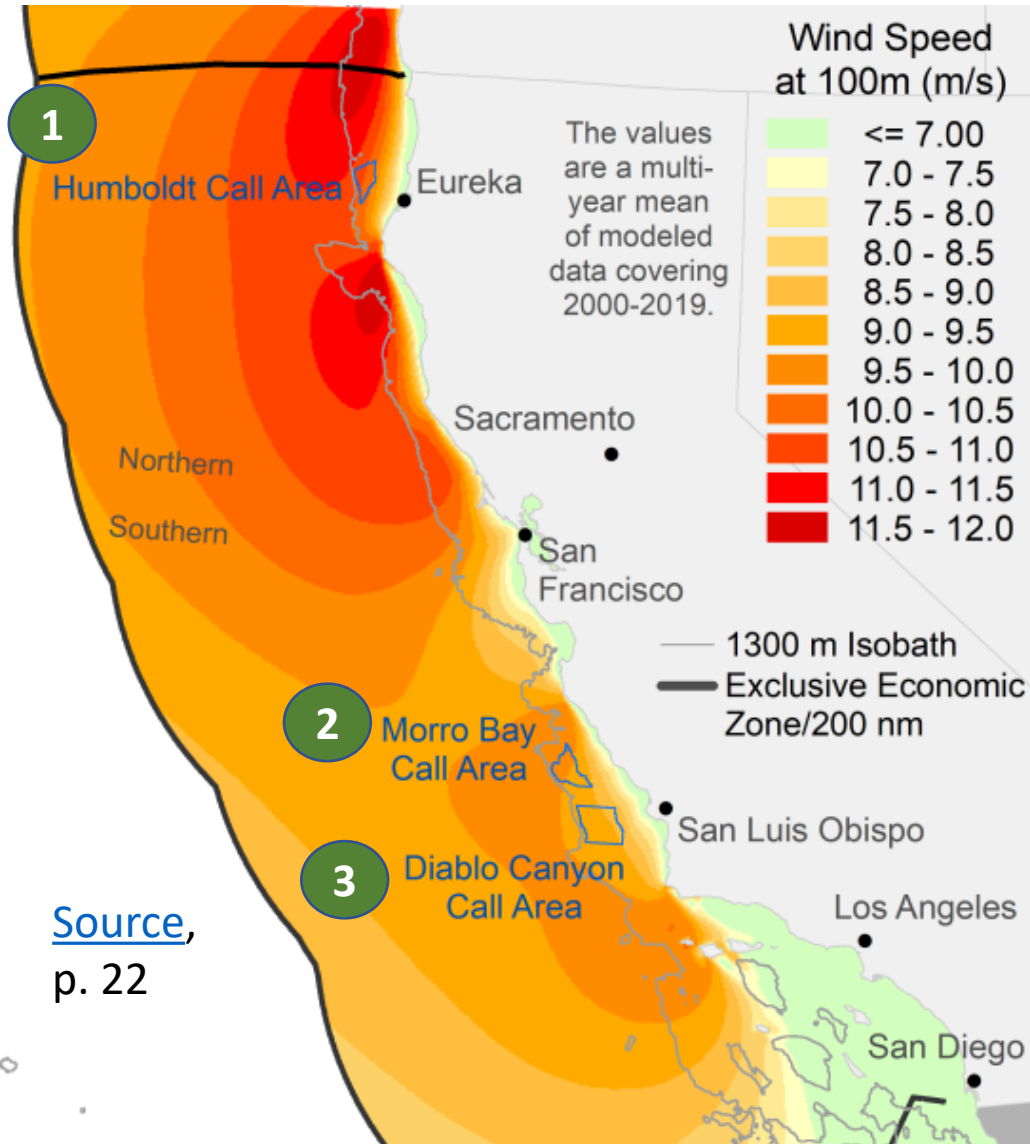


➔ Many regulatory jurisdictions involved...

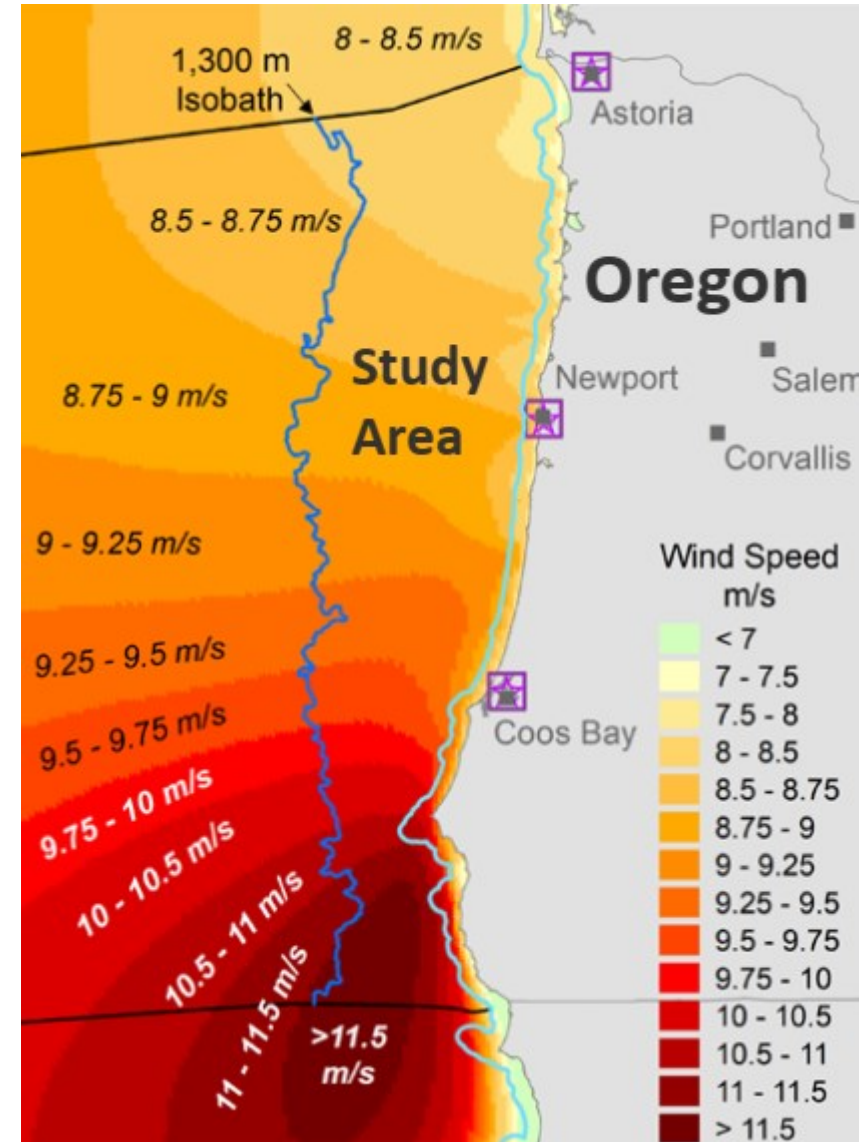


SITING - BOEM ACTIVITY (> 3 NAUTICAL MILES)

California - (3) Call areas identified



Oregon - Early engagement, Call areas soon



Literature Review & Key Topics with Q & A

(10 minutes)



FOSW DRAFT LITERATURE REVIEW

Goal: Survey recent energy literature to surface key benefits & challenges

Scope: Driven by HB 3375 directives -

1) Energy Focused

- emphasis on energy related aspects of floating offshore wind

2) Primary Sources – frequently cited and recent studies and reports

- Literature about FOSW and the energy sector that reported quantitative and/or qualitative findings.

**Please Provide
Feedback on
Reports/Studies
that may be
missing!**



Energy Focused & Recent/Frequently Cited Sources

FOSW DRAFT LITERATURE REVIEW

Scope: Driven by HB 3375 directives -

3) Identify key benefits & challenges of connecting FOSW into Oregon's grid

Key Question: Can it be built?

- What are the key factors affecting power grid value?
- Are there buyers in Western power markets?
- Are there siting/permitting challenges?

**Please Provide
Feedback on
Reports/Studies
that may be
missing!**

4) Provide a summary of the key benefits and challenges in a report to the Legislature

- Breadth & depth of literature review commensurate with end goal for a summary report to legislature
- Do not intend for summary of key topics from literature review or themes from stakeholder feedback to be an endorsement of findings from ODOE



Survey & Surface Key Topics for a High-Level Summary Report



LITERATURE REVIEW – EXAMPLE SOURCES

National Entities

- U.S. Department of Energy (DOE)
- National Renewable Energy Lab (NREL)
- Pacific Northwest National Lab (PNNL)
- Bureau of Ocean Energy Management (BOEM)
- Clean Energy States Alliance (CESA)

Global Entities

- Global Wind Energy Council (GWEC)

Research Consultants

- Evolved Energy Research (EER)
- Levitan & Associates

Scientific Journals

- Wind Energy

State Universities

- Humboldt State University - Schatz Energy Research Center
- University of Southern California - Schwarzenegger Institute for State and Global Policy

PNW Regional Entities

- NorthernGrid



Non-Exhaustive List, Many Other Sources...

LITERATURE REVIEW - KEY TOPICS

FOSW Technologies

- Wind Turbines
- Floating Platforms

Supporting Infrastructure

- Port Infrastructure
- Sea Vessels

Generation Implications for the Grid

- Technical Resource Capacity
- Achieving Clean Energy Goals
- Complementary Generation

Transmission Implications for the Grid

- **Transmission Infrastructure**
 - Offshore
 - Onshore
 - Planning
- **Reliability and Resilience**
 - Local
 - State & Regional

Offtakers - Power Systems & Markets

- Oregon Power Systems and Markets
- California Power Systems and Markets
- Renewable Hydrogen

Oregon Interests

- Clean & Renewable Energy
- Equity & Resilient Communities
- Economic Development (Local Jobs)
- Tribal & Local Government Engagement

Federal Interests & State Interests Outside Oregon

- Federal Interests
- State Interests Outside Oregon

Siting & Permitting Offshore/Onshore

- Federal & State Jurisdictions
- Potential Impacts to Ocean and Land Users
- Potential Environmental Impacts



A landscape photograph featuring a vibrant rainbow arching across a dark, stormy sky. Below the rainbow, a lush green field stretches across the foreground, with a row of trees and a vineyard visible in the mid-ground. The overall scene is dramatic and serene.

BREAK

5 minutes

Key Topics & Prompting Questions for Feedback with Q & A

(50 minutes)



KEY TOPICS & PROMPTING QUESTIONS

Questions are Organized by Key Topic

➤ **Goal:** To help prompt targeted feedback

- **Foundational Questions**
 - Achieving 100% Clean Energy Targets
 - Economic Development
 - Equity
 - Reliability & Resilience
- **Technology Questions**
 - FOSW Turbines
 - FOSW Platforms
- **Infrastructure Questions**
 - Port Infrastructure
 - Transmission Infrastructure
- **Energy Market & RTO Questions**
 - Investors/Purchasers (Offtakers)
 - Regional Transmission Operator
- **Siting and Permitting Questions**
- **Miscellaneous Questions**

<https://odoe.powerappsportals.us/en-US/fosw>

 **Plug in where you can, no need to respond to ALL questions...**





FOUNDATIONAL QUESTIONS

Achieving 100% Clean Energy Targets

(1) FOSW Contribution to 100% Clean

Economic Development

(2) Overall Benefits

(3) Location of Benefits

(4) Net Benefits

Equity

(5) Economic Equity

(6) Environmental Justice & Equity

Reliability & Resilience

(7) Transmission Power Supply Reliability

(8) Power System Resilience





TECHNOLOGY QUESTIONS

FOSW Turbines

(9) Turbine Size

(10) Technical Limitations

FOSW Platforms

(11) Overall Costs

(12) Costs by Platform Type

(13) Platforms for Oregon

(14) Innovative Designs

(15) Oregon Ports

(16) Out-of-state Ports

(17) Reliance on Out-of-state Ports





PORT INFRASTRUCTURE QUESTIONS

Ports Generally

(18) Single vs. Multiple Ports

(19) Coordination of Multi-state Ports

(20) Nexus with Interconnection to the Electric Grid

(21) Sea Vessels

(22) Shipping Routes & Port Access





TRANSMISSION INFRASTRUCTURE QUESTIONS

Scale, Configurations, Limitations

- (23) Economies of Scale
- (24) Offshore Transmission Configurations
- (25) Existing Transmission System Limitations
- (26) Transmission Upgrades
- (27) Costs & Barriers to Upgrades

Optimization & Resilience

- (28) Co-locating Storage
- (29) In-State & Regional Transmission Benefits
- (30) Subsea Backbone Transmission
- (31) Optimizing Transmission Generally
- (32) Coastal Resilience





ENERGY MARKET & RTO QUESTIONS

Investors/Purchasers (Offtakers)

(33) Sharing the Output

(34) Barriers to Cooperative
Offtake Arrangements

(35) Out-of-State Purchasers

(36) First Mover Advantage

Regional Transmission Organization

(37) General Effects of an RTO

(38) BA-Specific Transmission Planning

(39) Potential Value of a Regional Analysis

(40) Regionalization Pre-requisite



For more info on RTOs, please see ODOE's recent [RTO Study \(2021\)](#)



SITING & PERMITTING QUESTIONS

Siting and Permitting

(41) Process Gap Analysis

(42) Data Gap Analysis

(43) Identification of Effects of Concern

(44) General Best Practices for Addressing Effects of Concern

(45) Specific Recommendations for Addressing Effects of Concern





MISCELLANEOUS QUESTIONS

What else? Feedback on Draft Literature Review Report?

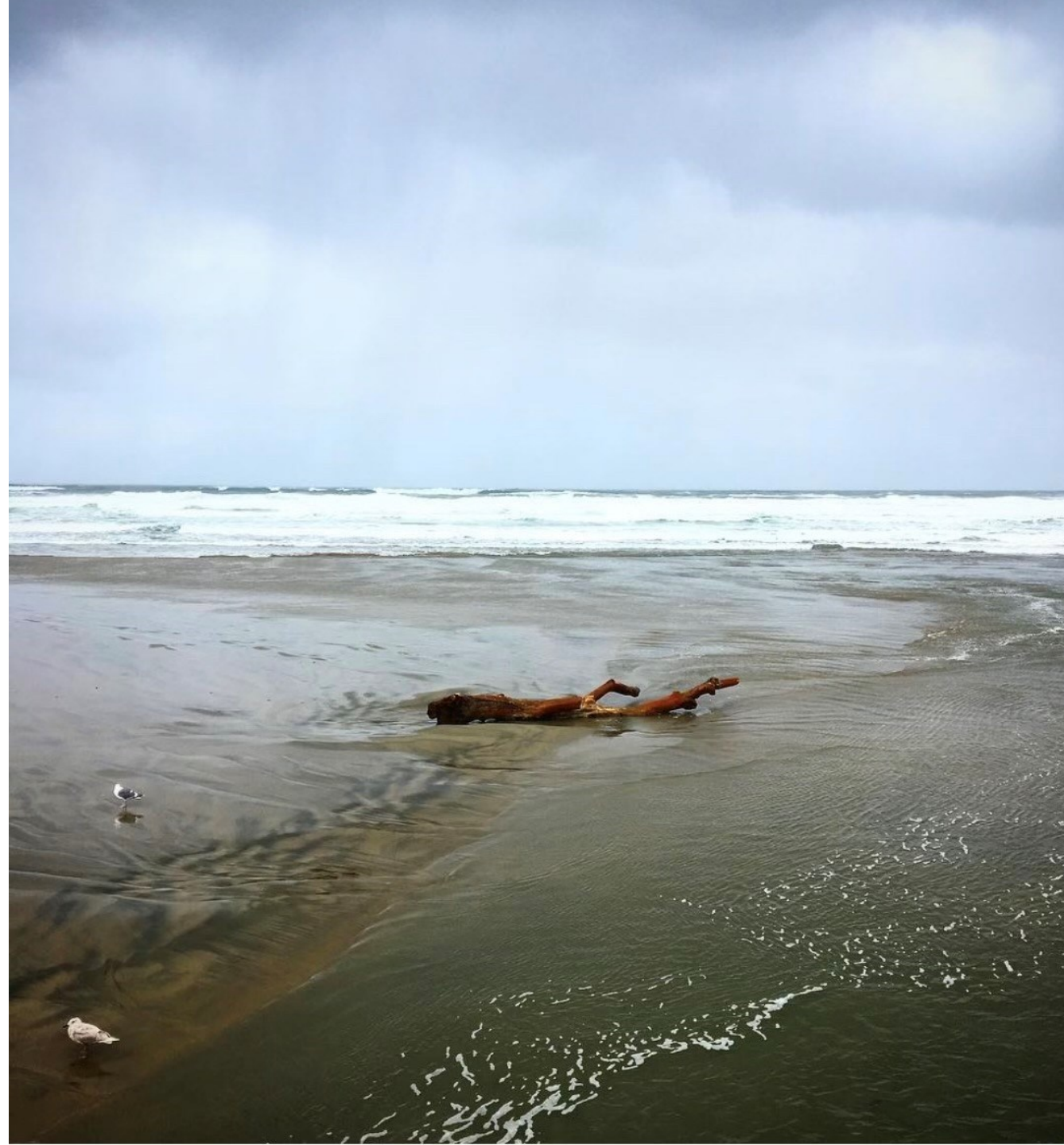
(46) Additional Topics: Are there specific topics or issues of significance that you believe have been overlooked in the Draft Literature Review Report the Department has produced as part of its implementation of HB 3375?

(47) Errors or Inconsistencies: Are there any specific errors or inconsistencies with existing literature in the Draft Literature Review Report the Department has produced?



Next Steps & Online Web Portal

(10 minutes)



WEB PORTAL FOR SUBMITTING FEEDBACK

<https://odoe.powerappsportals.us/en-US/fosw>

ODOE



Public Comments ▾

Financial Assistance ▾

Statute & Rules ▾

Data ▾

Contact Us ▾

Sign in

Home > **Floating Offshore Wind Study**

Floating Offshore Wind Study

Objective

To gather and synthesize the range of perspectives on the benefits and challenges of integrating up to 3 GW of floating offshore wind (FOSW) energy into Oregon's electric grid by 2030 as directed in HB 3375.

Please
Read

Instructions for Responding to Scoping Questions

To support your participation in responding to questions, it may be useful to refer to background information available on [ODOE's FOSW Study website](#), which covers information about how floating offshore wind technology differs from bottom-fixed offshore wind, typical costs, comparisons to other renewable energy technologies, infrastructure needs, and more. The website also includes ODOE's draft report summarizing its key findings from a review of existing literature, and the links to existing literature. This study's prompting questions below were developed based on the literature review. The Department also welcomes feedback on the literature review in case you find a study or report missing.

Your answers to the following questions will play a critical role in helping to inform the state with a better understanding of stakeholder perspectives on key issues relating to the potential for integrating large-scale deployments of FOSW into Oregon's electric grid. On the pages ahead, you will find questions categorized based on five broad topics and several sub-topics. Given the technical nature of these questions and that some stakeholders have more data and analysis to address some of these questions than others, it is not required to answer every question - Please provide feedback on as many questions as you can.



Floating Offshore Wind Study

Note that * denotes Required Fields.

Contact Information

First Name *

Organization Name

Email Address *

Street 1

City

Zip/Postal Code *

Last Name *

Organization Type

Phone Number

Street 2

State

Previous

Next

Instructions ✓

Contact Information

Foundational Questions

Technology Questions

Infrastructure Questions

Energy Market Questions

Permitting and Siting Questions

Miscellaneous Questions

Req'd Fields

Next

Will save
where you
are – but it
doesn't
submit



14. Innovative Designs: Are you aware of potential new floating platform designs under development (e.g. government-funded R&D, or commercial development efforts) that could significantly reduce the costs of producing them? To what extent could new floating platform designs be suitable for the deployment of FOSW in Oregon and why?

Example only: Designs for floating platforms are in early days, undergoing rapid innovation, and are continuously being optimized for early stage FOSW projects across the world...

Previous

Next

Instructions ✓

Contact Information ✓

Foundational Questions ✓

Technology Questions

Infrastructure Questions

Energy Market Questions

Permitting and Siting Questions

Miscellaneous Questions

Clicking Next will **save** text entered into feedback boxes.

This **does not submit** your feedback – but it saves to allow allow you to return later.



Floating Offshore Wind Study

Miscellaneous Questions

46. **Additional Topics:** Are there specific topics or issues of significance that you believe have been overlooked in the Draft Literature Review Report the Department has produced as part of its implementation of HB 3375?

47. **Errors or Inconsistencies:** Are there any specific errors or inconsistencies with existing literature in the Draft Literature Review Report the Department has produced?

To complete your feedback, you must hit **Submit** on Final Screen

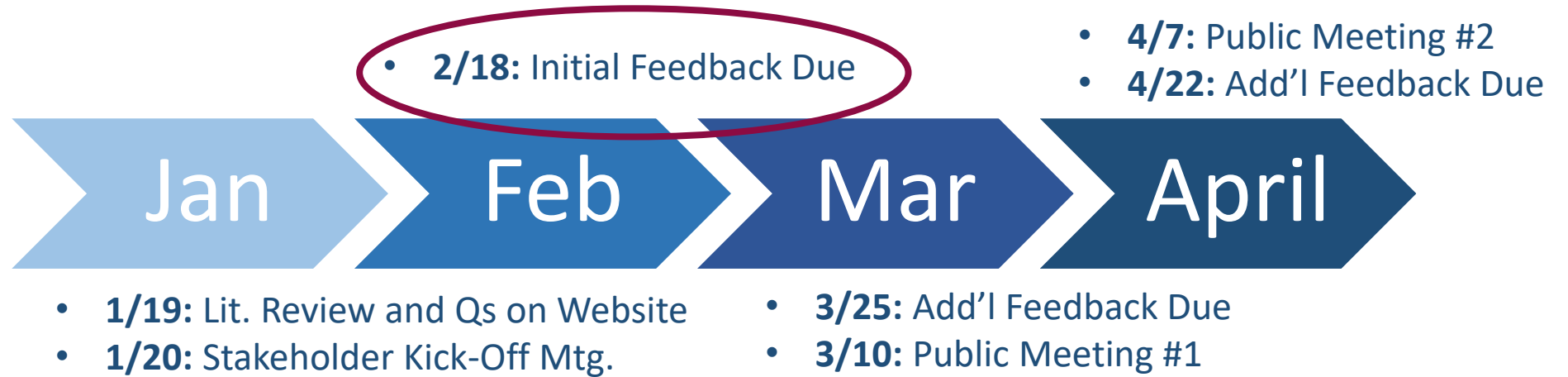
[Previous](#) [Submit](#)

Instructions ✓	Contact Information ✓	Foundational Questions ✓	Technology Questions ✓	Infrastructure Questions ✓	
Energy Market Questions ✓	Permitting and Siting Questions ✓	Miscellaneous Questions			



! PLEASE SUBMIT YOUR FEEDBACK BY FEBRUARY 18

Data Gathering & Engagement



Report Drafting & Submission





OREGON
DEPARTMENT OF
ENERGY

Q & A Time

Contact information:

Jason.Sierman@energy.oregon.gov