TECHNICAL APPENDIX B:

Federal Process for Permitting of Offshore Wind

This Technical Appendix provides additional details and context regarding the federal process for the siting, permitting, construction, operation, and ultimate decommissioning of offshore wind turbines and infrastructure.

A.1 The Process for Federal Waters

The Bureau of Ocean Energy Management (BOEM) is part of the Department of the Interior. BOEM is responsible for implementing the regulations for the Outer Continental Shelf (OCS) Renewable Energy Program (authorized by the Energy Policy Act of 2005).

This process can begin in multiple ways, but typically is driven by either interest from state governments that want to incorporate offshore wind energy into their energy portfolio or direct solicitations from offshore wind developers. To initiate the federal permitting and planning process, a state government can submit to the federal government a proposal for a specific area off their coast or an offshore wind developer can file an unsolicited lease application with the federal government. The federal government can also decide to initiate the planning process without a request from either a state or developer. These events trigger a detailed regulatory process across numerous jurisdictions and agencies.

Before the formal process begins, BOEM will initiate an Intergovernmental Renewable Energy Task Force. To date, BOEM is working closely with several states regarding offshore energy development and coordinates intergovernmental task forces in and across certain coastal states. Intergovernmental Renewable Energy Task Forces are comprised of representatives from federally recognized Tribes, federal agencies involved in the permitting and management of offshore wind resources, state governments, and local governments. These task forces serve as a forum through which the federal government can coordinate planning, solicit feedback, exchange relevant scientific and ecological data, and provide information about the process as it is ongoing. They also provide the opportunity for relevant state and federal agencies and Tribes to work together with other interested parties to help identify potential development areas and provide a means to identify and resolve potential conflicts.

The full lifecycle of an offshore wind turbine through the BOEM commercial leasing program has six distinct phases: 1) planning and analysis, 2) lease issuance, 3) site assessment, 4) construction and operations; 5) post-construction monitoring; and 6) decommissioning or repowering.

A.1.1 Planning and Analysis

Federal regulations provide a framework for issuing leases, easements, and rights-of-way for the production and transmission of offshore wind. BOEM formally begins the leasing process by publishing a Request For Interest (RFI).[1] RFIs are used to assess whether the agency should lease all or a part of the outer continental shelf (OCS) for offshore wind activities.[2] An RFI also helps

[1] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[2] BOEM, *Renewable Energy Leasing Schedule*, April 2024.

BOEM assess whether there is competitive interest in offshore wind within an area of the OCS. If so, BOEM is required under the Outer Continental Shelf Leasing Act (OCSLA) to competitively award leases within the area (typically through an auction). However, if through an RFI BOEM determines there is no competitive interest, BOEM may proceed with a noncompetitive leasing process. During the RFI, BOEM also determines whether to lease all or only a part of the OCS region.[3]

Following the RFI period, BOEM releases a Call for Information and Nominations (referred to as a Call). During this stage, BOEM continues to gauge interest from developers in leasing within the area as well as collecting information about any environmental and cultural concerns within the region. In addition to developers, the public and public interest organizations, like Audubon, may submit comments to BOEM in response to an RFI or a Call. In addition, typically both an RFI and Call invites comments from the public about known archaeological or cultural resource sites on the seabed, historic properties or potential impacts to historic properties from leasing, environmental or wildlife concerns related to the proposed area, as well as information that could inform BOEM's future reviews under the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA). BOEM uses this feedback to evaluate the potential impacts of leasing areas on human, marine, and coastal environments as required under the OCSLA. At this point BOEM consults with other federal agencies as well as continues consulting through the relevant Intergovernmental Renewable Energy Task Force about requirements from other potentially applicable federal statutes.

Following the Call, BOEM releases a draft area identification (Area ID) memo. This memo includes a refined area of the OCS that is under consideration for leasing. At this stage, the OCS area available for leasing has been narrowed to address environmental, wildlife, cultural, technical, and economic concerns raised by the public and industry in response to the RFI and Call.[4] Once again, BOEM requests public comment in the Area ID before moving forward. Once the agency receives feedback on the Area ID memo, the agency will publish final wind energy areas (WEAs).[5,6]

At this point, BOEM begins its first of several environmental reviews under the National Environmental Policy Act (NEPA) to examine the environmental impacts of leasing in the proposed area. BOEM is required to prepare a draft Environmental Assessment (EA) which details potential impacts on wildlife, ocean ecosystems, and details any other reasonably foreseeable significant environmental impacts.[7,8] The purpose of an EA is to determine whether or not an action by a federal agency is a "major federal action significantly affecting the quality of the human environment."[9] Should BOEM find during this process that leasing in this region meets this standard, the agency will undergo a longer review, called an Environmental Impact Statement

[3] BOEM, *Request for Interest in Commercial Leasing for Wind Power Development on the Gulf of Mexico Outer Continental Shelf (OCS)*, Docket No. BOEM-2021-0041 (2022).
[4] BOEM, *Memorandum on Request for Concurrence on Preliminary Wind Energy Areas for the Gulf of Mexico Area Identification Process Pursuant to 30 C.F.R. § 585.211(b)*, July 20, 2022.
[5] *Ibid.*
[6] BOEM, *Renewable Energy Leasing Schedule*, April 2024.
[7] *Ibid.*
[8] BOEM, *Memorandum on Request for Concurrence on Preliminary Wind Energy Areas for the Gulf of Mexico Area Identification Process Pursuant to 30 C.F.R. § 585.211(b)*, July 20, 2022.
[9] National Preservation Institute, "Environmental Assessment."

(EIS).[10] The EIS will be followed with a final detailed decision from the Agency about whether to move forward as well as a detailed plan for how to mitigate any environmental concerns raised during the process.[11] If BOEM does not find that leasing for offshore wind meets this standard, the Agency can publish a Finding of No Significant Impact (FONSI).[12] All of these documents, required under NEPA, are open to the public and BOEM will request feedback on each of these.

In 2021 Congress passed the Fiscal Responsibility Act (FRA) which made changes to the NEPA statute for the first time in nearly five decades.[13] These changes included statutory deadlines for agencies to publish an EA or EIS under NEPA. Since the passage of the FRA, the White House Council for Environmental Quality (CEQ) published a final rule promulgating new guidelines and regulations to govern how federal agencies should carry out NEPA analysis.[14] Under these guidelines, BOEM has one year to publish a final environmental assessment from the notice of intent (NOI) published ahead of the environmental review process under NEPA. Should the agency find that additional review is warranted through the EA process, BOEM has two years from that determination to publish a final environmental impact statement.[15]

Public comment, as well as comment from public interest organizations like Audubon, can help inform whether a more detailed EIS is necessary for a proposed wind area. Public comment, as well as comment from public interest organizations like Audubon, can help inform whether a more detailed EIS is necessary for a proposed wind area. However, generally, the environmental review process for WEAs do not result in environmental impact statements, which are more common later in the BOEM leasing process. BOEM has noted that an EIS during this stage of the offshore wind process would be limited in its ability to capture the detailed environmental impacts typically included in this level of review in several important ways. In this growing and quickly changing industry, it remains likely that technological improvements or changes may occur during the significant amount of time between this stage of review and the actual development of offshore wind infrastructure in the identified WEA. Furthermore, neither the agency, nor developers, have had the opportunity at this point in the process to carry out detailed site-specific characterizations of the WEA such as the collection of additional data on local avian and marine species, meteorological patterns, ocean currents, and more. Later NEPA reviews, which take place once this data is collected, typically undergo an EIS and more appropriately can capture the impacts of changing technologies and assess data collected by BOEM, other federal agencies, and the developer.[16]

Still, like the RFI and Call, the NEPA process is critically important for the removal of wind lease areas that could be potentially harmful to birds or the environment they need to thrive. Audubon and other environmental organizations consult with on-the-ground experts and utilize the best available science and data to help guide BOEM through the NEPA to a conclusion that best protects our environment and wildlife. Regardless of whether an EIS is warranted, the final EA

[10] EPA, *National Environmental Policy Act Review Process*, July 15, 2024.
[11] *Ibid.*
[12] *Ibid.*
[13] Fiscal Responsibility Act of 2023, 137 Stat. 10-49 (2023).
[14] National Environmental Policy Act Implementing Regulations Revisions Phase 2, 89 F.R. 35442 (2024).
[15] *Ibid.*
[16] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).

released by BOEM will often contain information that will guide best later environmental reviews and provide insights into best management practices to protect species, human health, and other competing marine interests during the construction, operation, and maintenance of offshore wind turbines.

While BOEM leads the NEPA process for offshore wind, other agencies are involved as well. For example:

- NOAA and the National Marine Fisheries Service (NMFS) are the consulting federal agencies focused on minimizing the impacts to ocean resources, critical habitats and fishing opportunities, and well as meeting the requirements of the Marine Mammal Protection Act, Endangered Species Act, Magnuson-Stevens Fisheries Conservation and Management Act, National Marine Sanctuaries Act, and the Fish and Wildlife Coordination Act.[17]

- The U.S. Fish & Wildlife Service (USFWS) is the consulting federal agency for endangered species and migratory birds ensuring offshore wind development projects meet the standards under the Endangered Species Act, Fish and Wildlife Coordination Act, and Migratory Birds Treaty Act.[18]
- The Environmental Protection Agency (EPA) is responsible for consideration of environmental justice impacts of offshore wind development projects as well as the permitting of sources of potential air pollution in the OCS.[19] Small amounts of air pollution could result from the equipment used in the construction or maintenance of offshore wind infrastructure.

A.1.2 Leasing

To begin the leasing process after designating a final WEA, BOEM initiates a sale by publishing a Proposed Sale Notice (PSN).[20] The PSN provides a detailed description of the lease areas and the competitive leasing process that will be used to lease these areas, including draft rules for the lease auction.[21]

The PSN will also detail whether BOEM plans to use "bidding credits." Bidding credits are incentives provided during a lease auction to developers that commit to making monetary contributions to certain programs or initiatives outlined by the agency.[22,23] Typically, these bidding credits are for programs or initiatives that help strengthen the offshore wind domestic industry, such as programs that support workforce training or building domestic supply chains for offshore wind energy infrastructure, or that benefit communities or the environment near the proposed leasing area. BOEM may award bidding credits for actions that a developer has already taken or for commitments to take future actions. However, should a bidder fail to meet commitments made

[17] BOEM, *Organizational Roles on Offshore Wind and Related Environmental Justice Responsibilities*, April 29, 2024.
[18] *Ibid.*
[19] *Ibid.*
[20] BOEM, *Renewable Energy Leasing Schedule*, April 2024.
[21] *Ibid.*
[22] *Ibid.*
[23] BOEM, *Bidding Credit – Requirements and Restrictions*, Accessed: July 2024.

during the leasing process, BOEM can force the developer to repay the amount of the bidding credit with interest and may assess civil penalties under § 585.106(e).[24] In some cases, bidding credits may be "stackable" or "non-stackable." Stackable credits allow developers to claim the total value of all credits for which they are eligible, whereas non-stackable credits would limit the total value of credits awarded to a developer to the value of the highest valued credit for which the developer was eligible.[25] While there is not a formal cap on the total value that BOEM may award to bidders through bidding credits, the agency has typically limited bidding credits to a maximum of 25 percent of the value of the highest bid unless BOEM determines that a higher bidding credit is specifically warranted for a sale.[26]

Once the public provides comments on the PSN, the agency issues a Final Sale Notice (FSN) and sets a date for the lease auction.[27] The FSN must be publish at least 30 calendar days before the date of the auction.[28] BOEM then conducts an auction for the relevant lease areas and announces the winning bidder for each commercial lease area from the auction. While the auction grants the winning bidder the exclusive right to move forward, the winning bidder still needs to complete additional steps to demonstrate their ability to responsibly develop and operate offshore wind energy infrastructure on the lease site before they can begin construction of offshore wind energy infrastructure.[29]

A.1.3 Site Assessment

After a commercial lease is awarded to a winning bidder, BOEM and the lease holder begin the process of conducting site-specific assessments to determine how to best deploy offshore wind infrastructure.[30] These activities can take up to five years to complete.[31] Site specific considerations can include weather conditions, ocean current patterns, migratory patterns for bird species, and more.[32]

During this phase, BOEM can undergo regional environmental reviews in situations where multiple offshore wind leases have been issued within the vicinity of one another. These reviews, called programmatic environmental impact statements (PEISs) are important emerging tools that help the agency understand any cumulative impacts from development across a region on communities, marine wildlife, birds, and the ocean environment. These PEISs can inform subsequent site-specific environmental review, helping the agency to streamline the review process. While site-specific reviews may not capture the holistic impact from multiple leases in a region, programmatic reviews ensure that those impacts are fully considered and that steps are taken in the site-specific COPs to avoid, minimize, mitigate, and monitor each individual lease's contribution to regional disruptions that may occur. Under NEPA, a PEIS must be reviewed every five years so long as it is in use, however, as noted by CEQ, the process for reevaluation need not

[24] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[25] *Ibid.*
[26] *Ibid.*
[27] BOEM, *Renewable Energy Leasing Schedule*, April 2024.
[28] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[29] BOEM, *Renewable Energy Leasing Schedule*, April 2024.
[30] BOEM, *Wind Energy Commercial Leasing Process*, May 2021.
[31] BOEM, *What Is The Duration Of The Lease?*, Accessed: July 2024.
[32] BOEM, *Wind Energy Commercial Leasing Process*, May 2021.

be lengthy so long as agencies can quickly and easily verify the ongoing accuracy of the evaluation.[33] PEISs are an emerging tool for BOEM, used for the first time in 2023 off the coast of New York.[34] In late 2023, BOEM issued a notice for a second PEIS off the coast of California.[35] Audubon submitted comments in February 2024 supporting the PEIS process and providing input on how to best conduct the PEIS.[36]

A.1.4 Construction and Operations

Once site assessments are complete, developers must submit a Construction and Operations Plan (COP). This detailed plan provides BOEM will information about how a developer plans to construct and operate offshore wind infrastructure within the lease area. BOEM also requires developers to include in their COP general information about the planned offshore wind development, including: a designation of operator; commercial lease stipulations and compliance; general structural and project design, fabrication, and installation; proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts; air quality information; and more.[37] In addition, the COP must include reports that document the results of the site assessment activities that occurred over the previous five years. These reports must address the following topics: (1) Geological and geotechnical to provide conditions of the seabed, including enough data to develop a geologic model and assess geologic hazards, (2) Biological report to determine the presence of biological features and marine resources, (3) Archaeological resources and other historic properties to provide BOEM with required information to conduct a review of the COP under the NHPA, (4) Meteorological and oceanographic to provide an overall understanding of these conditions at the proposed site and identify any conditions that could pose a risk to the offshore wind facility.[38]

The COP must also include detailed information and analysis to assist BOEM in complying with NEPA, ESA, NHPA, and other applicable laws, including any information required by law or any additional information about resources, conditions, and activities that may significantly affect, or that may have a significant effect on the proposed activities.[39] BOEM specifically details the need for additional information about topics including: water quality, biological resources, threatened or endangered species, sensitive biological resources or habitats, archaeological resources, social and economic resources, and how the proposed project might interfere with or interact with existing coastal and marine uses like military activities, vessel traffic, fisheries, and exploration and

[33] National Environmental Policy Act Implementing Regulations Revisions Phase 2, 89 F.R. 35442 (2024).
[34] Boling, et al. 2022.
[35] *Ibid.*
[36] NRDC, et al. to BOEM, Docket No. BOEM-2023-0061, February 20, 2024.

[37] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[38] *Ibid.*
[39] *Ibid*.

development of other natural resources.[40] Failure to provide any of this information could result in BOEM not approving a COP.[41]

Following submission of the COP, BOEM conducts environmental and technical reviews of the COP to decide whether to approve, approve with modification, or disapprove of the COP.[42] Like the draft WEA, BOEM's review of the COP must undergo review under NEPA.[43,44] Again, at this point BOEM invites comment from the public on environmental review documents related to the COP.[45] This review provides Audubon and other conservation organizations with an opportunity to ensure that the operation and construction of offshore wind infrastructure within the area follows the mitigation hierarchy to avoid, minimize, mitigate, and monitor any negative impacts on birds and other wildlife. As appropriate during this review BOEM may coordinate and consult with relevant federal, state, and local agencies as well as affected federally recognized Tribes.[46] BOEM may also request additional information from a project developer if they determine that the information provided by the COP is not sufficient to complete the review and approval process.[47] Should the developer fail to provide additional information requested, BOEM may deny the COP.[48] Generally, review of a COP requires an environmental impact statement be prepared. Under law, the preparation of an EIS can last up to two years before BOEM reaches a final decision and completes review under NEPA.[49]

If BOEM approves a COP, they may provide additional terms and conditions that must be incorporated into a project's COP.[50] If BOEM disapproves the COP, BOEM will provide the developer the reasons and allow the developer the opportunity to submit a revised plan that addresses the concerns raised by BOEM.[51] In this case, BOEM will allow the developer additional time to finalize their COP under the lease terms.[52]

Once BOEM approves the submitted COP, the developer submits a design and installation plan. The developer must also submit a Facility Design Report (FDR) and Fabrication and Installation Report (FIR) to BSEE.[53] The FDR will contain much of the technical engineering data, including geotechnical data, a summary of environmental data used for design, structural drawings, design calculations, and information about the loads imposed on the facility.[54] Meanwhile, the FIR includes much of the regulatory and installation data including, copies of permits from all pertinent jurisdictions, installation process information, fabrication schedule, additional environmental information regarding operations such as water discharge or waste disposal, and information

[40] *Ibid.*
[41] *Ibid*.
[42] BOEM, *Construction & Operations,* Accessed: July 2024.
[43] *Ibid.*
[44] BOEM, *Information Guidelines for a Renewable Energy Construction and Operations Plan (COP)*, 2020.
[45] BOEM, *Construction & Operations,* Accessed: July 2024.
[46] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[47] *Ibid.*
[48] *Ibid*.
[49] National Environmental Policy Act Implementing Regulations Revisions Phase 2, 89 F.R. 35442 (2024).
[50] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[51] *Ibid.*
[52] *Ibid.*
[53] *Ibid.*
[54] 30 CFR §285.701

about the installation of any infrastructure within a project easement.[55] Before the end of the lease term, the developer must also submit a plan detailing how they will decommission the offshore wind facilities at the end of the operations term. Typically, the operations term is 25 years.

A.1.5 Post Construction Monitoring

As noted in Section 2 of our full report, monitoring of an offshore wind project once in operation is critical for ensuring the success of mitigation efforts designed to protect birds and other wildlife. Much remains unknown about how offshore wind infrastructure impacts avian species off the coast of the United States. Additional transparency from the relevant agencies is needed to clarify how the implementation of the COP and decommissioning plan submitted by project developers will be monitored and enforced when necessary.

The regulatory regime governing how the construction and operation plans (COP) submitted by developers are enforced and operations monitored for compliance is still actively evolving as the domestic offshore wind industry grows. In 2023, the Biden Administration granted authority over enforcement and monitoring and decommissioning to the Bureau of Safety and Environmental Enforcement (BSEE) within the U.S. Department of the Interior.[56] This sister agency to BOEM is now responsible for ensuring the safe construction, installation, and operation of offshore wind infrastructure over its lifetime.[57] In addition to monitoring the compliance of offshore wind operators with their submitted COP and relevant regulations, BSEE is also tasked with developing and monitoring worker safety and environmental compliance strategies for offshore wind operators.[58] In early 2024, BSEE conducted its first offshore wind turbine inspection.[59] In addition, agencies other than BOEM and BSEE have enforcement responsibilities related to the interaction of offshore wind infrastructure with the local environment. For instance, the U.S. Fish and Wildlife Service (USFWS) has responsibility for enforcing the Endangered Species Act (ESA) in unfortunate cases where offshore wind infrastructure results in the incidental death of a protected species.

While inspections will be a necessary component of monitoring and enforcement of offshore wind compliance, BSEE, BOEM, and other agencies cannot rely on in-person inspections to monitor the quickly growing number of turbines in federal waters. Unlike in the land-based wind context, where surveys for bird carcasses in a standard radius around turbines can be used to estimate the overall impacts on specific bird species in an area, searching for carcasses in the offshore wind context is entirely impractical. Instead, different methods will be required to fully capture the impacts on birds while also ensuring compliance with federal environmental and conservation laws.

Recently, the USFWS has explored collision risk modeling[60] that could predict impacts on protected bird species from offshore wind infrastructure. However, collision risk models are only predictions of risk, and none of the models have been verified for their accuracy in the marine

[55] 30 CFR §285.702
[56] Dlouhy, "New Cop Tapped to Police Offshore Wind as Industry Booms."
[57] BSEE, *BSEE Conducts First Offshore Wind Turbine Inspection*, June 12, 2024.
[58] *Ibid.*
[59] *Ibid.*
[60] BOEM, *Environmental Studies Program: Ongoing Study*, Accessed: July 2024.

environment. Soon, collision risk models may become essential tools for ensuring offshore wind compliance of environmental laws, like the ESA. And until collision risk models can be verified, documenting collision events in the offshore environmental remains an important part of understanding offshore wind impacts on birds and other species.

In the meantime, technologies are quickly being developed that can supplement what in-person inspections and risk modeling can tell us about the impacts of offshore infrastructure on birds. Specific tools for monitoring bird collisions and displacement include radar, vessel and aerial surveys, acoustic monitoring, thermal imaging, and telemetry. These are all complimentary tools that provide data necessary for evaluating impacts, though none of these tools provides the full picture if and when used alone. Development of technologies to monitor the impacts of offshore wind on birds and other wildlife is being funded by the U.S. Department of Energy's (DOE) Wind Energy Technology Office (WETO) and the DOE's Office of Energy Efficiency and Renewable Energy (EERE). As new and improved technologies are developed to monitor wildlife impacts, industry should move quickly to incorporate these solutions.

In addition, regulators should also work towards the creation of industry-wide technology standards for protecting birds. DOE is currently evaluating the development status of these integrated systems based on their readiness for offshore wind deployment.[61] BOEM and industry should support development of such combined technologies, and regulators should require turbine developers to integrate these systems into their turbine designs. Instead of waiting for developers to drive the market, BOEM must require collision monitoring and work with the industry to support the development and deployment of these new technologies.[62]

Incorporation of these advanced monitoring technologies, ideally standardized, should be a required element in the post-construction monitoring plan for offshore wind energy projects. Regulators should require standardized methodology for using these new 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 ESA-listed species and other species of conservation obligation by augmenting tracking data with data from on-site detection technology.[63]

A.1.6 Decommissioning of Offshore Wind Infrastructure

At the end of a lease term, offshore wind projects are required to undergo decommissioning. The decommissioning process is governed by BSEE and BOEM but the decommissioning obligations are held by the lessee upon acceptance of a lease term.[64,65] There is also need for additional

[61] Brown-Saracino, "Technologies and Approaches for Monitoring Bird and Bat Collisions Offshore."
[62] Haney, C., 2024.
[63] *Ibid.*
[64] Fernandez Jr., et al. 2022.
[65] BOEM, *Conditions of Construction and Operations Plan Approval Lease Number OCS-A 0512*, February 21, 2024.

research into the best practices for the decommissioning of offshore wind energy infrastructure.[66,67,68]

The decommissioning process has three distinct stages: decommissioning application, decommissioning notice, and the final notice.[69] Between two years before the expiration of a lease and 90 days after the expiration of a lease, the operator is required to submit a decommissioning application to BSEE and BOEM.[70,71] This application must include information about all the infrastructure that will be decommissioned, a proposed schedule, and detailed plans for the transportation, disposal, or salvage of decommissioned materials.[72] After the decommissioning application is approved, the lease holder must submit a separate decommissioning notice at least 60 days before beginning the decommissioning process.[73] The notice will include any updates and any information about coordination with other federal agencies, state, local, or Tribal governments.[74] After the lease is terminated, the lease holder has two years to remove all offshore wind infrastructure, support infrastructure, and clear the seafloor of any obstructions created by activities during operation or construction.[75] Once the decommissioning process is complete, the lease holder has 60 days to submit a final notice of completion.[76]

However, while the formal process of decommissioning begins at the end of the lease term, it is worth noting that this is not the first time that BOEM considers the impacts of decommissioning. Importantly, the COP and other documents prepared by offshore wind lease holders are required to provide detailed information about their decommissioning plans at that point in time, including plans to provide for the costs of decommissioning at the end of the project's life.[77] To ensure that taxpayers are not ultimately left with the financial burden of decommissioning activities, BOEM regularly monitors each lessee's financial health. BOEM can, if necessary, adjust the amount and timing of required financial assurance.[78]

It is worth noting that, to date, the decommissioning of offshore wind infrastructure has yet to occur in the OCS of the United States.[79] Lessons may be learned from European decommissioning efforts where a more mature offshore wind industry has allowed for greater analysis into real decommissioning efforts over a number of years.[80] In addition, several states have begun developing policies around the disposal, recycling, and environmental impacts of land-based wind turbine components following decommissioning.[81] These policies may provide models for states as

[66] Fernandez Jr., et al. 2022.
[67] *Ibid.*
[68] BOEM, *Conditions of Construction and Operations Plan Approval Lease Number OCS-A 0512,* February 21, 2024.
[69] Fernandez Jr., et al. 2022.
[70] 30 CFR §285.902
[71] 30 CFR §585.905
[72] Fernandez Jr., et al. 2022.
[73] *Ibid.*
[74] *Ibid.*
[75] *Ibid.*
[76] *Ibid.*
[77] Renewable Energy Modernization Rule, 89 F.R. 42602 (2024).
[78] *Ibid.*
[79] Cox, "Evolving regulations for wind turbine end-of-life."
[80] Shafiee and Adedipe 2022.
[81] Cox, "Evolving regulations for wind turbine end-of-life."

they consider the local impacts from the decommissioning of offshore wind infrastructure in federal or state waters off their coasts. As the offshore wind leases issued in the last decade approach the end of their lease terms, additional policies will need to be developed in order to ensure the decommissioning and disposal of offshore wind infrastructure is done in a safe and sustainable manner.

Likewise, it is likely that many offshore wind projects may ultimately undergo repowering at least once before being ultimately decommissioned. 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.[82] While repowering is a more common occurrence in the on-land wind industry, there is very little guidance on the process for repowering in the offshore wind context provided by BSEE and BOEM.

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

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