Oregon Department of **ENERGY**

Floating Offshore Wind in Oregon: Benefits & Challenges

Senate Interim Committee on Energy & Environment

Jason Sierman
September 22, 2022

OREGON DEPARTMENT OF ENERGY

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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

ODOE Floating Offshore Wind Study

- Recap of HB 3375
- Summary of Preliminary Key Findings
  - Key Potential Benefits
  - Key Potential Challenges
- Summary of Opportunities for Future Study and Engagement

HB 3375 – DIRECTION TO ODOE

Study the effects, including benefits and challenges, of integrating up to 3 GW of floating offshore wind energy on energy reliability, state renewable energy goals, jobs, equity, and resilience.

1. Literature Review
   - Reviewed studies and reports relevant to benefits & challenges of FOSW
2. Stakeholder Feedback
   - Several state, regional, and national entities listed in bill to consult
   - Additional stakeholders identified by ODOE, including those from BOEM Task Force
3. At Least Two Public Remote Meetings
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

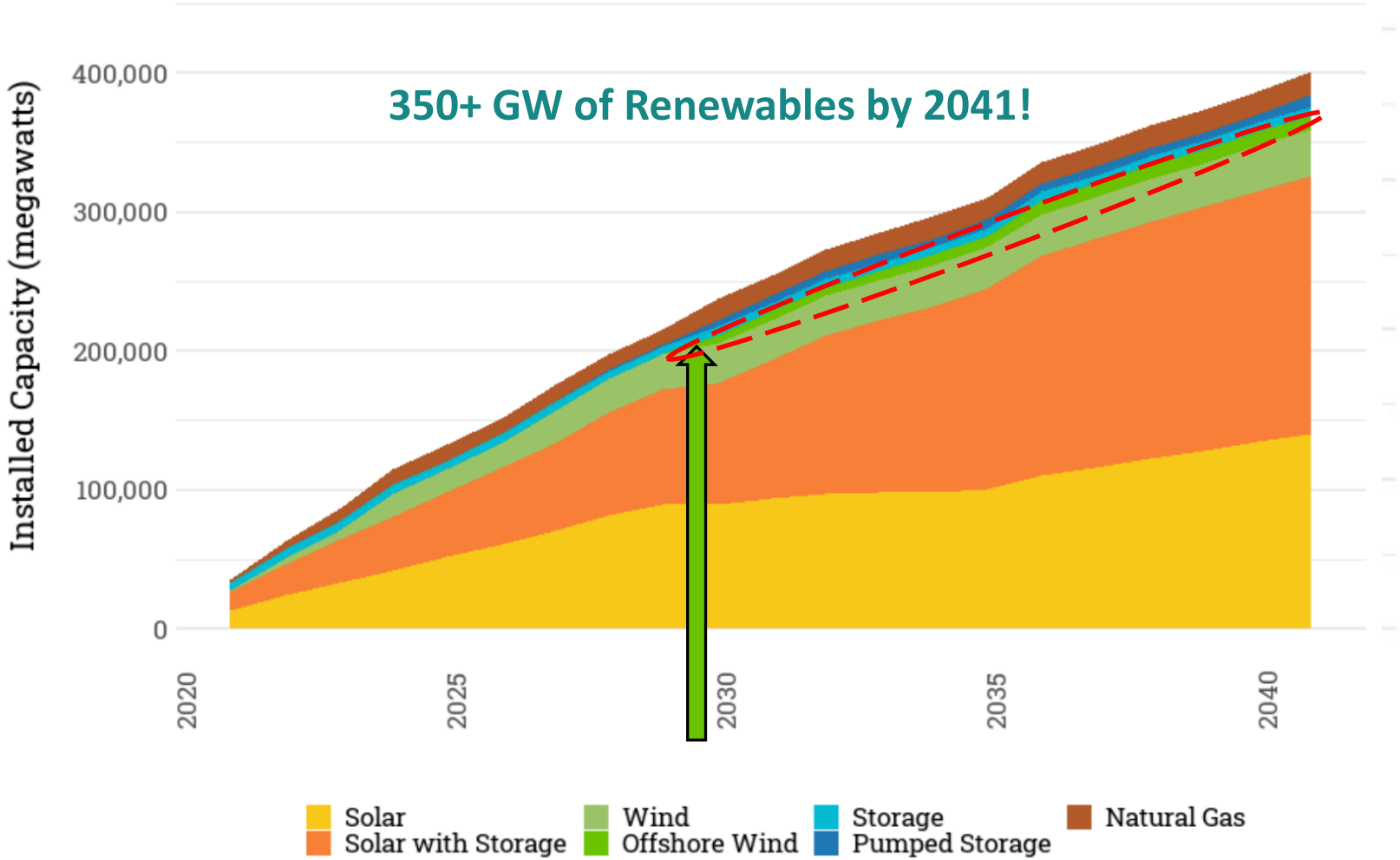
FEEDBACK RECEIVED

More than 80 different comments received from a variety of perspectives, including:

- Members of the public
- Coastal cities, counties, and ports
- Fisheries
- State agencies
- Elected state officials
- Federal entities
- Non-governmental organizations
- Utilities and transmission providers
- Developers and supply chain
- Research consortiums and national labs

Feedback received can be viewed online:
https://odoe.powerappsportals.us/en-US/fosw/foswview/

FOSW CONTEXT



THE 2021 NORTHWEST POWER PLAN
FOR A SECURE & AFFORDABLE ENERGY FUTURE

Source, p. 51

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

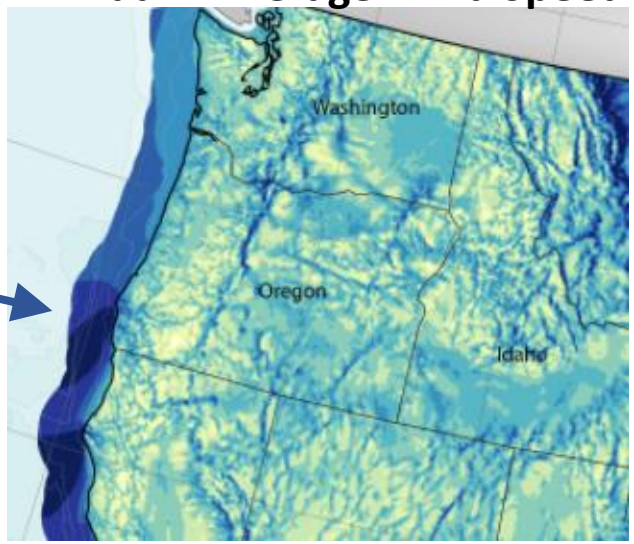
Diversity is least cost, least risk.

Can it all get built in time? Where?

HIGHEST-LEVEL KEY FINDINGS

- 2050 Clean Targets - **100s of gigawatts (GWs)** of new renewables are necessary across the West to achieve policy goals.
- Oregon has outstanding offshore wind resources - **strong & consistent.**
  - Ocean depth requires **floating** offshore wind technology.
  - Emerging tech, global deployments total ~0.1 GW (100 MW).
- FOSW and supporting transmission can have potential effects on ocean users and the environment.
- FOSW is a unique renewable technology because it requires:
  - GW-scale for commercial development.
  - Floating platforms.
  - Port upgrades.
  - Transmission upgrades.
    - New offshore & expanded onshore transmission.

Annual – Average Wind Speed



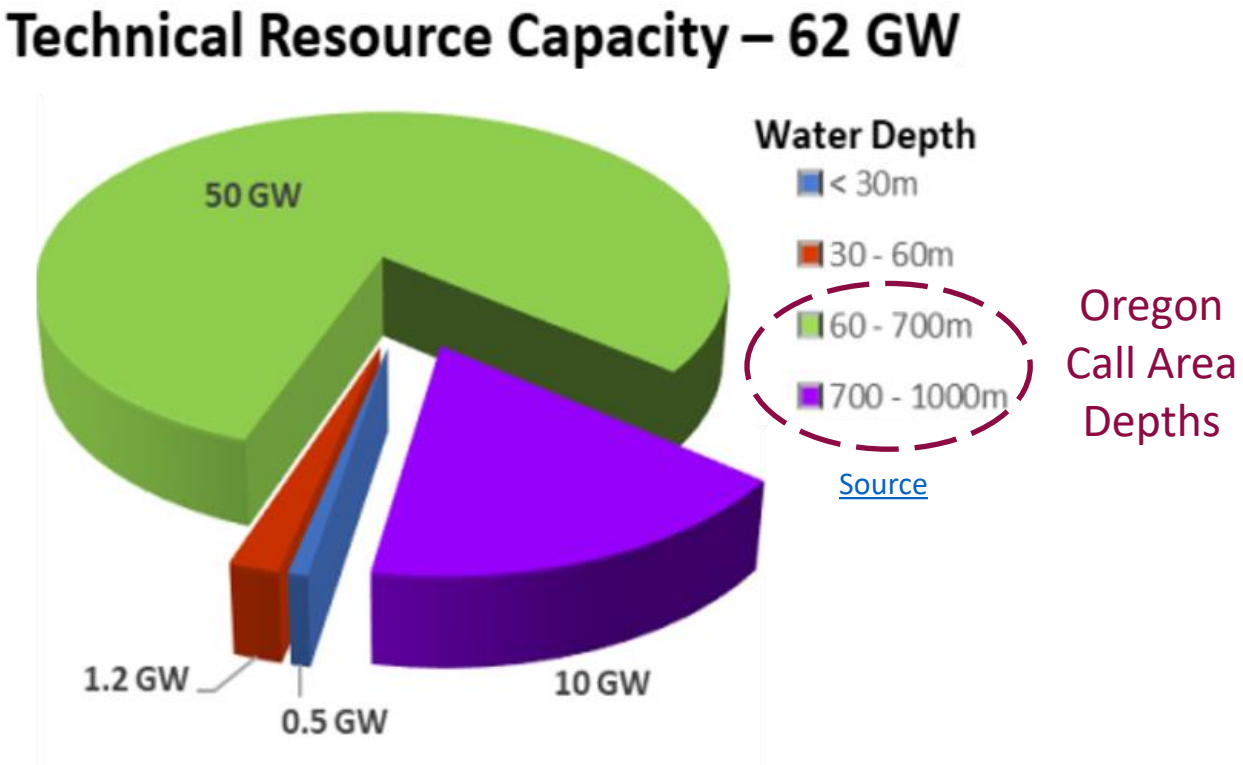
Source

Potential Effects

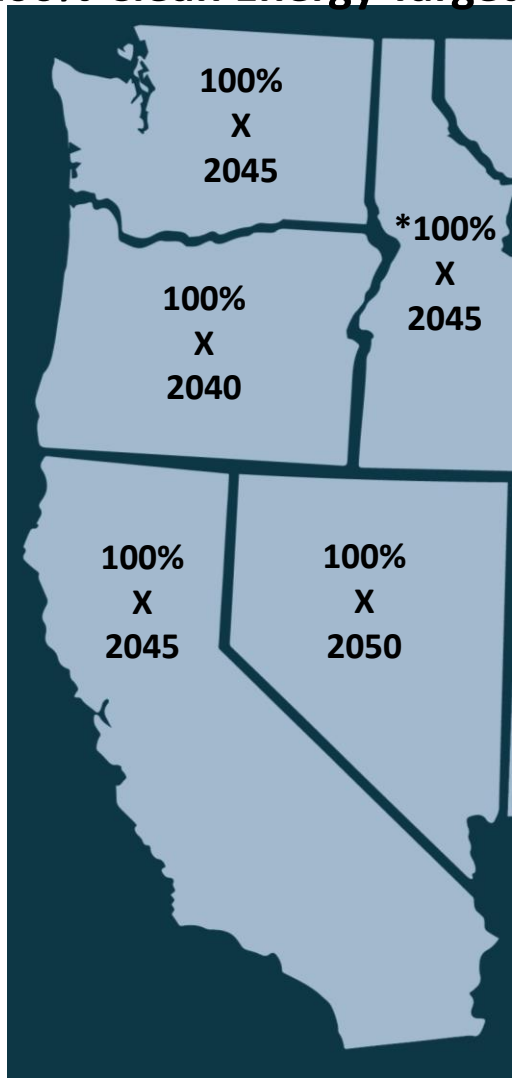
POTENTIAL BENEFIT: IMMENSE RESOURCE

Scale of FOSW can help achieve mid-century clean energy targets.

- Dozens of GWs could be deployed if potential effects can be avoided and mitigated.



Regional States w/ 100% Clean Energy Targets



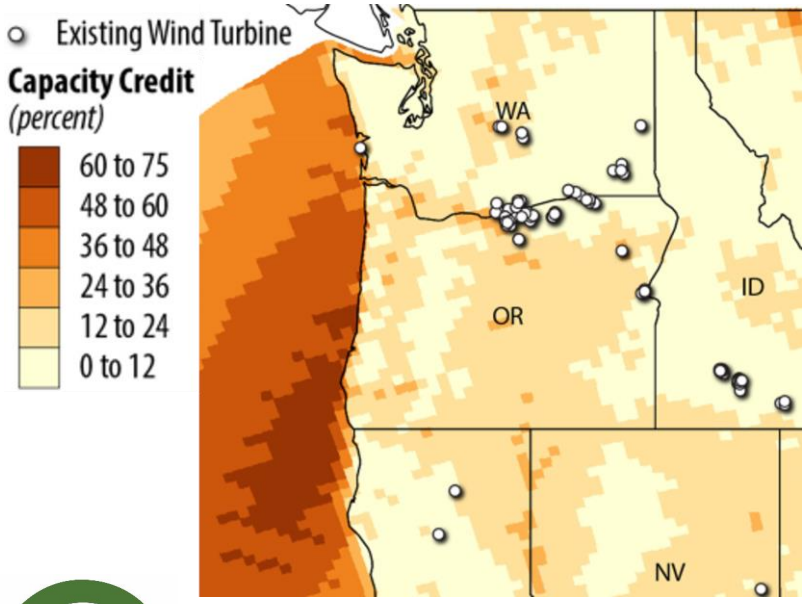
*Idaho Power & Avista Targets

POTENTIAL BENEFIT: GENERATION DIVERSITY

FOSW can provide critical reliability contributions to a 100% clean power grid.

- Complementary Output: FOSW output complements loads and output of onshore clean energy across days, nights, and seasons.

Avg. Wind Credit to Grid Needs



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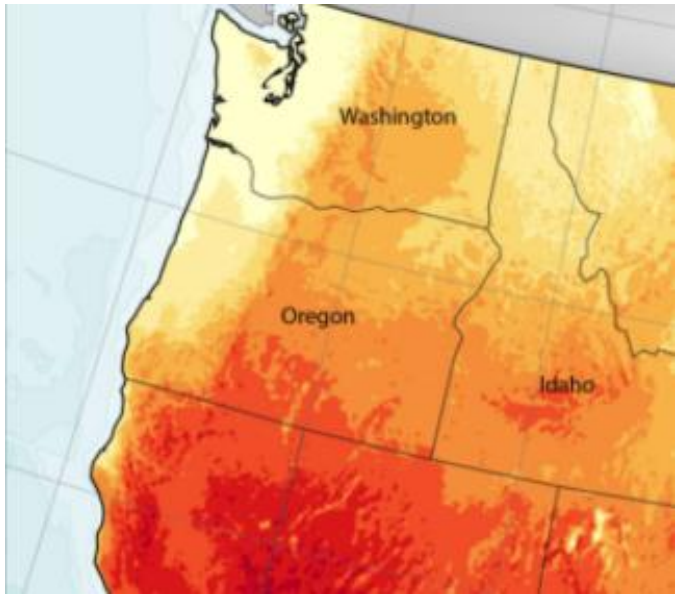
Avg. Solar Irradiance



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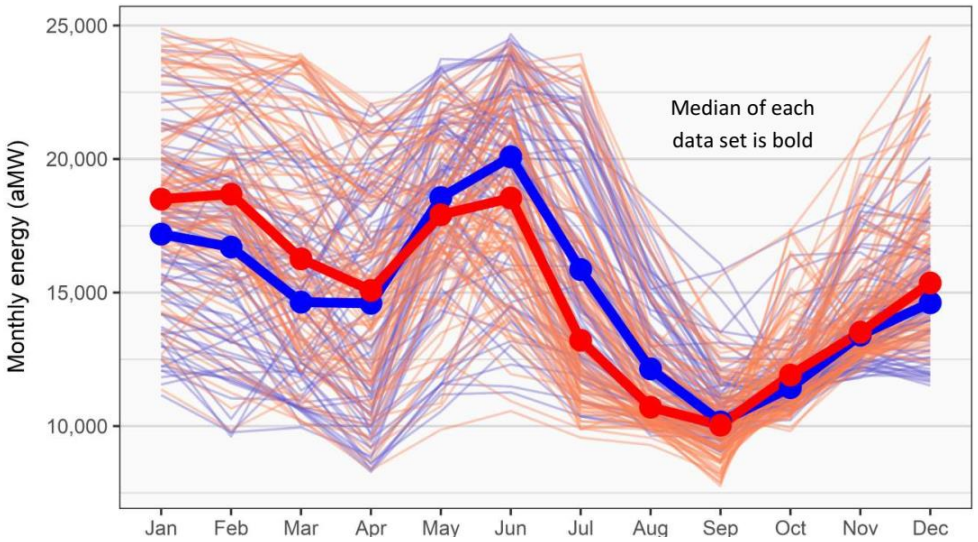
Median Monthly Hydro Output



Historical

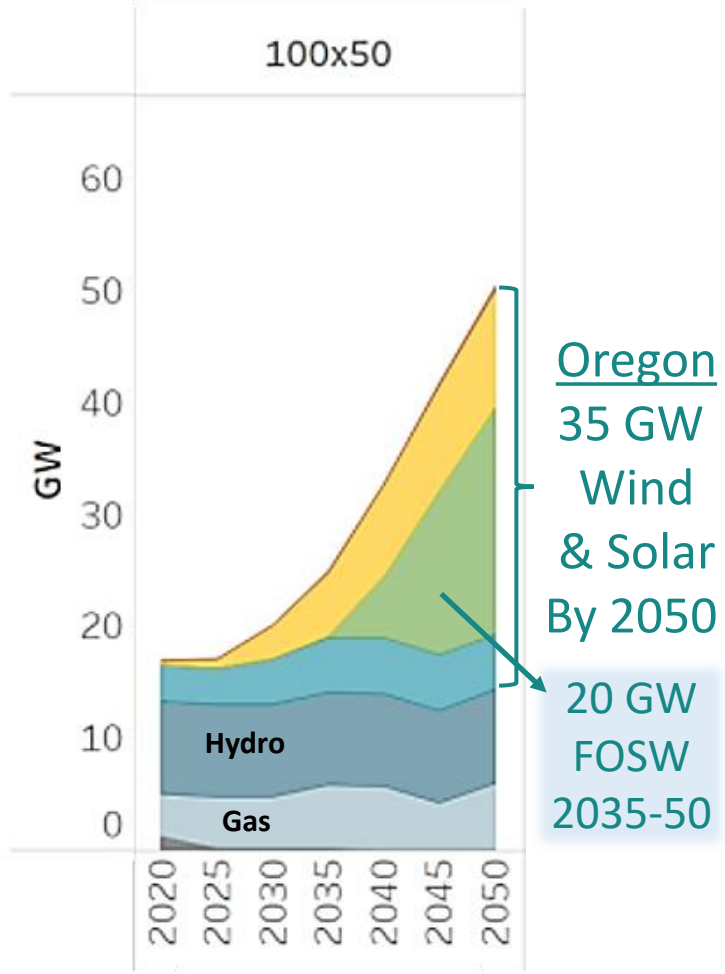
Forecast w/ Climate Change

Source

POTENTIAL BENEFIT: GENERATION DIVERSITY

- Complementary Output & Unique Ocean Location could help manage costs & risks of achieving mid-century clean energy goals.
  - Optimize Onshore Costs: FOSW could help optimize the scale of investment in onshore renewables & transmission.
  - Hedge Onshore Risks: FOSW could help reduce the risks of relying on onshore development alone to meet the pace and scale of renewable build-out necessary.

Oregon Clean Pathways Study (2021)



EVOLVED ENERGY RESEARCH

Source

POTENTIAL BENEFIT: BALANCE LAND USE IMPACTS

FOSW and supporting transmission development could help balance and offset the cumulative development of new renewables and transmission on land.

Solar - Central Oregon

Source

Solar - Willamette Valley

Source

Onshore Wind – Eastern Oregon

Source

POTENTIAL BENEFIT: POWER SYSTEM RELIABILITY & RESILIENCE

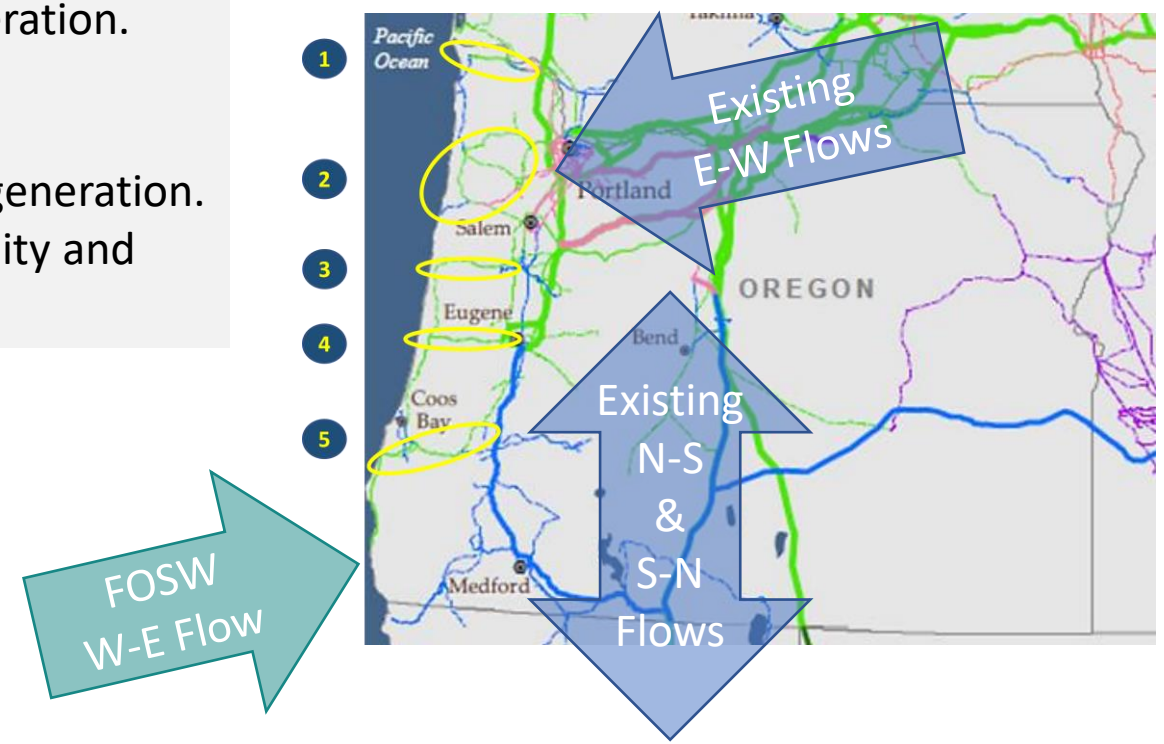
FOSW at the grid's western edge can bolster the reliability & resilience of both the coastal and regional power grid.

Coastal power systems currently served by **distant** generation.

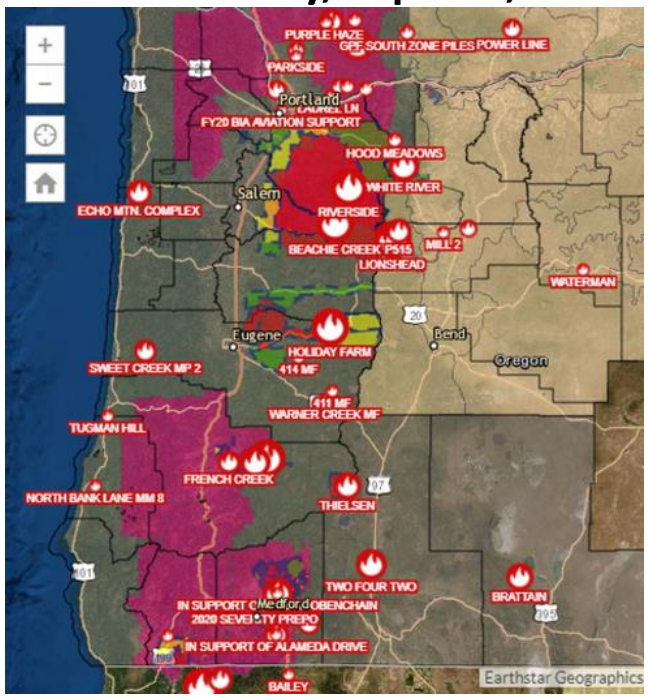
FOSW could provide:

- **Coastal** large-scale generation.
- Transmission reliability and resilience benefits.

Oregon's predominant power flows



Wildfire Snapshot from Oregon RAPTOR at 7 a.m. Friday, Sept. 11, 2020



POTENTIAL BENEFITS: JOBS & EQUITY

Economic Development: FOSW could bring direct, indirect, and induced economic benefits for coastal Oregon, other Oregon areas, and neighboring West Coast states.

- Potential adverse impacts to existing coastal economies (fishing, seafood, recreation & tourism industries, etc.)
- Further study needed to assess net economic effects.

ENERGY NEWS NETWORK DONATE

NORTHEAST

Massachusetts grants focus on equity in offshore wind workforce development

The Massachusetts Clean Energy Center has awarded $1.6 million in grants to eight offshore wind workforce training programs aimed at reducing specific obstacles for people of color and low-income people.

by **Sarah Shemkus**
August 3, 2021

Source

- Equity: New jobs in **underemployed coastal communities**; and reduced emissions that disproportionately impact **disadvantaged communities**.

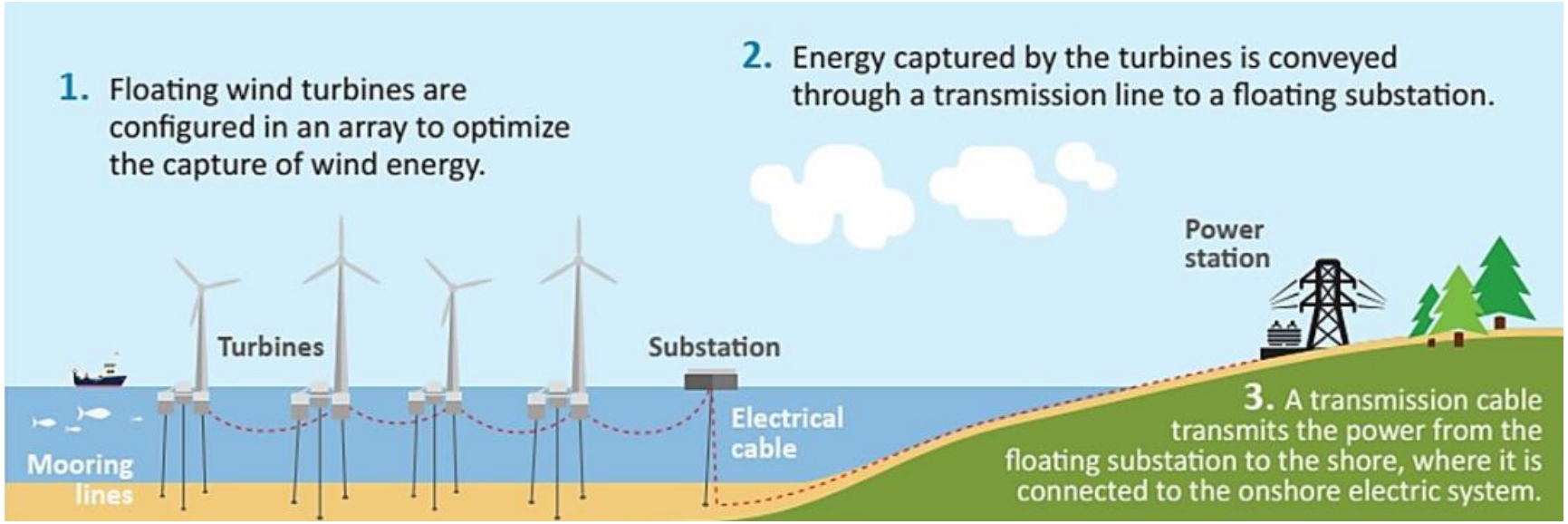
POTENTIAL CHALLENGE: CONCERNS FOR EFFECTS ON OCEAN & LAND USERS AND THE ENVIRONMENT

Avoiding & mitigating effects from FOSW on **coastal communities, existing industries, the environment, and cultural resources** could be a significant challenge.

Examples - potential impacts to: Fishing, Shipping, Military, Tribes, Coastal Citizens, Tourists, Others

Examples - potential impacts to:

- Local & migratory fish & wildlife
  - Marine & land-based species
  - Birds
  - Others
- Sensitive habitats
  - Marine
  - Seafloor
  - Estuary
  - Land-based
  - Others



POTENTIAL CHALLENGE: CONCERNS FOR EFFECTS ON OCEAN & LAND USERS AND THE ENVIRONMENT

Cumulative effects of multiple FOSW projects could be challenging to assess.

- Ex. Potential cumulative effects to fishing industry & marine habitat/species.

Potential Data Gaps: Imperfect knowledge about key potential effects.

- Ex. Fisheries, migratory species, sensitive habitats and subsea geology, socioeconomic, and FOSW viability at depths greater than 1,300m.

Effects of Concern: Calls for comprehensive analysis of many particular potential effects.

- Ex. Potential economic losses from excluded ocean areas; ecosystem effects; and potential aviation impacts from height of FOSW & new onshore transmission.

POTENTIAL CHALLENGE: COMPLEX SITING & PERMITTING PROCESSES

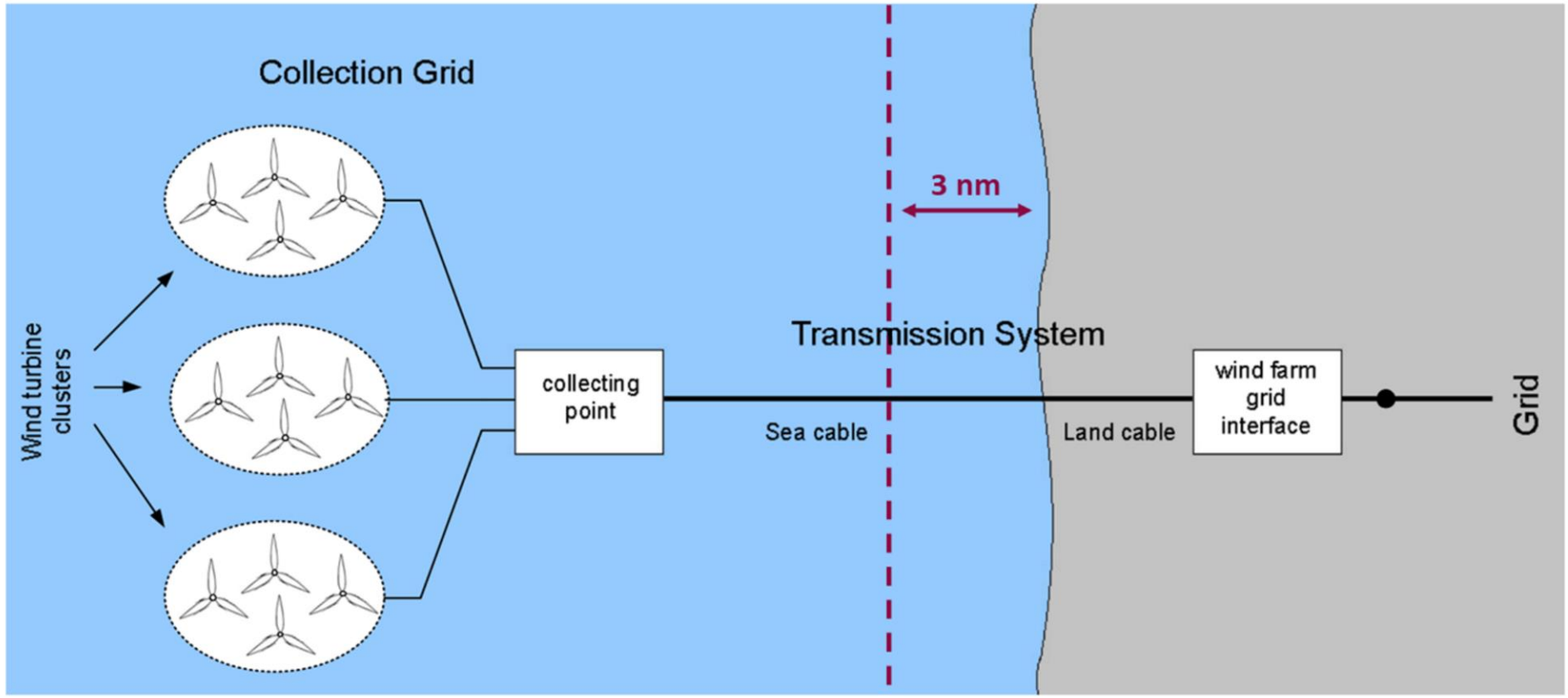
Complex system of rules and regulations governing the siting and permitting of energy resources and infrastructure offshore and on land.

Offshore Federal Waters

- Federal Jurisdiction—BOEM
- Consistency w/ State Territorial Sea Plan—DLCD

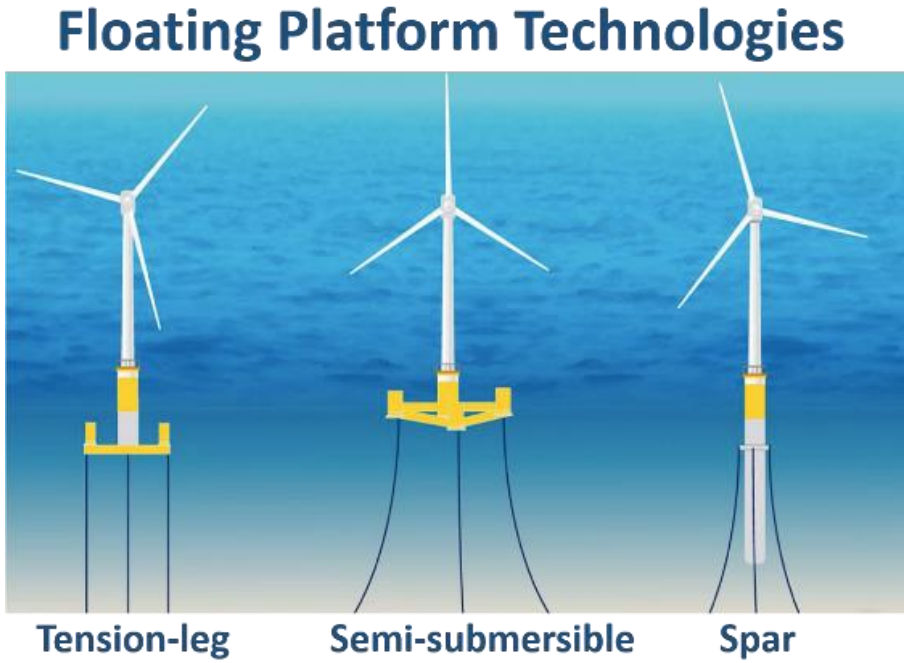
State Waters & Onshore

- Oregon Jurisdiction — DSL & OPRD
- Other Federal, State, Local Jurisdictions

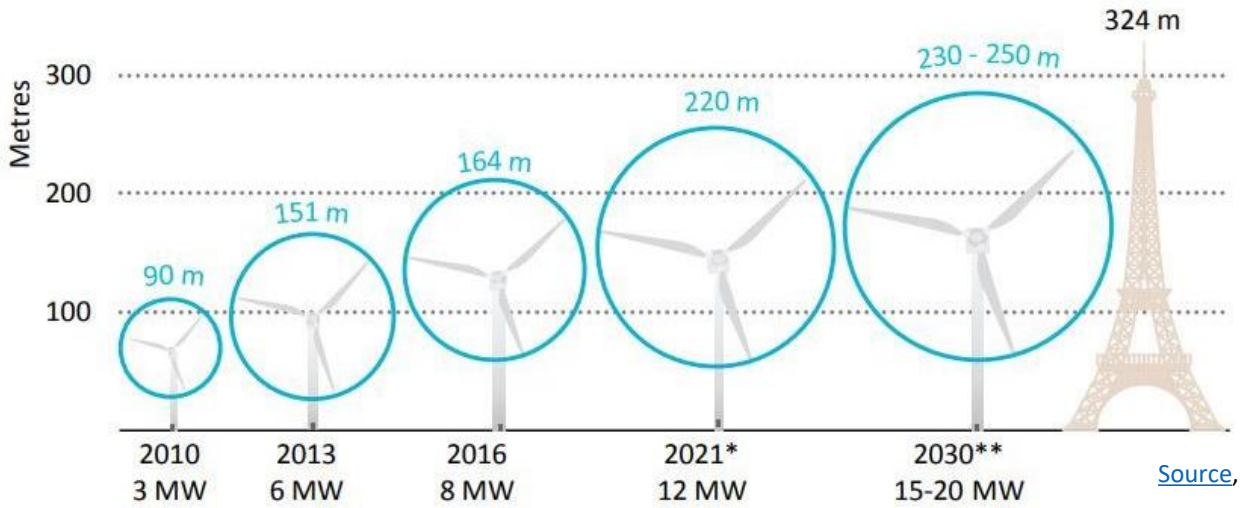


POTENTIAL CHALLENGES: TECHNOLOGY READINESS

Floating Platforms: Need for novel floating platforms, and new facilities to fabricate them, add significant capital costs.



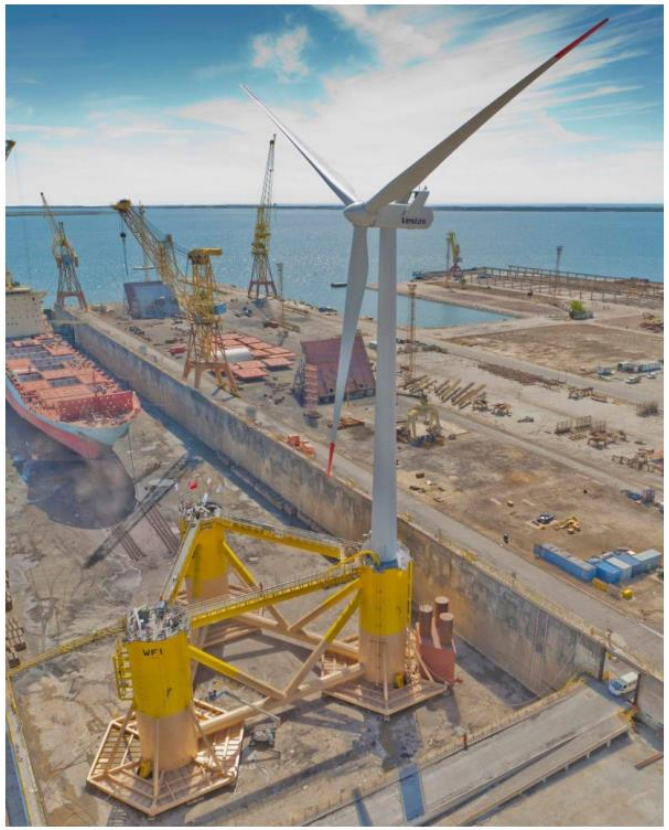
Larger Turbines: Proven technology with ongoing research and development to increase the size of turbines to drive reductions in the costs of energy.



Source, pg. 20

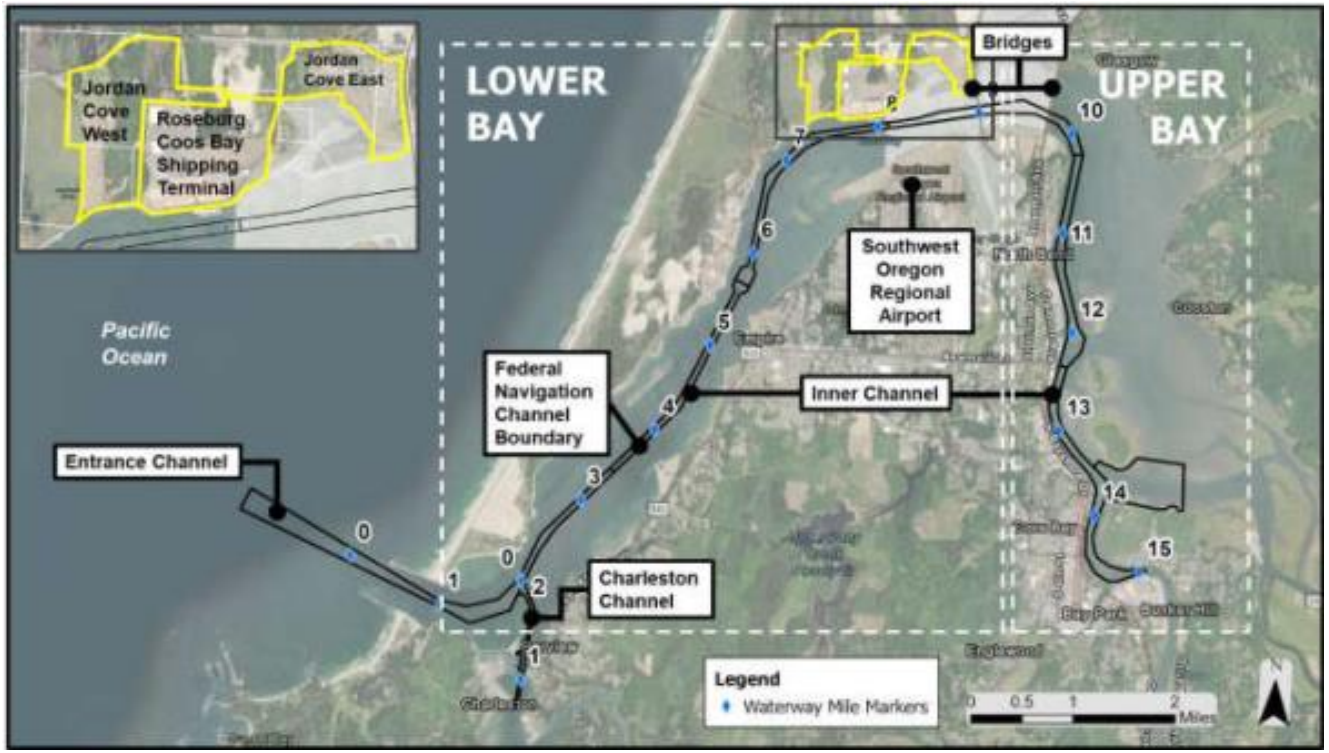
POTENTIAL CHALLENGE: PORT INFRASTRUCTURE

Port Upgrades: Need for costly upgrades to Oregon ports to support the construction, deployment, and maintenance of FOSW projects.



Source: BOEM Port Study, 2016

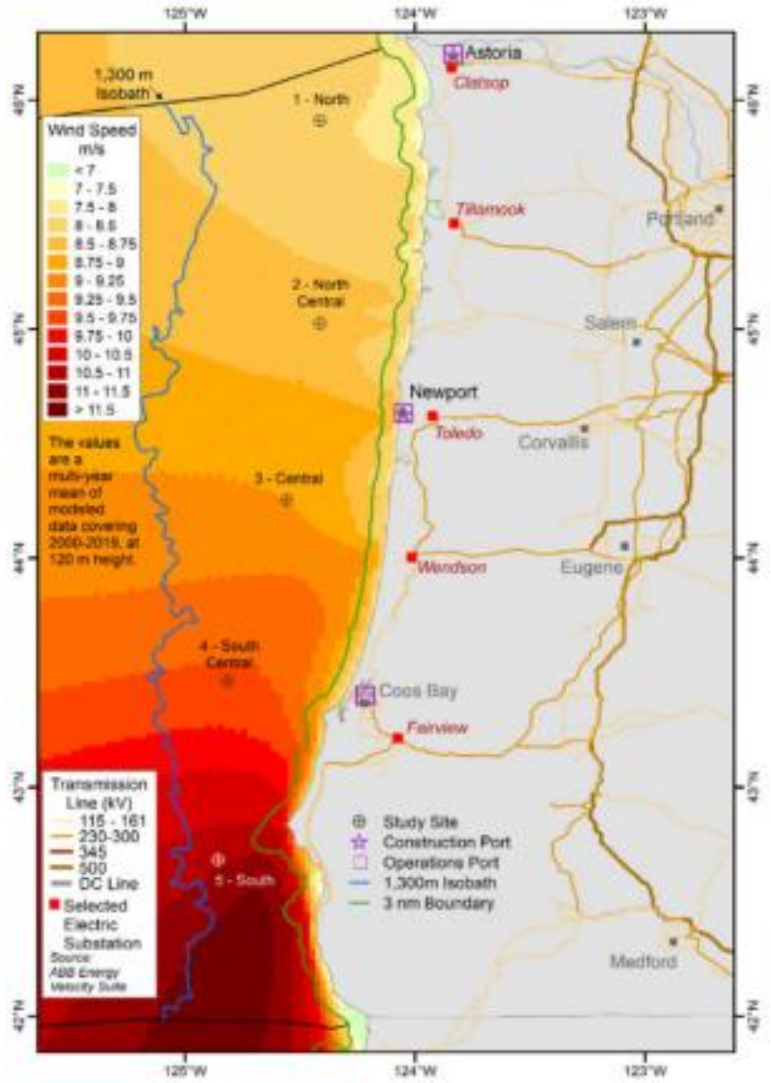
Candidate Oregon Port – Port of Coos Bay



Source: BOEM Port Study, 2016

POTENTIAL CHALLENGE: TRANSMISSION INFRASTRUCTURE

Transmission Expansion: Need for costly new offshore transmission and expanded onshore transmission.



POTENTIAL CHALLENGE: POWER OFFTAKERS

GW-scales likely necessary to attract investment are likely too large for near-term demand from Oregon offtakers alone.

- Cooperation Not Formalized: Oregon lacks a collective, state-wide planning process and is not part of a Regional Transmission Organization (RTO).
- Fragmented Planning: Bi-lateral markets make cooperative offtake challenging.
- Voluntary Cooperation: Multiple offtakers in bi-lateral markets is possible if utilities are flexible and cooperative in planning and procurement activities.

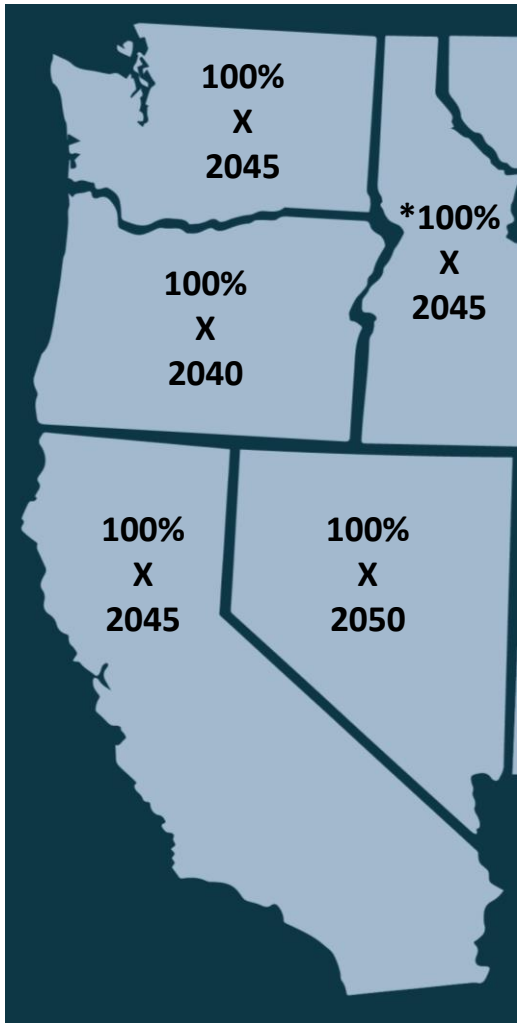
Source

PIECING IT ALL TOGETHER

Opportunities for Future Study and Engagement

- Additional Technical Studies Across Many Topics
- Comprehensive State Strategy & Planning
  - Tailored for Oregon and informed by similar planning in other states.
- Broad and Robust Engagement & Input
  - All interested parties - the public, local communities, Tribes, fishing and other coastal industries, interest groups, utilities, and state, regional, and federal entities.
- Expanded Regional Collaboration
  - To optimize opportunities for FOSW that best avoids and minimizes cumulative effects.

Regional States w/ 100% Clean Energy Targets



*Idaho Power & Avista Targets

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Thank You!

Contact information:

Jason.Sierman@energy.oregon.gov

Christy.Splitt@energy.Oregon.gov

Photo by Scottish Government