

# Offshore Wind and Birds

SUMMARY AND  
RECOMMENDATIONS  
FOR POLICYMAKERS



Audubon

# Introduction

## Audubon's core mission—to protect birds and their habitats—is informed by the best available science, and the science is clear.

Two-thirds of bird species in North America will face extinction unless we tackle climate change. That is why Audubon supports the swift deployment of diverse renewable energy resources to decarbonize the economy and stabilize the climate. The projected environmental and economic impacts of climate change on coastal ecosystems and human communities are particularly staggering. Rising sea-levels, increasingly severe storms, marine heat waves, and ocean acidification are already affecting birds and people. At the same time, a number of factors are increasing our national electricity demands. Investments in manufacturing and industrial facilities, data centers, and the use of AI have sparked this rapid growth. To meet these demands and ensure reliability, the U.S. must rapidly grow its energy and storage portfolios, and modernize and expand our grid.

The expeditious deployment of offshore wind offers a critical opportunity to quickly decarbonize our economy. Because the open ocean provides consistently high windspeeds, offshore wind has the potential to provide a steady supply of significant amounts of energy near large populations. By utilizing offshore wind to supply 10 to 25 percent of national electricity demand, the U.S. can feasibly reach net-zero greenhouse gas emissions economy-wide while supporting high levels of electrification for vehicles and other mobile emissions sources.<sup>1</sup> Such an investment would not only reduce emissions dramatically but could create as many as 390,000 jobs by 2050.<sup>2</sup> To meet this goal, the U.S. would only need to utilize 10% to 13% of its total estimated offshore wind capacity (not including the Great Lakes).

Yet, despite this potential, offshore wind energy buildout in the U.S. is still in early stages, and we are far behind the global leaders in production. As of 2023, China leads the world with over 31 GW of operating offshore wind capacity, followed by the United Kingdom at 14.7 GW.<sup>3</sup> Conversely, there are only three operational wind projects in U.S. waters to date which collectively produce approximately 0.174 GW. There is, however, an ambitious planning process underway and over the next 10 years, there will be exciting new projects in every ocean. To meet our offshore wind targets in a manner that protects birds and people, we must have planning processes and policies that are informed by science and the voices of

local communities. With this opportunity in mind, Audubon is working with regulators, developers, and state and federal lawmakers to ensure the development of offshore wind proceeds efficiently and is safe for birds.

Responsible wind energy development addresses the potential risks that development poses to birds by employing a four-element mitigation hierarchy that first avoids, then minimizes, then offsets, and ultimately monitors impacts on birds and other wildlife. The overarching goal of this layered approach is to have no net impact; in other words, we seek to prevent a decrease in seabird populations or, best case scenario, promote an increase. [Our full report](#) examines the risk of bird collisions with wind turbines, loss of habitat if birds are displaced from feeding areas or must fly around project areas, and the potential for development to alter ocean ecosystems that provide food for birds. In summary table found on page 2 of this document, where applicable, each policy recommendation is labeled to indicate where in the mitigation hierarchy it falls.

In addition to working directly with offshore wind regulators and developers on siting, construction, and operations that avoid and minimize bird impacts, Audubon recognizes that policy improvements are required to speed the rate of offshore wind deployment, create regulatory certainty for developers, and foster community support for offshore wind projects, all while ensuring adequate protections for vulnerable bird species and the habitats on which they depend.

Audubon is actively engaged with state and federal lawmakers, Governors, regulatory agencies, other conservation organizations, utilities, clean energy developers, and other decision makers to promote policy priorities with the goal of quickly increasing bird-friendly offshore wind infrastructure deployment. This companion document provides a comprehensive set of policy recommendations based on Audubon's findings and the general recommendations provided in our main report. These recommendations are also outlined in a summary table detailing which recommendations apply to Congress, federal agencies, or state and local governments. Through this document, we hope to provide meaningful and actionable recommendations that can inform the work of industry, agencies, and legislators as they work to deploy responsibly-sited offshore wind energy.

## Policy Recommendation Summary Table

PAGE	POLICY RECOMMENDATION	LEGISLATIVE	ADMINISTRATIVE	STATE	PRIMARY MITIGATION HIERARCHY MECHANISM (IF APPLICABLE)
<b>7 PROMOTING DESIGN AND OPERATION THAT IS BETTER FOR BIRDS</b>					
	Develop and subsequently require offshore wind lease holders to adhere to a set of standard best management practices (BMPs) to avoid and minimize impacts on birds from the placement, construction, and operation of offshore wind turbines.	•			 Minimize
	Require the use of the best available perching deterrents to avoid bird presence at offshore wind infrastructure.	•			 Minimize
	Create light abatement standards for offshore wind infrastructure operation.	•			 Minimize
	Require the use of the best available technologies to reduce rotor collision risks.	•			 Minimize
	Additional research into project-scale repowering.	•	•		 Minimize
	Require the use of turbine micro-siting whenever possible.	•	•		 Avoid
<b>8 IMPROVING MONITORING OF WILDLIFE IMPACTS FROM OFFSHORE WIND PROJECTS</b>					
	Additional funding for the research, design, and deployment of the latest collision detection and bird monitoring technologies for offshore wind technologies.	•	•		 Monitor
	Require turbine developers to integrate the latest collision detection technologies into wind turbine designs and appropriately apply data collected from these technologies.	•	•		 Monitor
	Require consistent and transparent public reporting of known bird and wildlife mortality events.	•	•		 Monitor
	Increase NOAA fleet capacity to address the greatly increased demand for marine resource surveys that arise from offshore wind energy development.	•			 Monitor
	Require early publication of working papers from federal research into the latest collision detection and bird monitoring technologies ahead of peer review.	•	•	•	 Monitor
	Create a federal pilot program in which state and Tribal governments receive funding to help facilitate monitoring of offshore wind leases.	•	•	•	 Monitor
<b>9 INCREASING INVESTMENT IN RESEARCH, MITIGATION STRATEGIES, AND NET CONSERVATION GAINS FOR BIRDS</b>					
	Develop mitigation programs aimed at seabirds impacted by offshore wind infrastructure.	•	•	•	 Offset
	Provide targeted funding for research and pilot programs to develop smart, region-specific curtailment models that incorporate data from offshore bird detection radars and real-time weather forecasts.	•	•		 Minimize

PAGE	POLICY RECOMMENDATION	LEGISLATIVE	ADMINISTRATIVE	STATE	PRIMARY MITIGATION HIERARCHY MECHANISM (IF APPLICABLE)
	Increase funding for research, design, and deployment (RD&D) of floating wind turbines and other innovative designs that can be deployed further out to sea.	•			 Avoid
	Provide additional funding for research into technologies and materials that can extend the useful lifetime of offshore wind turbines beyond their current 20-25 year lifespan.	•	•		 Minimize
	Produce a public report on the end-of-life of offshore wind turbines and the decommissioning process, including options for recycling and reuse of turbine materials.	•	•		 Minimize
	Make permanent the renewable energy biologist positions in USFWS that are currently temporarily-funded through the Inflation Reduction Act.	•	•		 Minimize
	Increase funding for studies to expand our knowledge of offshore wind's impact on birds.	•			 Monitor

## 10 PREPARING STATES FOR THE MAGNITUDE OF OFFSHORE WIND DEVELOPMENT

States should continue to establish concrete goals for offshore wind production.	•		
States should develop offshore wind and transmission authorities to coordinate permitting and planning for these resources alongside relevant utility companies. In addition, federal funds should be made available to help states develop these authorities.	•	•	
State governments should establish shared best management practices for the disposal, recycling, and management of environmental impacts from offshore wind infrastructure at the end of its useful life.		•	 Minimize
Federal agencies should regularly convene state governments to facilitate learning of best practices for community engagement, planning, and effective permitting, integration, and siting of offshore wind energy.	•	•	
The federal government should provide funding to promote the creation of regional hubs for offshore wind development.	•		

## 11 IMPROVING SITING AND PERMITTING FOR OFFSHORE WIND

Codify a national offshore wind permitting target.	•		
Conduct planning area impact studies that examine the cumulative impact on human, marine, avian, and coastal environments of offshore wind development in a planning area before issuing a draft area identification memo.	•	•	 Avoid
Formally consider community benefits offered by offshore wind developers as a part of the leasing process.	•	•	
Provide increased funding to facilitate timely and effective environmental reviews of offshore wind projects.	•		 Avoid

PAGE	POLICY RECOMMENDATION	LEGISLATIVE	ADMINISTRATIVE	STATE	PRIMARY MITIGATION HIERARCHY MECHANISM (IF APPLICABLE)
	Create an Offshore Renewable Energy Coexistence Fund.	●			 Offset
	Formally consider community benefit agreements in the environmental review process.	●	●		 Offset
	Increase funding to help affected communities participate in the offshore wind permitting process.	●		●	
	Increase funding for regional ocean partnerships (ROPs).	●			
	Increase the use of programmatic environmental impact statements (PEIS) under NEPA for projects located near each other.			●	 Avoid
	Designate Tribes as cooperating Tribal Governments at the outset of the permitting process.			●	
	Establish a dedicated BOEM Tribal advisory group to facilitate meaningful engagement and collaboration between BOEM and tribal representatives throughout the planning and permitting process.			●	
	Establish and implement co-stewardship guidelines in accordance with Joint Secretarial Order 3403.			●	
<b>13</b>	<b>PROMOTING INTEROPERABILITY AND IMPROVING TRANSMISSION INFRASTRUCTURE FOR OFFSHORE WIND PROJECTS</b>				
	Incorporate BOEM into the National Interest Electric Transmission Corridors (NIETC) designation process in collaboration with the Department of Energy.	●		●	
	Establish a program at the Department of Energy to standardize the interoperability of equipment used in offshore transmission networks across projects and between land-based and offshore electric energy transmission systems.	●		●	
	Update existing statute to clarify the authority to issue offshore rights-of-way for transmission cables within a NOAA National Marine Sanctuary.	●			
	Direct states that have not already done so to evaluate the incorporation of offshore wind onto their grid systems.	●		●	 Minimize
	Require coastal states and regional transmission organizations to regularly identify interconnection points for planned and future offshore wind development.	●	●	●	 Minimize
	Increase funding for marine transmission R&D.	●		●	 Minimize
	Maintain funding from the Inflation Reduction Act for the Department of Energy's Grid Deployment Office (GDO) to facilitate interregional and offshore wind electricity transmission planning, modeling, and analysis.	●			

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<b>14</b>	<b>CREATING REGULATORY AND FINANCIAL CERTAINTY FOR OFFSHORE WIND PROJECTS AND DEVELOPERS</b>				
	Maintain investments made in offshore wind infrastructure made through the Inflation Reduction Act and provide consistent regulatory guidance on their implementation.	●		●	
	Repeal unnecessary statutes that tie offshore wind development to offshore oil and gas development.	●			
	Ensure state governments and coastal communities benefit from offshore wind royalties.	●			
	Continue publishing five-year leasing plans that are updated on a regular basis to provide long-term certainty to the offshore wind industry as well as state, local, and Tribal governments and other interested parties.			●	
	Increase federal funding for registered apprenticeships for skilled positions that meet existing and future needs from the offshore wind industry.	●			
	Conduct regular assessments of offshore wind workforce gaps and needs to help target federal and state workforce investments.	●	●	●	
	Incentivize the development of a domestic offshore wind workforce alongside new leases.	●	●		
	Establish grant programs to support the expansion, modernization, and establishment of shipyards and other manufacturing facilities needed for the domestic production of offshore wind vessels.	●		●	
	Examine whether intellectual property requirements in federal grant and loan programs for offshore wind and related technologies disincentivizes industry participation in the programs.	●	●		
	Provide additional guidance on the process for potential repowering of offshore wind projects. This should be complemented by specific funding for research on the unique challenges and environmental disruptions that repowering may pose in the offshore context.	●	●		

# Audubon's Policy Recommendations for Developing the Offshore Wind Birds Need

## Promoting Design and Operation that is Better for Birds

As offshore wind infrastructure is deployed, it is essential that it is designed and operated with birds in mind. Through the Department of Energy's Wind Energy Technology Office (WETO), California Energy Commission, the Regional Wildlife Science Collaborative for Offshore Wind, and other agencies, there is ongoing research into real time monitoring of direct and indirect avian impacts from offshore wind, as well as techniques and technologies to mitigate, minimize, and avoid these impacts. However, many low-cost strategies for reducing avian impacts from offshore wind already exist and have been successfully implemented by a handful of offshore wind developers across the world. As highlighted in Section 2.4.3 of our report, these include strategies to eliminate factors that attract birds to turbines, increase the visibility of the rotor blades, and change the operation schedule of turbines to reduce risk during critical periods. Audubon supports policies that encourage the adoption of these best management and technology practices as regionally appropriate and continue to prioritize the need for real time monitoring for collision and displacement of birds by offshore wind at both the state and federal level. Likewise, Audubon encourages state agencies to urge adoption of these best management and technology practices when making siting recommendations to the Bureau of Ocean Energy Management (BOEM).

### Specific policies to support this goal include:

- Develop and subsequently require offshore wind lease holders to adhere to a set of standard best management practices (BMPs) to avoid and minimize impacts on birds from the placement, construction, and operation of offshore wind turbines.** This set of BMPs should embrace adaptive management strategies that allow BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) to include operational adjustments that are reasonable, cost-effective, and include advances in detection and avoidance technology. As highlighted in Section 2.4.3 of our full report, there are several existing strategies for designing the layout of turbines within a wind project to reduce the impact of barrier effects and displacement, as well as strategies to reduce vessel and noise-related disturbances during construction. Topics for BMPs should include avoiding and minimizing impacts from displacement during construction, disturbances from construction vessel traffic, turbine attraction, and collisions. Ideally the process for the creation of these BMPs would be led by agency staff from BOEM and USFWS, with input from relevant industry experts, state agencies, federal agencies, and wildlife experts.

- Require the use of the best available perching deterrents to avoid bird presence at offshore wind infrastructure.** As discussed in Section 2.1.1 of our full report, bird presence at offshore wind infrastructure can be problematic to the safe operation of the turbines and can increase collision risks for marine birds attracted to the infrastructure. BOEM, U.S. Fish and Wildlife Service (USFWS), and other appropriate agencies should assess existing, commercially available deterrents, including visual, auditory, and physical obstruction devices, and create binding BMPs for their use. Standards should also consider the use of auditory and visual proximity alarms to alter flight paths of birds and other wildlife away from wind turbines. More on anti-perching devices can be found in Section 2.4.3 of our full report.

- Create light abatement standards for offshore wind infrastructure operation.** Lights can attract birds to offshore wind infrastructure, increasing the likelihood of avian collisions. As highlighted in Section 2.4.3 of our full report, lighting on or around turbines should be Federal Aviation Administration (FAA) compliant, reduced to a minimum, and utilize bird-friendly practices. BOEM, BSEE, and USFWS, in coordination with FAA, should develop new standards for offshore wind infrastructure to reduce to the maximum extent possible any direct and all-white light illumination around offshore wind infrastructure. These standards should take into account the latest research on light attraction for bird species. For instance, research suggests that all light sources used offshore should be restricted to a minimum, but if lighting is needed, blinking light is preferred over continuous light, and if continuous light is required, then red light should be the standard.<sup>4</sup> Wherever appropriate, standards should require the use of FAA-approved aircraft detection lighting systems that turn on lights when approaching aircraft enter the area.<sup>5</sup>

- Require the use of the best available technologies to reduce rotor collision risks.** When moving at high velocities, wind turbine blades can present as transparent due to motion smear at the tips of the rotors. Adjustments to speed when birds are detected in the area, as well as designs that utilize achromatic, high-contrast patterns or ultra-violet visible paint, can reduce collision risk. BOEM and USFWS should develop binding BMPs for the design and operation of offshore wind rotors to reduce bird impacts; these BMPs should take into account geographic and species differences across the outer continental shelf (OCS).

- Additional research into project-scale repowering.**

As new, more efficient offshore wind turbines become available, it may be possible to use fewer turbines within

the larger overall footprint of an existing wind project, thereby reducing risks to birds and other wildlife. The Department of Energy (DOE) and USFWS should conduct additional research into the repowering of offshore wind at the project-scale and into the potential wildlife benefits from repowering. As necessary, Congress should direct additional funds to support this research.

- **Require the use of turbine micro-siting whenever possible.** Micro-siting involves the use of rated collision hazards maps to relocate or rearrange wind turbines to reduce fatalities of target species. When appropriate, micro-siting may help reduce impacts to birds from offshore wind energy development. BOEM and USFWS should work in coordination with developers, relevant state agencies, and local governments to facilitate micro-siting for areas where avoidance of certain bird species at risk of collision may not be possible.

## Improving Monitoring of Wildlife Impacts from Offshore Wind Projects

Compared to land-based wind energy, monitoring avian and other wildlife impacts from offshore wind infrastructure poses unique challenges. While direct monitoring of all bird activity in near offshore wind infrastructure is not practical or economic, new monitoring techniques continue to be developed to help better quantify impacts, including avian mortalities from collisions, avoidance behaviors, perching behaviors, and changes in other behaviors. Policies should be enacted to encourage best practices for bird monitoring, and additional research is needed to further improve monitoring and bird detection technologies around offshore wind infrastructure. Further, as appropriate, the federal government should explore opportunities to incorporate partnerships with state, local, and Tribal governments to supplement monitoring activities for offshore leases.

### Specific policies to support this goal include:

- **Additional funding for the research, design, and deployment of the latest collision detection and bird monitoring technologies for offshore wind technologies.**

This should include funding for pilot programs through which industry and regulators can jointly assess the efficacy and feasibility of new monitoring technologies. Federal funding for research should be directed to DOE's WETO, USFWS, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS).

- **Require turbine developers to integrate the latest collision detection technologies into wind turbine designs and appropriately apply data collected from these technologies.** In addition to incorporating the latest technologies, BOEM, in coordination with USFWS, should work to standardize methodology for using new collision monitoring technologies across all projects in U.S. waters to: (1) incorporate mortality data, and, where relevant,

displacement data, into ongoing cumulative effects assessments and adaptive management strategies; (2) validate collision risk models; and (3) measure impacts on Endangered Species Act-listed species and other protected species by augmenting tracking data with data from on-site detection technology.

- **Require consistent and transparent public reporting of known bird and wildlife mortality events.** Misinformation about offshore wind turbines threatens the public acceptance and long-term viability of projects in U.S. waters. Increased transparency about bird and other wildlife mortality events will both help researchers understand actual threats infrastructure posed by offshore wind turbines to specific species and help dispel myths about the impacts of offshore wind projects. This data will also help research to improve emerging collision risk models (see Section 2.6 of our full report), eventually reducing the need for high-resolution monitoring at all projects. USFWS and BSEE should require this data collection and reporting. As appropriate, state agencies may also work to increase consistent and transparent reporting.
- **Increase NOAA fleet capacity to address the greatly increased demand for marine resource surveys that arise from offshore wind energy development.** NOAA currently operates a fleet of 15 research and survey vessels focused on a wide array of activities, including aiding maritime commerce and safe navigation, studying marine life and ocean conditions, and conducting meteorological observation and sensor deployment. As the U.S. looks to deploy additional offshore wind capacity, far more vessels will be required to conduct timely surveys and research on potential obstacles for deployment and environmental impacts from new infrastructure. Audubon urges Congress to significantly invest in additional fleet capacity, beyond the planned additional vessels laid out in the most current NOAA Fleet Plan.
- **Require early publication of working papers from federal research into the latest collision detection and bird monitoring technologies ahead of peer review.** As the offshore wind energy footprint quickly expands, peer review will be a critical step in the vetting of academic research. It is important that the best and latest technologies can be tested and deployed as soon as possible. To help facilitate the rapid adoption and field testing of emerging technologies, Congress and state legislatures should direct government agencies conducting research on monitoring technologies, such as new radar systems for bird detection, to release research working papers ahead of the peer review process.
- **Create a federal pilot program in which state and Tribal governments receive funding to help facilitate monitoring of offshore wind leases.** While the primary responsibility for the monitoring of offshore wind leases must rest with

federal agencies, there may be additional efficiencies gained by utilizing partnerships with state and Tribal governments to monitor offshore wind projects off their coasts for specific impacts. In addition to potentially expanding capacity for real-time monitoring, involvement of state and Tribal governments in monitoring may help improve community outreach efforts and ensure regular government-to-government coordination even after the offshore wind infrastructure is installed. As such, Congress should fund a pilot program through BOEM to provide grants to Tribal and state governments for certain monitoring activities.<sup>6</sup> Congress should require at least half of the grants awarded through this program go to Tribal governments.

### **Increasing Investment in Research, Mitigation Strategies, and Net Conservation Gains for Birds**

Mitigation of impacts on avian and other wildlife populations from offshore wind infrastructure poses a unique set of challenges. Funding is needed to develop additional mitigation strategies for bird populations where direct impacts from offshore wind infrastructure is not otherwise avoidable. Likewise, funding should be increased for research into offshore wind technologies and designs that can help reduce the impacts on wildlife and birds. Funding for research should also target enhancements of offshore wind infrastructure that can improve turbine efficiency and reduce energy loss, thus minimizing the overall footprint of offshore wind turbines needed to meet our clean energy goals. A full list of suggested topics for federal and state research can be found in Section 2.6 of our full report.

#### **Specific policies designed to support this goal include:**

- **Develop mitigation programs aimed at seabirds impacted by offshore wind infrastructure.** These programs should direct habitat restoration work that supports birds affected by offshore wind projects. Projects could include management activities that augment populations, including the translocation of chicks to establish new colonies at different locations; construction of artificial nests and burrows to increase breeding population size; protection of breeding sites by wardens; and eradication or other control measures aimed at nest predators. While mitigation activities should be coordinated across jurisdictions, state and federal legislators and agencies should consider establishing programs targeted at mitigation for impacted seabirds.
- **Provide targeted funding for research and pilot programs to develop smart, region-specific curtailment models that incorporate data from offshore bird detection radars and real-time weather forecasts.** Curtailment or the temporary cessation of turbines can be a highly effective strategy to reduce the risk to birds, especially during high-risk scenarios, such as high-density nocturnal migration events. However, additional data and modeling is needed to accurately inform the timing and duration of curtailment

to improve the strategy's impact and cost-effectiveness. As stated in Section 2.6 of our full report, additional research to inform curtailment should also include research into nocturnal migration flight altitudes and the development of tracking technologies that can capture fine-scale bird movements for smaller species.

- **Increase funding for research, design, and deployment (RD&D) of floating wind turbines and other innovative designs that can be deployed further out to sea.** In particular, Congress should increase funding for the U.S. Floating Offshore Wind Shot, a research initiative led by the DOE. RD&D should focus not only on the economic viability of these turbines, but also on the species impacts from their deployment at distances far from the coast.
- **Provide additional funding for research into technologies and materials that can extend the useful lifetime of offshore wind turbines beyond their current 20-25 year lifespan.** Reducing the turnover of offshore wind turbines and projects reduces the need for potential disruptions within the coastal environment, including from the decommissioning of existing turbines, construction of new turbines to replace the power generation, and other related activities. This is also important in the context of the climate crisis, as increasingly extreme weather will cause harsher conditions for offshore wind turbines and related infrastructure.
- **Produce a public report on the end-of-life for offshore wind turbines and the decommissioning process, including options for recycling and reuse of turbine materials.**<sup>7</sup> The report should be produced by BSEE, in coordination with BOEM and DOE, and should provide information on the ongoing efforts to improve wind turbine end of service and recycling funded by the Bipartisan Infrastructure Law, including research conducted by the National Renewable Energy Laboratory (NREL) and the wind turbine materials recycling prize contest launched by WETO.<sup>8</sup> If necessary, Congress should require this report with the goal of informing how federal resources may be leveraged to improve the sustainability of offshore wind turbines and the decommissioning process.
- **Make permanent the renewable energy biologist positions in USFWS that are currently temporarily-funded through the Inflation Reduction Act (IRA).** The IRA includes several measures to help bolster the domestic offshore wind industry and improve research and permitting activities at relevant agencies. In particular, funding for additional USFWS renewable energy biologist positions through this law has been tremendously helpful in helping us better understand the interactions between offshore wind infrastructure and vulnerable birds and wildlife. Unfortunately, these positions are funded for only three years. Congress should increase funding to maintain these positions after the three-year funding expires. In the

absence of additional funding, Audubon urges USFWS, as appropriate, to maintain these positions using general program funds.

- **Increase funding for studies to expand our knowledge of offshore wind's impact on birds.** As the area considered for offshore wind energy leasing expands, so will the need for additional studies to support BOEM's decision-making under the Outer Continental Shelf Leasing Act (OCSLA), National Environmental Policy Act (NEPA), and other relevant statutes. BOEM's Environmental Studies program has the potential to provide baseline and impact studies related to offshore wind energy areas and leasing blocks across all Outer Continental Shelf (OCS) regions. As such, Congress should significantly increase funding for BOEM's Environmental Studies program.

## Preparing States for the Magnitude of Offshore Wind Development

While the vast majority of offshore wind energy currently planned or in operation is located in the portion of the OCS under federal jurisdiction, states play an important role in the deployment, development, and ultimate success of offshore wind energy. Over the last two decades, state legislatures and governors have demonstrated consistent leadership in developing policy supports and planning processes that facilitate the rapid deployment of offshore wind, while maintaining robust environmental protections and community engagement. Examples such as New York's Offshore Wind Master Plan developed by New York State Research and Development Authority (NYSERDA) and planning carried out by Massachusetts' Clean Energy Center provide one template in which a single agency can successfully site and coordinate a state's offshore wind deployment. However, as more states work to build their offshore wind industry, new and innovative models for offshore wind deployment tailored to each state's unique needs and regulatory environment are sure to emerge.

Likewise, additional resources will be necessary across all states to ensure effective and efficient siting, permitting, and deployment of infrastructure supporting offshore wind facilities both in and out of the water. The federal government can help states speed up the responsible deployment of offshore wind energy.

### Policies that could help support this goal include:

- **States should continue to establish concrete goals for offshore wind production.** The United States has tremendous untapped offshore wind energy potential. As noted in Section 1 of our full report, the DOE estimates the nation's total feasible offshore wind capacity to be twice the combined generating capacity of all U.S. electric power plants.<sup>9</sup> By establishing concrete goals for offshore wind production and empowering state agencies to carry out activities designed to meet these goals, state legislators and Governors can facilitate the responsible and rapid

permitting of offshore wind in the OCS. As they develop these goals, states should coordinate with BOEM and other federal agencies to ensure their goals are appropriately scaled within federal goals, as well as environmental and regulatory constraints.

- **States should develop offshore wind and transmission authorities to coordinate permitting and planning for these resources alongside relevant utility companies.** In addition, federal funds should be made available to help states develop these authorities. States like New Mexico and Colorado are utilizing transmission authorities to undertake planning and stakeholder engagement processes, acting directly as a project co-developer. These authorities have proven effective at improving outcomes for proposed transmission lines, improving interstate planning processes, identifying transmission corridors, engaging in transmission planning, participating in permitting and siting activities, and speeding the cost-allocation process for proposed lines by representing their state at the Federal Energy Regulatory Commission (FERC).<sup>10</sup> Given the complexities of planning, siting, permitting, and connecting offshore wind infrastructure to the grid, state policymakers should be incentivized to adopt a similar model to state transmission authorities that would be applied in the context of expanding offshore wind infrastructure.
- **State governments should establish shared best management practices for the disposal, recycling, and management of environmental impacts from offshore wind infrastructure at the end of its useful life.** Already, these policies are beginning to take shape for both land-based and offshore wind infrastructure.<sup>11</sup> To date, land-based wind turbine disposal has mostly relied on traditional landfills; however, new options are emerging.<sup>12</sup> State policymakers should collaborate now, working with federal partners and experienced international actors, to understand how to ensure a smooth disposal, recycling, and decommissioning process at the end of a turbine's useful life.
- **Federal agencies should regularly convene state governments to facilitate learning of best practices for community engagement, planning, and effective permitting, integration, and siting of offshore wind energy.** As various states have embraced different models for offshore wind deployment, there are often efficiencies developed in one state that may be useful for others. Using their convening power, DOE and BOEM should help facilitate regular roundtable discussions and conferences for states engaged in or interested in engaging in the development of offshore wind energy. Following these discussions, DOE and BOEM should publish a report informed by the event detailing best practices, including case studies on successful state models. Finally, technical assistance grants should be made available by Congress for federal assistance in implementing these best practices.

- **The federal government should provide funding to promote the creation of regional hubs for offshore wind development.** Economic hubs can help us better align state requirements for offshore wind projects and streamline interstate coordination on projects in multiple jurisdictions. Resources, which have already successfully enhanced interstate coordination, helped align state requirements, and enticed additional private sector investments.<sup>13</sup>

## Improving Siting and Permitting for Offshore Wind

Dramatically expanding the footprint of wind projects off the U.S. coast will require improving the existing siting and permitting process in an environmentally sensitive manner that ensures meaningful and early engagement with impacted communities, Tribal governments, and local wildlife organizations. Building on BOEM's existing process, more can be done to provide certainty and efficiency for offshore wind developers and communities alike. Audubon supports policies that improve timely siting and permitting, increase agency coordination, and enhance engagement with interested parties and other governments, including other federal agencies, state and local governments, Tribal governments, and impacted communities. In particular, BOEM should work to expand and strengthen government-to-government consultation with Tribal governments, including through direct investments that expand their capacity for engagement with the permitting process.<sup>14</sup> Capacity building is also critical in the context of impacted communities that may not have the experience or expertise needed to fully participate in the BOEM permitting process. As mentioned above, through their own planning processes, states can play an integral role in facilitating meaningful consultation during offshore wind siting, laying the groundwork for the federal process. Audubon encourages states to invest in robust planning like the Offshore Wind Master Plan process utilized by New York which included holistic environmental studies, community engagement, coordination with Tribal governments, robust infrastructure reviews, and more. Audubon also supports policies that ensure that a portion of the benefits from a project's development flow to communities that may be impacted by the project and that are informed by the needs and wants of the impacted communities.

### Specific policies that could beneficially improve this process include:

- **Codify a national offshore wind permitting target.** Congress should pass legislation that codifies the goal established by the Biden Administration for the Department of Interior (DOI) to issue permits that authorize offshore wind energy projects at a level of at least 30 gigawatts (GW) by 2030. Furthermore, Congress should set a second target for the DOI to issue permits for at least 50 GW of offshore wind energy by 2035.<sup>15</sup>
- **Conduct planning area impact studies that examine the cumulative impact on human, marine, avian, and coastal**

**environments of offshore wind development in a planning area before issuing a draft area identification memo.** By doing so, BOEM can more quickly identify least-conflict zones before narrowing potential offshore wind lease areas.<sup>16</sup> As appropriate, Congress should consider legislative action to require this change.

- **Formally consider community benefits offered by offshore wind developers as a part of the leasing process.** As the domestic footprint of offshore wind energy expands, Audubon supports policies that help ensure Tribal and local governments, impacted groups, and local communities benefit from this infrastructure. By pursuing policies that bolster the sustainable and equitable development of offshore wind infrastructure, policymakers can reduce local opposition to projects, improve economic outcomes for local communities, and benefit local ecosystems. As such, Congress should amend OCLSA to require the Secretary of Interior to consider non-monetary factors and commitments made by a developer bidding for an offshore wind lease to: 1) establish legally binding Community Benefit Agreements (CBAs) with local communities or other groups impacted by proposed projects; 2) utilize best practices for the monitoring and minimization of impacts on birds and other wildlife; 3) increase apprenticeship and pre-apprenticeship programs to bolster the offshore wind workforce; and 4) develop domestic manufacturing supply chains for offshore wind energy components.<sup>17</sup> Audubon supports the codification of the use of "bidding credits" for these purposes; however, we also recommend Congress maintain the existing twenty-five percent of the asking price cap on the total non-monetary credits that may be claimed by a developer to facilitate auction efficiency, ensure fair return to the government of offshore wind leases, and allow sufficient funds to direct the use of offshore wind revenues for related purposes (as recommended elsewhere in this Section).<sup>18</sup>

- **Provide increased funding to facilitate timely and effective environmental reviews of offshore wind projects.** While environmental reviews can be time-consuming for energy infrastructure projects, multiple studies have found that one of the most significant contributors to delays can be a lack of staff, staff expertise, and funding.<sup>19</sup> To ensure responsible and efficient permitting and siting, Congress should increase funding for agencies like BOEM, BSEE, NOAA, DOE, USFWS, USGS, and FERC for the purposes of hiring of additional staff, retention of existing staff, training of new staff, expanding and supporting stakeholder engagement, and collection and standardization of environmental data.

- **Create an Offshore Renewable Energy Coexistence Fund.** As discussed in Section 2.4.4 of our full report, after avoidance and minimization strategies have been thoroughly employed, unavoidable impacts within a wind project can be mitigated through offsets. In the case of impacts on birds, offsets may include improving reproductive success

through invasive species removal, reducing disturbances to nesting birds, and creating new nesting habitat and colony sites. Offsetting may also be necessary to address unavoidable harms to communities, Tribal Nations, fisheries, and other impacted industries. As such, Congress should establish an Offshore Renewable Energy Coexistence Fund to contribute payments to interests that have been adversely impacted by offshore wind development, subject to oversight by the Secretary of the Interior, funded in part through offshore wind royalties, fees, rentals, bonuses, and other payments under the OCSLA.<sup>20</sup>

- **Formally consider community benefit agreements in the environmental review process.** Throughout the permitting process, BOEM and other agencies are required to undergo environmental review of a project under NEPA. While this review should not overlook obvious harms to the ecosystem, vulnerable species, or local communities, there may be some cases where groups representing this interest agree that the harm may be addressable through mitigation. In those cases, Congress should allow BOEM and other agencies to consider whether a project sponsor has entered into a CBA with an affected state, Tribe, local government, or community benefits organization to offset any social or economic impacts from the project or legacy harm or cumulative impacts in the project's location.<sup>21</sup>

- **Increase funding to help affected communities participate in the offshore wind permitting process.** Under the Infrastructure Investment and Jobs Act (IIJA), Congress provided funds that have helped support \$1.5 million in grants through WETO to facilitate capacity-building for community participation in the offshore wind process at BOEM.<sup>22</sup> As offshore wind capacity continues to grow, Congress should increase funding for this purpose, creating a sustained and dedicated appropriation to facilitate capacity-building in impacted communities. In coordination with BOEM, WETO should regularly publish a report detailing lessons learned from the administration of these grants to inform best practices for developers and government agencies when consulting impacted communities. In addition, Congress should create a parallel program to provide grants and help inform best practices for building capacity with Tribal governments.<sup>23</sup> Finally, states should consider creating similar grant programs to facilitate community and Tribal participation in relevant state planning activities as well as with project developers.

- **Increase funding for regional ocean partnerships (ROPs).** ROPs are regional organizations voluntarily convened by governors in collaboration with the federal government, Tribal governments, and other parties that may be impacted by ocean and coastal issues in a region. ROPs are administered by NOAA and received increased funding under the bipartisan IIJA.<sup>24</sup> As offshore wind energy developments continue, additional funding can help ROPs better

anticipate conflicts between the offshore wind industry and local stakeholders.

- **Increase the use of programmatic environmental impact statements (PEIS) under NEPA for projects located near each other.** As noted in Section 3.1 of our full report, BOEM has already undergone multiple PEIS processes to consider cumulative impacts from development of offshore wind infrastructure across a region on communities, marine wildlife, birds, and the ocean environment. Audubon supports using PEISs in addition to site-specific reviews to ensure a holistic understanding of potential impacts to vulnerable species, while enabling greater efficiency in subsequent site-specific environmental reviews. By utilizing the PEIS process in addition to conventional reviews, BOEM can also reduce the risk of litigation while increasing community input and support. In addition, BOEM should utilize the PEIS process to help inform regional mitigation activities that can be applied across several leases to avoid, minimize, or offset adverse impacts to the environment and communities.

- **Designate Tribes as cooperating Tribal Governments at the outset of the permitting process.** One way that BOEM can improve early and meaningful consultation with Tribes is to designate them as cooperating agencies or consulting parties under NEPA and Section 106 of the National Historic Preservation Act (NHPA), respectively. Further, the agency should take additional steps to ensure that all required processes under the Native American Graves Protection and Repatriation Act and Archaeological Resources Protection Act are carried out to protect Tribal cultural heritage items.<sup>25</sup>

- **Establish a dedicated BOEM Tribal advisory group to facilitate meaningful engagement and collaboration between BOEM and Tribal representatives throughout the planning and permitting process.** Despite significant progress in the past few years towards better integrating Tribal governments in the BOEM process, several Tribal governments continue to raise concerns over insufficient government-to-government consultation and mitigation on offshore wind projects. Establishing a specific tribal advisory group at BOEM would recognize the unique perspectives brought to this process that may not be sufficiently represented in the Intergovernmental Task Forces currently established by BOEM. This advisory group may be based in part on the Secretary of Interior's Tribal Advisory Committee.<sup>26</sup>

- **Establish and implement co-stewardship guidelines in accordance with Joint Secretarial Order 3403.**<sup>27</sup> Order 3403 was issued by the Secretary of the Interior in November 2021 to ensure the responsible management of federal lands and waters "in a manner that seeks to protect the treaty, religious, subsistence, and cultural interests of federally recognized Indian Tribes."<sup>28</sup> Following the issuance of this order, the Bureau of Land Management (BLM) published formal guidance that outlined how the agency will continue

to partner with Tribes on co-stewardship of public lands.<sup>29</sup> Following the model established by BLM, BOEM and BSEE should establish and implement co-stewardship guidelines for their management of federal waters for offshore wind development and other energy and mineral uses.<sup>30</sup>

## Promoting Interoperability and Improving Transmission Infrastructure for Offshore Wind Projects

Despite nearly 23 GW of offshore wind energy currently in the permitting stage or beyond, decades of poor planning at the regional and interregional levels have resulted in a transmission network that is ill-equipped to handle this new generation. This problem is further compounded when considering the amount of offshore wind capacity that will be needed to effectively meet our decarbonization goals by mid-century. As noted in Audubon's *Birds and Transmission Report*, there are many challenges facing the planning, siting, permitting, and deployment of transmission infrastructure nationwide at the necessary scope and scale necessary to meet our climate goals.<sup>31</sup> In addition, the offshore wind industry faces unique challenges in building out transmission capacity capable of connecting offshore infrastructure to the grid.

The rapid growth of the domestic offshore wind industry has resulted in poor coordination between project developers and grid operators. Consequently, siloed infrastructure development can be incompatible with new projects, and the offshore grid built to harness energy from turbines is not always compatible with the onshore grid designed to distribute the power. This incompatibility across technology and systems threatens to severely limit the industry's ability to develop offshore wind energy at a larger scale.

Deployment of transmission infrastructure to connect offshore wind energy to the grid will require considerable coordination between federal agencies. Audubon is encouraged by the recent publication of the Offshore Wind Transmission Development in the U.S. Atlantic Region, and encourages the DOE's Grid Deployment Office (GDO) to continue its work with BOEM to develop action plans for the Pacific and Gulf Coasts.<sup>32</sup> In addition, Audubon encourages coordination between BOEM and other federal agencies on implementation of funding and support programs for transmission infrastructure, including the National Interest Electric Transmission Corridor (NIETC) Program.

Audubon supports several policy recommendations to hasten the development of offshore transmission infrastructure and promote interoperability of offshore wind technologies, all while protecting birds from the impacts of these new lines.

### These policies include:

- **Incorporate BOEM into the National Interest Electric Transmission Corridors (NIETC) designation process in collaboration with the Department of Energy.**<sup>33</sup> The NIETC process allows DOE to designate priority corridors

to streamline the development of new transmission within the corridor by unlocking a suite of financial and regulatory tools. These newly improved tools include additional federal financing tools and allowing FERC to issue permits for the siting of transmission lines within the NIETC under certain circumstances. While DOE notably included the designation of a corridor near New York and New Jersey that would foster connections between offshore energy and the onshore grid, additional designations of corridors between the OCS and onshore grid would substantially facilitate the deployment of offshore wind energy. Incorporation of BOEM into the NIETC designation process would provide additional expertise to DOE on the transmission needs of the offshore wind industry, present and future. If necessary, Congress should consider changing the existing statute to formalize the role of BOEM within the NIETC process.

- **Establish a program at the Department of Energy to standardize the interoperability of equipment used in offshore transmission networks across projects and between land-based and offshore electric energy transmission systems.**<sup>34</sup> The development of consistent equipment standards has already helped reduce the costs and increase the speed of deploying transmission infrastructure for offshore wind projects across European nations.<sup>35</sup> By ensuring U.S. developers utilize consistent standards for transmission infrastructure, DOE can help speed the rate at which offshore wind projects are connected to the onshore grid. Audubon further supports specific technical recommendations for standardization made in DOE and BOEM's Action Plan for Offshore Wind Transmission Development in U.S. Atlantic Region.<sup>36</sup>
- **Update existing statute to clarify the authority to issue offshore rights-of-way for transmission cables within a NOAA National Marine Sanctuary.**<sup>37</sup> As noted in Section 3.2.1 of our full report, under current law, the authority to issue rights of way for transmission infrastructure from offshore wind projects through National Marine Sanctuaries is unclear, creating tension between dual goals of conserving marine environments and expanding offshore wind energy. Congress can provide additional certainty to the offshore wind industry and conservation efforts by amending current law to make NOAA's authority clear, allowing it to act as the ultimate decision maker about whether transmission cables can safely traverse an existing or proposed National Marine Sanctuary.
- **Direct states that have not already done so to evaluate the incorporation of offshore wind onto their grid systems.**<sup>38</sup> As coastal states plan for the future of their grid, it is important that policymakers consider infrastructure needs to facilitate the integration of offshore wind energy on to the grid. Congress should direct states to plan for the incorporation of these resources into their grid systems. States should regularly undergo this planning process.

- **Require coastal states and regional transmission organizations to regularly identify interconnection points for planned and future offshore wind development.** Environmental impacts from transmission infrastructure associated with offshore wind energy can be significant at landfall locations. As such, robust and regular planning and procurement processes should be in place to minimize the number and impact of landfall locations and identify Points of Interconnection (POIs) in advance. States should be required to coordinate these efforts regionally, alongside Independent System Operators (ISOs) and Regional Transmission Organizations (RTOS), and ensure that BOEM, other relevant federal agencies, and interested parties are made aware of ideal POIs for connecting the offshore grid or interregional transmission. Coastal state legislatures may also consider requiring local utilities to regularly produce plans detailing potential interconnection points for planned and future offshore wind development. Ideally, utilities should be asked to consider the number of interconnection points that could be minimized through innovative technologies, allowing for shared backbone transmission infrastructure between offshore wind projects. Reducing the number of POIs will ultimately minimize impacts to coastal wildlife.
- **Increase funding for marine transmission R&DD.** Emerging transmission technologies may be able to help minimize the size of the grid needed to bring offshore wind energy to the onshore grid. Increasing federal investment in research, design, and deployment of these technologies, including through pilot projects, will help reduce environmental and species impacts from offshore wind transmission infrastructure. As such, Audubon supports increasing funding for these efforts with a focus on cost-effective strategies to connect offshore wind resources to the grid, including offshore backbone high-voltage transmission corridors, such as those proposed in the Atlantic Offshore Wind Transmission Study,<sup>39</sup> energy islands like those used in Europe,<sup>40</sup> and integration of energy storage with offshore wind.
- **Maintain funding from the Inflation Reduction Act for the Department of Energy's Grid Deployment Office (GDO) to facilitate interregional and offshore wind electricity transmission planning, modeling, and analysis.**<sup>41</sup> GDO should be encouraged to coordinate with BOEM in the use of these funds.

### Creating Regulatory and Financial Certainty for Offshore Wind Projects and Developers

Regulatory and financial uncertainty have been major obstacles to the expansion of offshore wind energy in the United States. This uncertainty has been fueled by prolonged inflation, supply chain disruptions, policy reversals fueled by partisan decision-making, irregularity in federal leasing practices, and inconsistent tax policies. In addition, as offshore wind develops from a nascent to more mature industry in the United States,

federal agencies and Congress must work together to provide guidance for untested or underdeveloped policy areas, such as the decommissioning or repowering of offshore wind projects. Lessons learned from more mature offshore wind industries abroad will be invaluable for this process. A federal policy regime which provides regulatory and financial certainty for developers will help bolster private investment in and loaning activities for offshore wind developers, insulating projects from regular market uncertainties that are more difficult to avoid.

In addition, financial certainty can be bolstered for offshore wind developers through federal and state policies that invest in building out domestic manufacturing of offshore wind technology, components, and other infrastructure needed to support the industry, such as specialized ships. Policy should also aim to help bolster a skilled domestic workforce that can support growth of a domestic offshore wind industry. According to a 2021 study from NREL, to reach the 30 GW by 2030 target set by the Biden Administration, the offshore wind energy industry must employ over 44,000 more workers by 2030, with nearly 33,000 of those workers clustered in communities near offshore infrastructure.<sup>42</sup> Some steps could include increasing federal funding for registered apprenticeships in the offshore wind industry, regularly conducting an assessment of workforce needs within the offshore wind industry, and continuing to offer bid credits for projects that invest in building a domestic workforce.

### Other policies that will help advance these goals include:

- **Maintain investments made in offshore wind infrastructure made through the Inflation Reduction Act and provide consistent regulatory guidance on their implementation.** Tax incentives and other federal investments included in the IRA have spurred significant growth and private investment in the domestic offshore wind industry. Failure to maintain these investments in this emerging industry could stall several proposed offshore wind projects and slow the overall rate of deployment. In particular, Audubon supports maintaining the 30% investment tax credit for offshore wind development and tax credits for domestic manufacturers of offshore wind energy infrastructure and components included in the IRA.<sup>43</sup>
- **Repeal unnecessary statutes that tie offshore wind development to offshore oil and gas development.** Audubon urges Congress to repeal paragraph (2) of Section 50265(b) of the Inflation Reduction Act to end the mandate that DOI hold an offshore oil and gas lease sale in the year prior to issuing an offshore wind lease. Offshore oil and gas development is subject to a completely different set of economic, political, and environmental factors than those faced by the offshore wind industry. This restriction causes uncertainty for offshore wind developers by suggesting that offshore wind development must be paired with development of unrelated energy infrastructure.<sup>44</sup>
- **Ensure state governments and coastal communities benefit from offshore wind royalties.** One way of creating

economic certainty for offshore wind developments is to ensure that the benefits of that energy are realized by state governments, as well as local communities. As such, Audubon supports the passage of the bipartisan Reinvesting in Shoreline Economies & Ecosystems (RISEE) Act to amend the Gulf of Mexico Energy Security Act (GOMESA) and create a dedicated funding stream from future offshore wind development for state governments to use for investment in coastal protection and resiliency.<sup>45</sup>

- **Continue publishing five-year leasing plans that are updated on a regular basis to provide long-term certainty to the offshore wind industry as well as state, local, and Tribal governments and other interested parties.** In April 2024, BOEM released a five-year anticipated lease schedule for offshore wind development in the United States, including projects already in the planning phase and several anticipated projects that had not yet formally undergone agency consideration.<sup>46</sup> By providing a forecast of future agency action, BOEM can help the offshore wind industry and state, local, and Tribal governments better prepare and plan for lease sales. Allowing community outreach and scientific analysis to begin well in advance of the actual process will increase the overall efficiency of the permitting process and improve transparency for the public.
- **Increase federal funding for registered apprenticeships for skilled positions that meet existing and future needs from the offshore wind industry.** Shortages of experienced workers to fill roles required for offshore wind infrastructure threaten the ability of the U.S. to meet its offshore wind energy deployment goals. Roles currently facing shortages include transmission engineers, manufacturing plant workers, offshore wind technicians, and truck drivers to transport transmission and offshore wind energy components.<sup>47</sup> Registered apprenticeship programs have been shown to reduce barriers to employment, attract a more diverse workforce, and reduce workforce turnover.<sup>48</sup> Congress should increase dedicated funding for apprenticeships that meet the existing and future needs of the offshore wind industry to ensure American competitiveness and facilitate the hiring of a domestic workforce.
- **Conduct regular assessments of offshore wind workforce gaps and needs to help target federal and state workforce investments.** As the offshore wind energy industry grows, its needs from a workforce perspective will continue to change and grow. Building on the work NREL has already done in coordination with DOE's WETO to assess workforce and supply chain needs, Congress should require a regular assessment of the workforce needs of the offshore wind industry. In addition to NREL and WETO, BOEM and the Department of Labor should be consulted during the development of this report. The report should be provided to lawmakers and include recommendations

for additional policy actions that can address workforce shortages. Coastal states and states with a considerable offshore wind supply chain footprint should consider conducting similar regular assessments.

- **Incentivize the development of a domestic offshore wind workforce alongside new leases.** Offshore wind deployment at scale will require a significant domestic workforce that does not currently exist. As noted in Section 3.1.2 of our full report, under current law BOEM may consider commitments made by developers to train and develop a local workforce when auctioning new leases through bid credits. Audubon supports codifying the discretionary practice of offering bid credits for offshore wind projects that invest in building a domestic offshore wind workforce and bolster domestic offshore wind infrastructure manufacturing. As stated above, Audubon also recommends Congress maintain the twenty-five percent of the asking price cap on the total non-monetary credits that may be claimed by a developer to facilitate auction efficiency, ensure fair return to the government of offshore wind leases, and allow sufficient funds to direct the use of offshore wind revenues for related purposes.<sup>49</sup>
- **Establish grant programs to support the expansion, modernization, and establishment of shipyards and other manufacturing facilities needed for the domestic production of offshore wind vessels.**<sup>50</sup> The size and scale of turbine blades used in offshore wind turbines makes the transportation of these components exceptionally difficult. In much of the world, specialized vehicles called wind turbine installation vessels (WTIVs) are typically used to bring blades and other turbine components to project sites and aid in the construction of the turbine. The use of WTIVs makes the installation and construction of these projects far more efficient. Unfortunately, there are no WTIVs in service in the United States, forcing domestic offshore wind projects to rely on less specialized and less suitable vehicles. To speed the deployment of offshore wind projects, Congress should create a federal grant program to support the expansion of a WTIV fleet and the creation of specialized port infrastructure. State governments may also play a role in funding the expansion of WTIV fleets through targeted investments to help spur local offshore wind development, create jobs, and attract new industry to the region.
- **Examine whether intellectual property requirements in federal grant and loan programs for offshore wind and related technologies disincentivizes industry participation in the programs.** Congress and relevant federal agencies should conduct a detailed review of intellectual property requirements included in federal grant and loan programs to avoid disincentives that could prevent participation by offshore wind industry partners. In doing so, Congress and federal agencies should recognize the balance between

ensuring a level of accountability needed to protect taxpayers from waste and fraud and ensuring a level of privacy required to allow private companies to maintain their competitive advantage and propriety information.

- **Provide additional guidance on the process for potential repowering of offshore wind projects.** This should be complemented by specific funding for research on the unique challenges and environmental disruptions that repowering may pose in the offshore context. Repowering is the process by which existing wind turbines are either refurbished or dismantled and replaced by new ones in their place to extend the life of a project.<sup>51</sup> While repowering is a more common occurrence in the on-land wind industry, very little guidance has been provided to

offshore wind lease holders about the potential for the repowering of existing offshore wind infrastructure at the end of the 25-year lease term. Already, other nations have wrestled with the question of how to handle offshore wind projects at the end of their life, providing a model for U.S. regulators.<sup>52</sup> As the domestic offshore wind industry continues to mature, BOEM and BSEE should provide additional guidance to developers about repowering and the regulatory process that would guide this process. In addition, Congress should provide specific funding to DOE, BOEM, and USFWS for research on the unique challenges and environmental disruptions that repowering may pose in the offshore context.

To read Audubon's full offshore wind report, visit [audubon.org/offshorewind](http://audubon.org/offshorewind)

## Endnotes

- 1 Paliwal et al. 2023
- 2 Ibid.
- 3 Westwood Global Energy Group and WFO, "Global Offshore Wind Report 2023," April 2024.
- 4 Rebke et al. 2019
- 5 Orr et al. 2016
- 6 Murray et al. 2024
- 7 U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.
- 8 Kreider, et al. 2024; Wind Energy Technologies Office, Wind Turbine Materials Recycling Prize, Accessed: August 2024.
- 9 U.S. Department of Energy, Strengthening America's Energy Security with Offshore Wind, April 2012; U.S. Energy Information Administration (EIA), Electricity Explained: Energy Storage for Electricity Generation, Accessed: July 2024; U.S. Energy Information Administration (EIA), Electricity Explained: Energy Storage for Electricity Generation, Accessed: July 2024.
- 10 Solomon, "DOE study highlights America's transmission needs, but how do we accelerate buildout?"; National Caucus of Environmental Legislators, "Transmission Briefing Book," June 2024.
- 11 Cox, "Evolving regulations for wind turbine end-of-life."
- 12 Gignac, "Wind Turbine Blades Don't Have To End Up In Landfills."
- 13 Maryland Energy Association Wind & Water Program, Maryland Virginia and North Carolina Regional SMART-POWER Partnership, Accessed: July 2024.
- 14 Grijalva, et al. to Klein. 2024.
- 15 U.S. Congress, House, Clean Electricity and Transmission Acceleration Act of 2023, Reps. Casten (D-IL) and Levin (D-CA), HR 6747. 118th Cong., 1st sess.
- 16 U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.
- 17 U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.
- 18 Renewable Energy Modernization Rule, 89 F.R. 42602 (2024); U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.
- 19 Bozuwa and Mulvaney, 2023.
- 20 U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.; U.S. Congress, House, Clean Electricity and Transmission Acceleration Act of 2023, Reps. Casten (D-IL) and Levin (D-CA), HR 6747. 118th Cong., 1st sess.; U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act

(COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.

**21** U.S. Congress, House, Clean Electricity and Transmission Acceleration Act of 2023, Reps. Casten (D-IL) and Levin (D-CA), HR 6747. 118th Cong., 1st sess.

**22** Wind Energy Technologies Office, DOE Wind Energy Technologies Office Selects 15 Projects Totaling \$27 Million to Address Key Deployment Challenges for Offshore, Land-Based, and Distributed Wind, September 21, 2023; The White House, Fact Sheet: Biden-Harris Administration Continues to Advance American Offshore Wind Opportunities, March 29, 2023.

**23** Murray et al. 2024.

**24** NOAA, Regional Ocean Partnerships, June 2022.

**25** Grijalva, et al. to Klein. 2024; BOEM, BOEM Funds IDIQ to Support Tribal Reviews: Aiding in participation of Offshore Wind Activities, August 2023.

**26** Grijalva, et al. to Klein. 2024.

**27** Halaand and Vilsack 2021, Joint Secretarial Order No. 3403.

**28** Ibid.

**29** BLM, BLM Publishes Tribal Co-stewardship Policy, Reaffirms Commitment to Work with Tribes to Manage Public Lands, September 2022.

**30** Grijalva, et al. to Klein. 2024.

**31** “Birds and Transmission: Building the Grid Birds Need,” Bateman, et al. 2023.

**32** DOE and BOEM, An Action Plan For Offshore Wind Transmission Development in the U.S. Atlantic Region, March 2024.

**33** U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.

**34** U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.

**35** DOE and BOEM, An Action Plan For Offshore Wind Transmission Development in the U.S. Atlantic Region, March 2024.

**36** DOE and BOEM, An Action Plan For Offshore Wind Transmission Development in the U.S. Atlantic Region, March 2024.

**37** U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.

**38** U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.

**39** Brinkman, et al. 2024

**40** Danish Energy Agency, Denmark’s Energy Islands, Accessed: July 2024.

**41** Section 50153 of the Inflation Reduction Act of 2023.

**42** Stefek, “Offshore Wind Energy Workforce Assessment,” Accessed: August 27, 2024; Lantz, et al. 2021.

**43** Sections 13702 and 13502 of the Inflation Reduction Act of 2023; Energy Credit, 26 U.S. Code § 48 (2024).

**44** U.S. Congress, House, Nonrestrictive Offshore Wind (NOW) Act, HR 4936, 118th Congr., 1st sess.

**45** U.S. Congress, House, Reinvesting in Shoreline Economies and Ecosystems (RISEE) Act of 2023, Reps. Fletcher (D-TX) and Weber (R-TX), HR 913, 118th Congr., 1st sess.; U.S. Congress, Senate, Reinvesting in Shoreline Economies and Ecosystems (RISEE) Act of 2023, Sen. Whitehouse (D-RI), 118th Congr., 1st sess.

**46** BOEM, Renewable Energy Leasing Schedule, April 2024.

**47** DOE and BOEM, An Action Plan For Offshore Wind Transmission Development in the U.S. Atlantic Region, March 2024.

**48** Office of Policy and Strategic Planning, The Benefits and Costs of Apprenticeships, November 2016; Office of Disability Employment Policy, Building an Inclusive Registered Apprenticeship Program: Best Practices from Adaptive Construction Solutions, Accessed: July 2024.

**49** Renewable Energy Modernization Rule, 89 F.R. 42602 (2024); U.S. Congress, Senate, Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act, Sen. Whitehouse (D-RI), S. 5441, 118th Cong., 2nd sess.

**50** U.S. Congress, House, Offshore Wind Modernization Act of 2024, Rep. Tonko (D-NY), HR 10508, 118th Cong., 2nd sess.

**51** WETO, Wind Repowering Helps Set the Stage for Energy Transition. June 2, 2021.

**52** Spyroudi, 2021.

## Citations

Bozuwa, Johanna and Dustin Mulvaney. 2023. "A Progressive Take on Permitting Reform: Principles and Policies to Unleash a Faster, More Equitable Green Transition." Roosevelt Institute. [https://rooseveltinstitute.org/wp-content/uploads/2023/08/RI\\_Progressive\\_Permitting\\_Report\\_202308.pdf](https://rooseveltinstitute.org/wp-content/uploads/2023/08/RI_Progressive_Permitting_Report_202308.pdf).

Brinkman, Gregory, Mike Bannister, Sophie Brendenjamp, Lanaia Carveth, Dave Corbus, Rebecca Green, Luke Lavin, Anthony Lopez, Melinda Marquis, Joseph Mowers, Matthew Mowers, Leonardo Rese, Billy Roberts, Amy Rose, Shahil Shah, Pranav Sharma, Hongfei Sun, and Bin Wang. 2024. "Atlantic Offshore Wind Transmission Study." National Renewable Energy Laboratory: U.S. Department of Energy. March, 2024. <https://www.nrel.gov/docs/fy24osti/88003.pdf>.

Brooke L Bateman, Gary Moody, Jennifer Fuller, Lotem Taylor, Nat Seavy, Joanna Grand, Jon Belak, Garry George, Chad Wilsey, and Sarah Rose. 2023. Audubon's Birds and Transmission Report: Building the Grid Birds Need. National Audubon Society: New York. <https://media.audubon.org/2023-08/BirdsAndTransmissionReport.pdf>.

Bureau of Land Management. 2022. "BLM Publishes Tribal Co-stewardship Policy, Reaffirms Commitment to Work with Tribes to Manage Public Lands." U.S. Department of Interior. September 13, 2022. <https://www.blm.gov/press-release/blm-publishes-tribal-co-stewardship-policy-reaffirms-commitment-work-tribes-manage>.

Bureau of Ocean Energy Management. 2023. "BOEM Funds IDIQ to Support Tribal Reviews: Aiding in participation of Offshore Wind Activities." U.S. Department of Interior. <https://www.boem.gov/sites/default/files/documents/BOEM%20Funds%20IDIQ%20to%20Support%20Tribal%20Reviews.pdf>.

Bureau of Ocean Energy Management. 2024. "Renewable Energy Leasing Schedule." U.S. Washington (DC): Department of the Interior. <https://www.boem.gov/sites/default/files/documents/renewable-energy/RELS%20Information%20Sheet%20Handout%20v3.pdf>.

Cox, David. 2023. "Evolving Regulations for Wind Turbine End-of-Life." Renewable Energy World, December 29, 2023. <https://www.renewableenergyworld.com/wind-power/evolving-regulations-for-wind-turbine-end-of-life/>.

Denmark Energy Agency. n.d. "Denmark's Energy Islands." Accessed: July 2024. <https://ens.dk/en/energy-sources/offshore-wind-power/denmarks-energy-islands#:~:text=The%20islands%20serve%20as%20hubs,access%20to%20this%20green%20electricity>.

Energy Credit, 26 U.S. Code § 48 (2024).

Gignac, James. 2020. "Wind Turbine Blades Don't Have To End Up In Landfills." The Equation, October 30, 2020. <https://blog.ucsusa.org/james-gignac/wind-turbine-blades-recycling/>.

Grijalva, Raúl M., Jared Huffman, and Val Hoyle. 2024. Letter to Director Elizabeth Klein, Bureau of Ocean Energy Management, May 23, 2024. U.S. House of Representatives Committee on Natural Resources. <https://democrats-naturalresources.house.gov/imo/media/doc/2024-5-23%20RG%20JH%20VH%20to%20BOEM%20re%20Tribal%20Consultation%20on%20Offshore%20Wind.pdf>.

Inflation Reduction Act of 2023. 2023. U.S. Government Publishing Office. <https://www.govinfo.gov/app/details/BILLS-118hr812ih>.

Kreider Matilda, Lucas Eshuis, Chloe Constant, and Derek Berry. 2024. "Winding Down: End of Service and Recycling for Wind Energy." NREL/PR-5000-89658. Golden, CO: National Renewable Energy Lab. (NREL). <https://www.nrel.gov/docs/fy24osti/89658.pdf>.

Lantz, Eric, Garrett Barter, Patrick Gilman, David Keyser, Trieu Mai, Melinda Marquis, Matthew Mowers, Matt Shields, Paul Spitsen, and Jeremy Stefek. 2021. "Power Sector, Supply Chain, Jobs, and Emissions Implications of 30 Gigawatts of Offshore Wind Power by 2030." NREL/TP-5000-80031. Golden, CO: National Renewable Energy Laboratory.

Maryland Energy Association Wind & Water Program. n.d. "Maryland Virginia and North Carolina Regional SMART-POWER Partnership." Accessed: July 2024. <https://energy.maryland.gov/SiteAssets/Pages/Info/renewable/offshorewind/SmartPower%20Factsheet%20%282024%29.pdf>.

Murray, Mariel J., Laura B. Comay, and Anthony R. Marshak. 2024. "Offshore Wind: The Bureau of Ocean Energy Management's Engagement with Federally Recognized Tribes." Congressional Research Service Report IF12650. Congressional Research Service. <https://crsreports.congress.gov/product/pdf/IF/IF12650>.

National Caucus of Environmental Legislators. 2024. "Transmission Briefing Book." <https://ncelenviro.org/app/uploads/2024/06/CE-Transmission-Briefing-Book.pdf>.

National Oceanic and Atmospheric Administration. 2022. "Regional Ocean Partnerships." U.S. Department of Commerce. <https://www.noaa.gov/infrastructure-law/infrastructure-law-climate-data-and-services/regional-ocean-partnerships>.

Office of the Federal Register, National Archives and Records Administration. 2024. "Renewable Energy Modernization Rule." Federal Register 89 (95): 42602-42645. May 15, 2024. 40 C.F.R. Parts 900-999. <https://www.federalregister.gov/documents/2024/05/15/2024-08791/renewable-energy-modernization-rule>.

Office of Policy and Strategic Planning. 2016. "The Benefits and Costs of Apprenticeships: A Business Perspective." U.S. Washington (DC): Department of Commerce. <https://www.commerce.gov/data-and-reports/reports/2016/11/benefits-and-costs-apprenticeships-business-perspective>.

Office of Disability Employment Policy. n.d. "Building an Inclusive Registered Apprenticeship Program: Best Practices from

Adaptive Construction Solutions.” U.S. Washington (DC): Department of Labor. Accessed: July 2024. <https://www.dol.gov/agencies/odep/program-areas/apprenticeship/pia/acs>.

Orr, Terry, Stephen Wood, Michael Drunsic, and Gordon Perkins. 2016. “Development of Guidance for Lighting of Offshore Wind Turbines Beyond 12 Nautical Miles.” BOEM 2016-002. Bureau of Ocean Energy Management (BOEM).

Rebke, Maren, Volker Dierschke, Christiane N. Weiner, Ralf Aumüller, Katrin Hill, and Reinhold Hill. 2019. “Attraction of nocturnally migrating birds to artificial light: The influence of colour, intensity and blinking mode under different cloud cover conditions.” *Biological Conservation* 233: 220–227. <https://doi.org/10.1016/j.biocon.2019.02.029>.

Secretary Halaand, Deb and Secretary Thomas J. Vilsack. 2021. “Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters.” U.S. Department of Interior and U.S. Department of Agriculture. Joint Secretarial Order No. 3403. <https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3403-joint-secretarial-order-on-fulfilling-the-trust-responsibility-to-indian-tribes-in-the-stewardship-of-federal-lands-and-waters.pdf>.

Solomon, Michelle. 2023. “DOE study highlights America’s transmission needs, but how do we accelerate buildout?” Utility Dive, March 31, 2023. <https://www.utilitydive.com/news/doe-study-transmission-clean-energy/646589/>.

Spyroudi, Angeliki. 2021. “End-of-life planning in offshore wind.” ORE Catapult. [https://cms.ore.catapult.org.uk/wp-content/uploads/2021/04/End-of-Life-decision-planning-in-offshore-wind\\_FINAL\\_AS-1.pdf](https://cms.ore.catapult.org.uk/wp-content/uploads/2021/04/End-of-Life-decision-planning-in-offshore-wind_FINAL_AS-1.pdf).

Stefek, Jeremy. 2024. “Offshore Wind Energy Workforce Assessment.” National Renewable Energy Laboratory, August 27, 2024. <https://www.nrel.gov/wind/offshore-workforce.html>.

The White House. 2023. “Fact Sheet: Biden-Harris Administration Continues to Advance American Offshore Wind Opportunities.” March 29, 2023. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/03/29/fact-sheet-biden-harris-administration-continues-to-advance-american-offshore-wind-opportunities/>.

U.S. Congress. House. Clean Electricity and Transmission Acceleration Act of 2023. Representatives Sean Casten (D-IL) and Mike Levin (D-CA). HR 6747. 118th Cong., 1st sess. Introduced in the House December 13, 2023. <https://www.congress.gov/bill/118th-congress/house-bill/6747>.

U.S. Congress. House. Nonrestrictive Offshore Wind (NOW) Act. Representatives Alexandria Ocasio-Cortez (D-NY) and Deborah Ross (D-NC). HR 4936. 118th Congr., 1st sess. Introduced in the House July 26, 2023. <https://www.congress.gov/bill/118th-congress/house-bill/4936>.

U.S. Congress. House. Offshore Wind Modernization Act of 2024. Representative Paul Tonko (D-NY). HR 10508. 118th Cong., 2nd sess. Introduced in the House December 18, 2024. <https://www.congress.gov/bill/118th-congress/house-bill/10508>.

U.S. Congress. House. Reinvesting In Shoreline Economies and Ecosystems (RISEE) Act of 2023. Representatives Lizzie Fletcher (D-TX) and Randy Weber (R-TX). HR 913. 118th Congr., 1st sess. Introduced in the House February 9, 2023. <https://www.congress.gov/bill/118th-congress/house-bill/913>.

U.S. Congress. Senate. Create Offshore Leadership and Livelihood Alignment By Operating Responsibility And Together for the Environment Act (COLLABORATE) Act. Senator Sheldon Whitehouse (D-RI). S. 5441. 118th Cong., 2nd sess. Introduced in the Senate December 5, 2024. <https://www.congress.gov/bill/118th-congress/senate-bill/5441>.

U.S. Congress. Senate. Reinvesting In Shoreline Economies and Ecosystems (RISEE) Act of 2023. Senators Sheldon Whitehouse (D-RI) and Bill Cassidy (R-LA). 118th Congr., 1st sess. Introduced in the Senate February 9, 2023. <https://www.congress.gov/bill/118th-congress/senate-bill/373>.

U.S. Department of Energy. 2012. “Strengthening America’s Energy Security with Offshore Wind.” DOE/ GO-102011-3143. Wind and Water Power Program. Washington (DC): U.S. Department of Interior. <https://www.nrel.gov/docs/fy12osti/49222.pdf>.

U.S. Department of Energy, and Bureau of Ocean Energy Management. 2024. “An Action Plan for Offshore Wind Transmission Development in the U.S. Atlantic Region.” Washington (DC): United States Department of the Interior. [https://www.energy.gov/sites/default/files/2024-04/Atlantic\\_Offshore\\_Wind\\_Transmission\\_Plan\\_Report\\_v16\\_RELEASE\\_508C.pdf](https://www.energy.gov/sites/default/files/2024-04/Atlantic_Offshore_Wind_Transmission_Plan_Report_v16_RELEASE_508C.pdf)

U.S. Energy Information Administration (EIA). n.d. “Electricity Explained: Energy Storage for Electricity Generation.” Accessed July 2024. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php>.

Wind Energy Technologies Office. 2021. “Wind Repowering Helps Set the Stage for Energy Transition.” U.S. Department of Energy, June 21, 2021. <https://www.energy.gov/eere/wind/articles/wind-repowering-helps-set-stage-energy-transition>.

Wind Energy Technologies Office. 2023. “DOE Wind Energy Technologies Office Selects 15 Projects Totaling \$27 Million to Address Key Deployment Challenges for Offshore, Land-Based, and Distributed Wind.” U.S. Department of Energy. September 21, 2023. <https://www.energy.gov/eere/wind/articles/doe-wind-energy-technologies-office-selects-15-projects-totaling-27-million>.

Wind Energy Technologies Office. n.d. “Wind Turbine Materials Recycling Prize,” U.S. Department of Energy. Accessed: August 2024. <https://www.energy.gov/eere/wind/wind-turbine-materials-recycling-prize>.