

**DOCKETED**

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# California Energy Commission

## Eli Harland



# Updates on Offshore Wind Activities

- **Assembly Bill 525 Strategic Plan**
- **Bureau of Ocean Energy Management (BOEM)**
  - NEPA/Environmental Review
  - Leasing
- **California Coastal Commission**
  - Consistency review of BOEM consistency determination:  
<https://www.coastal.ca.gov/upcoming-projects/offshore-wind/>
- **Integrated Resource and Transmission Planning**
  - CPUC, CAISO, CEC:
  - Assess within resource portfolios and in longer-term transmission outlooks
- **2021-2022 State Budget Investments**
  - Environmental research and synthesis
    - Ocean Protection Council
  - Tribal and stakeholder engagement
  - Infrastructure assessments and port upgrades
    - State Lands Commission
- **Governor Newsom's 2022-2023 Budget Proposal**
  - \$45 million proposed to support planning and design improvements at California waterfront facilities to support offshore wind deployment
  - \$4.1 million to support an interagency approach to meet the requirements of Assembly Bill 525



# **Assembly Bill 525 Strategic Plan for Wind Energy Offshore California and Establishing Offshore Wind Megawatt Planning Goals.**

Presenter: Rhett deMesa, Siting, Transmission, and Environmental Protection Division

Date: March 3, 2022



# Legislative Findings

- If developed at scale, offshore wind can:
  - Provide economic and environmental benefits.
  - Advance progress toward California's renewable and climate goals.
  - Diversify the state's energy portfolio.
  - Realize economic and workforce development benefits.
  - Contribute to renewable resource portfolio that can serve electricity needs and improve air quality in disadvantaged communities.
  - Offer career pathways and workforce training opportunities.
- Offshore wind should be developed in a manner that protects coastal and marine ecosystems.



# Assembly Bill 525 Requirements and Stakeholders

**June 1, 2022**

Assess and quantify maximum feasible capacity and establish megawatt planning goals

**December 31, 2022**

- 1) Preliminary assessment of economic benefits as they relate to seaport investments and workforce
- 2) Develop permitting roadmap

**June 30, 2023**

Develop Strategic Plan

## Strategic Plan Chapters:

1. Identification of sea space
2. Economic and workforce development and identification of port space and infrastructure
3. Transmission planning
4. Permitting
5. Potential impacts on coastal resources, fisheries, Native American and Indigenous peoples, and national defense, and strategies for addressing them

**Public Resources Code section 25991.6:** "... "stakeholders" includes, but is not limited to, fisheries groups, labor unions, industry, environmental justice organizations, environmental organizations, and other ocean users."



# Strategic Plan Priorities

- Emphasize and prioritize near-term actions to accommodate jobs and economic development.
- Strive for compatibility with harbor tenants and ocean users when considering port retrofits.
- Emphasize and prioritize actions to improve port infrastructure and support local workforce.
- In development of the strategic plan consult with representatives of labor organizations and apprenticeship programs.



# First Required Deliverable in AB 525

**By June 1, 2022 the CEC will:**

- 1) Evaluate and quantify the maximum feasible capacity of offshore wind to achieve reliability, ratepayer, employment, and decarbonization benefits
- 2) Establish megawatt offshore wind planning goals for 2030 and 2045





# Evaluating and Quantifying the Maximum Feasible Capacity of Offshore Wind

- National Renewable Energy Laboratory (NREL)
  - [2020 Offshore Wind Resource Assessment for the California Pacific Outer Continental Shelf](#), October 2020
  - [The Cost of Floating Offshore Wind Energy in California Between 2019 and 2032](#), November 2020
- U.S. Department of Energy
  - [Offshore Wind Energy Strategies](#), January 2022
  - [Offshore Wind Market Report: 2021 Edition](#)
- California Public Utilities Commission
  - [Attachment A: Modeling Assumptions for the 2021-2022 Transmission Planning Process](#), February 2021
  - [Decision Adopting 2021 Preferred System Plan](#), December 2021
- California Independent System Operator
  - [Draft 20-Year Transmission Outlook](#)
- [Schatz Energy Research Center](#)
- [California Offshore Wind: Workforce Impacts and Grid Integration](#), UC Berkeley Labor Center, September 2019



# Establishing Megawatt Offshore Wind Planning Goals

1. Findings from the Joint Agency 2021 SB100 Report
  2. Need to initiate long-term transmission and infrastructure planning
  3. Need for renewable energy to accommodate California's shifting peak load
  4. Generation profile of offshore wind off the coast of California
  5. Potential impacts on coastal resources, fisheries, Native American and Indigenous peoples, and national defense and strategies to address them
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6. Potential to attract supply chain manufacturing for components in the Pacific region
  7. Need for economies of scale to reduce costs of floating offshore wind
  8. NREL finding that California has 200 GW of offshore wind technical power potential
  9. Need to develop skilled and trained offshore wind workforce
  10. Availability of federal tax incentives
  11. Opportunity for California to participate in federal offshore wind megawatt goals
  12. Executive actions from the Governor



# 2021 Joint Agency SB100 Report

## Energy and Climate Goals:

- RPS – 60% by 2030
- Zero carbon resources for retail electricity sales by 2045
- Reduce GHG emissions to 40% below 1990 levels by 2030

## Key Findings:

- Includes 10 GW of OSW in 2045
- Need for sustained record setting build rates
- Diversifying resource portfolio could save \$1B annually
- Additional work is needed to understand the potential of emerging technologies including offshore wind.

**California**  
Clean Electricity Resources

	Existing Resources		Projected New Resources	
	2019*	2030**	2030**	2045**
Solar (Utility-Scale)	12.5 GW	16.9 GW	69.4 GW	
Solar (Customer)	8.0 GW	12.5 GW	28.2 GW	
Storage (Battery)	0.2 GW	9.5 GW	48.8 GW	
Storage (Long Duration)	3.7 GW	0.9 GW	4.0 GW	
Wind (Onshore)	6.0 GW	8.2 GW	12.6 GW	
Wind (Offshore)	0 GW	0 GW	10.0 GW	
Geothermal	2.7 GW	0 GW	0.1 GW	
Biomass	1.3 GW	0 GW	0 GW	
Hydrogen Fuel Cells	0 GW	0 GW	0 GW	
Hydro (Large)	12.3 GW	N/A†	N/A†	
Hydro (Small)	1.8 GW	N/A†	N/A†	
Nuclear	2.4 GW	N/A†	N/A†	



# Need for Long Term Planning - Transmission

## CPUC IRP

- 8.3 GW of Offshore Wind
  - Humboldt 1.6 GW
  - Morro Bay 2.3 GW
  - Diablo Canyon 4.4 GW

## CAISO 20 Year Outlook

- 10 GW of Offshore Wind
  - North Coast – 4 GW
  - South Central Coast - 6 GW
  - Study Includes Humboldt Call Area
  - Areas of Technical Potential on the North Coast
  - Morro Bay Call Area

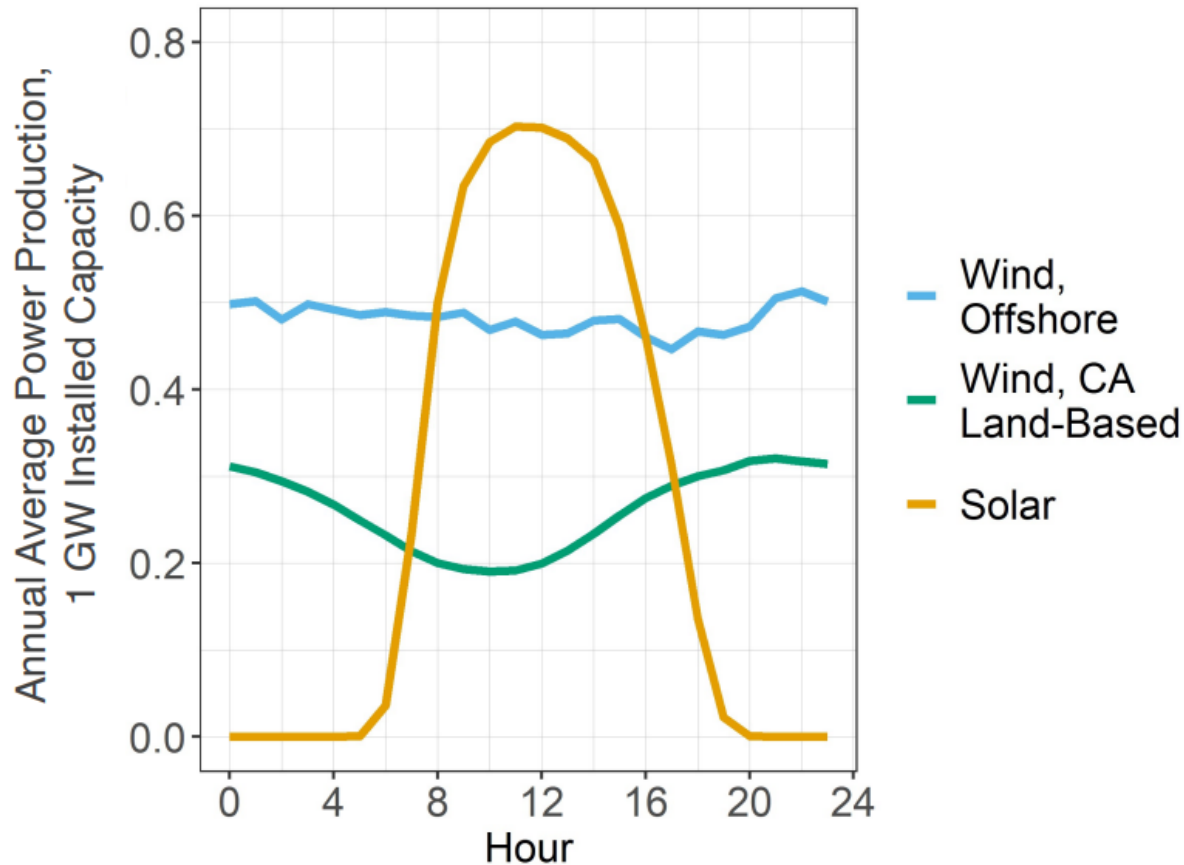
## Humboldt State University

### Humboldt Call Area:

- Evaluated project scenarios 30 MW to 1.86 GW
- 2030 estimated load
- Transmission upgrades required for fully deliverable



# California's Shifting Peak Load



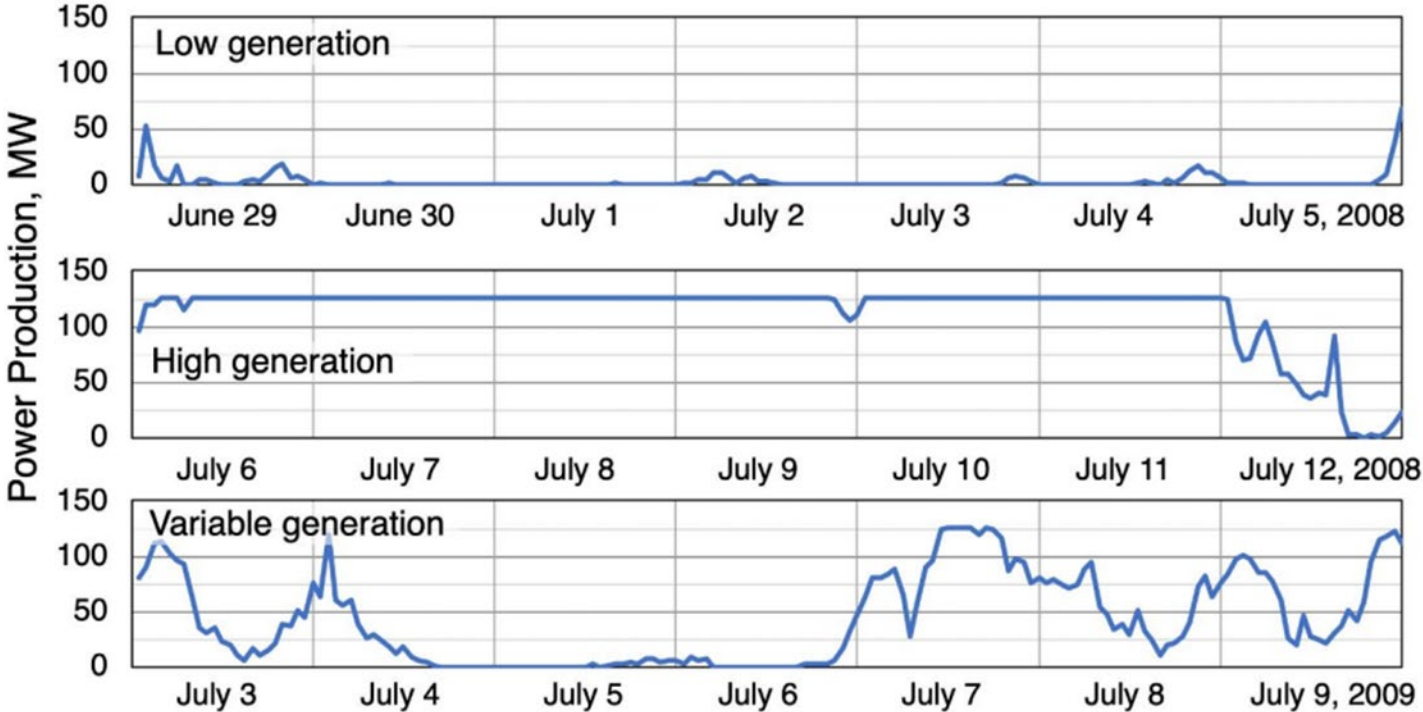
- California's daily peak load is shifting to later in the afternoon.
- Necessitates additional renewable resources that generate later in the day.
- On average offshore wind complements solar both daily and seasonally but can be variable.



# Offshore Wind Generation Profile

***Offshore wind resource are highly variable.***

Example of Variability in Offshore Wind Power Generation  
Profile Scenario for the Humboldt Call Area  
(Assuming 144 MW Nameplate Capacity)





# Potential Impacts to Consider and Address

**California Offshore Wind Energy Gateway**  
In support of the Intergovernmental Renewable Energy Task Force  
powered by DATA BASIN

Get Started | Explore | Create | Community | Workspace

What is the California Offshore Wind Energy Gateway?  
What can I do?  
How do I start exploring?

The Offshore Renewable Wind Energy Gateway assembles geospatial information on ocean wind resources, ecological and natural resources, ocean commercial and recreational uses and community values. This information will help identify areas off of California that are potentially suitable for wind energy generation. [read more](#)

California Marine & Coastal Energy | California Marine & Coastal Management | California Marine & Coastal Ecology and Natural Resources | California Marine Fishing and Traditional Uses

Featured Items

BOEM California Off-Shore Wind Call Areas

Download the Fact Sheet & Get Involved | Follow Progress

BOEM BUREAU OF OCEAN ENERGY MANAGEMENT | California Energy Commission

Requires the CEC to consider potential impacts to:

- Coastal resources
- Fisheries
- Native American and Indigenous peoples
- National defense

And strategies to address those impacts

California Offshore Wind Energy Gateway  
<https://caoffshorewind.databasin.org/>



# Coastal Resource Considerations

## Ocean Use

- Cultural Areas and Sacred Sites
- Fishing Industry Conflicts
- Visual
- Vessel Traffic
- Economic
- Military Training and Testing

## Environmental

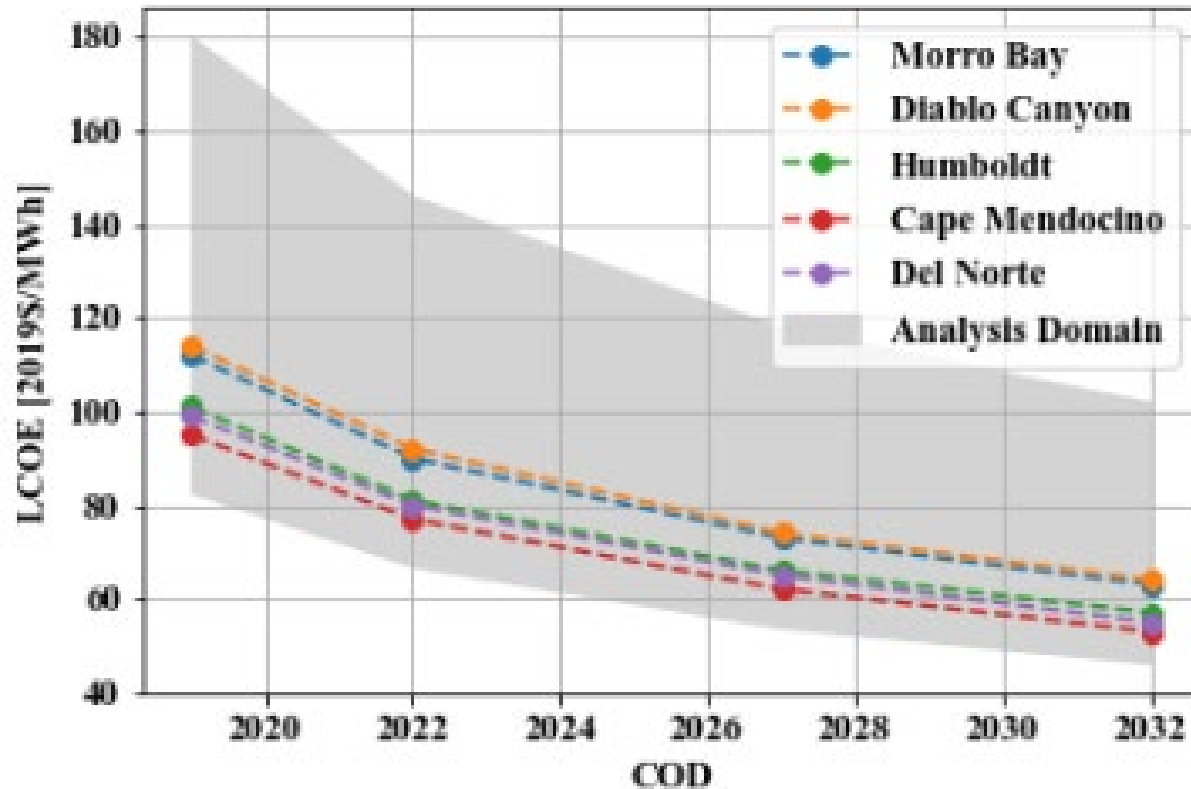
- Pelagic and Benthic Fish
- Marine Mammals
- Sea Turtles
- Marine Birds
- Seabed and Habitat Disturbance
- Water Quality
- Ocean Currents and Upwelling





# Attracting Supply-Chain Manufacturing and Reducing Costs Through Economies of Scale

Estimated LCOE trajectory between 2019 and 2032

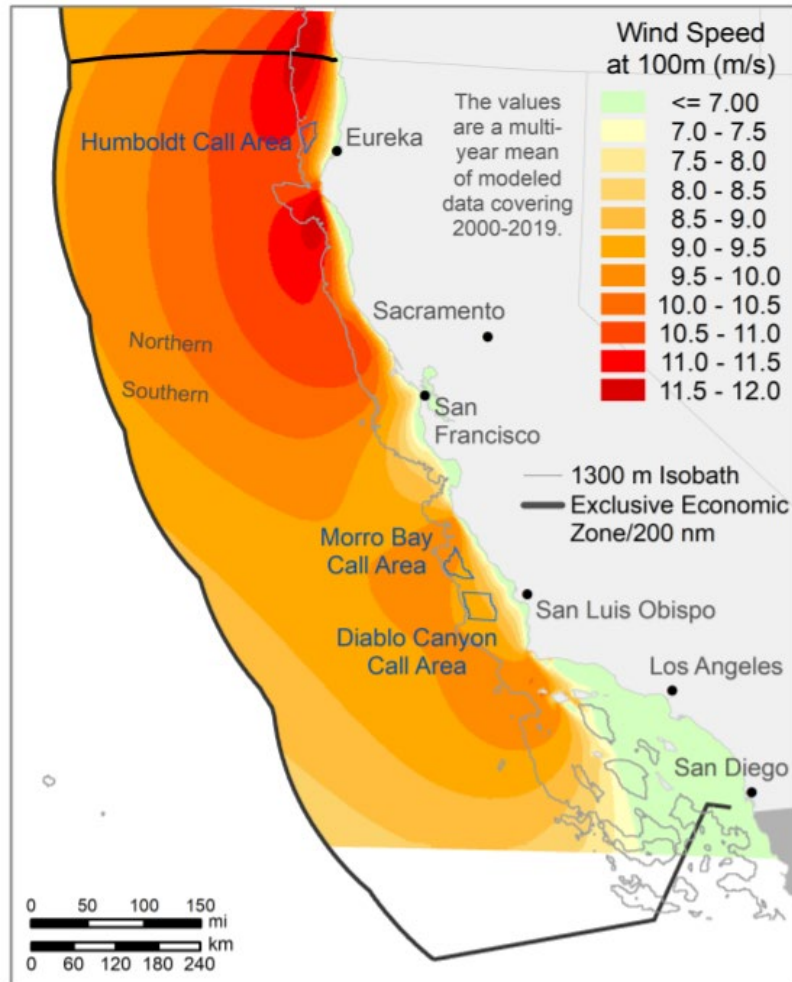


Levelized Cost of Energy (LCOE) is estimated to decline by as much as 44% by 2032 due to the following:

1. Turbine Upsizing
2. Economies of Scale and Efficiencies in Manufacturing
3. Technology Innovations



# NREL Report Finding on Technical Potential



Map: Mean annual wind resource

In 2020, NREL released an updated offshore wind resource data set finding California has a **201 GW of technical offshore wind power potential.**

Represents an increase from 150 GW technical power potential found in their 2016 assessment.

Source: 2020 Offshore Wind Resource Assessment for the California Pacific Outer Continental Shelf <https://www.nrel.gov/docs/fy21osti/77642.pdf>



# Developing a Skilled and Trained Workforce

Economic opportunity can be significant with supportive policies driving a robust offshore wind market.

California Workforce Development Board has funding available for construction apprenticeship programs.

	5 GW		18 GW	
	2035	2045	2035	2045
Direct Jobs	1,880	2,510	5,510	7,930
Indirect	1,035	1,220	2,920	4,595
Induced	1,224	1,567	3,541	5,261
<b>Total</b>	<b>4,139</b>	<b>5,297</b>	<b>11,971</b>	<b>17,786</b>
Construction	3,060	3,202	9,670	12,958
Operation	1,079	2,095	2,300	4,828
<b>Total</b>	<b>4,139</b>	<b>5,297</b>	<b>11,971</b>	<b>17,786</b>
% from construction	74	60	81	73

Sources:

- 1) California Offshore Wind: Workforce Impacts and Grid Integration, UC Berkeley Labor Center, September 2019
- 2) The California Offshore Wind Project: A Vision for Industry Growth, American Jobs Project, February 2019



# Need for Long-Term Planning – Port Infrastructure

## Key Study Findings:

- Existing ports would require major investments to expand and upgrade infrastructure and facilities.
- Upgrading facilities will require long-lead times.
- Multiple ports may be needed to support offshore wind activities.



Photo Source: Aker Offshore Wind

## Sources:

- 1) Determining the Infrastructure Needs to Support Offshore Floating Wind and Marine Hydrokinetic Facilities on the Pacific West Coast and Hawaii, BOEM, March 2016
- 2) Port Infrastructure Assessment Report, Schatz Energy Research Center, December 2020

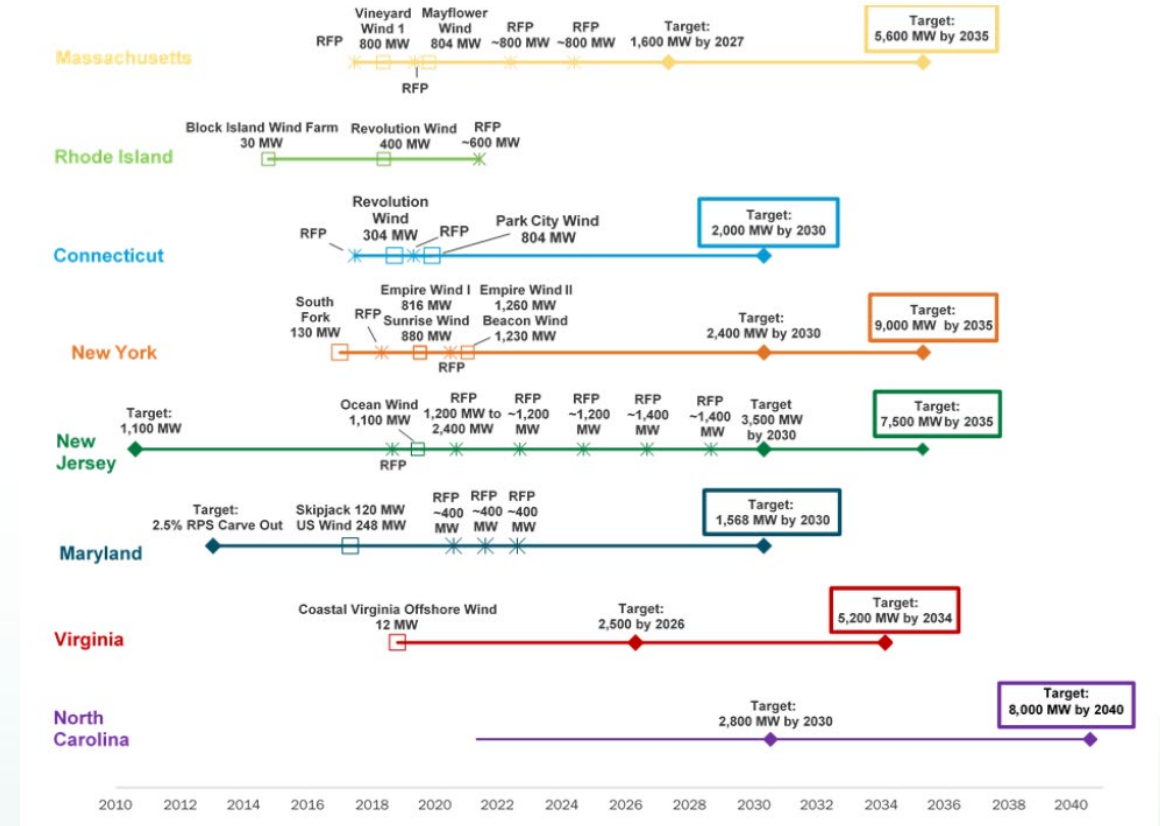


# Federal Tax Incentives and Opportunity to Contribute to the Federal Target

## Investment Tax Credit (Offshore wind provision)

- ✓ 30% investment tax credit
- ✓ Eligibility triggered by beginning physical construction OR investing 5% of the capital expenditure of a project by 2025
- ✓ In the IRP, ITC combined with other key offshore wind assumptions, reduces LCOE by 15 to 20 percent (capital and operating expense only)

## Procurement Targets By State



Current U.S. procurement activities and targets include 39 GW of offshore wind capacity by 2040.



# Considerations for Offshore Wind Planning Goals By the Numbers

- BOEM California Wind Energy could support **up to 4.6 GW**
- SB100 core scenario includes **10 GW** by 2045
- CPUC's preferred system planning identified **1.7 GW** by 2032
- CAISO's offshore wind sensitivity study assessed the cost of transmission upgrades to accommodate **8.3 GW** with the potential to increase the capacity to **21 GW**
- NREL report finding of **201 GW** of technical potential



# Next Steps

Continue to assess relevant information and have a public process to evaluate and quantify the maximum feasible capacity of offshore wind to achieve reliability, ratepayer, employment, and decarbonization benefits and establish megawatt offshore wind planning goals for 2030 and 2045.

Milestone	Key Dates
Workshop Comments Due	March 11, 2022
Release Public Review Draft	Proposed release in the second quarter of 2022
CEC Adoption	By June 1, 2022



**Thank You**

