

Offshore Wind Environmental
Research and Related Technology
Request for Information (RFI) DE-FOA-0002235

DATE: June 3, 2020
SUBJECT: Request for Information (RFI)

Description

The Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), in coordination with the Bureau of Ocean Energy Management (BOEM), the U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA NMFS), requests information from the public on research needs regarding environmental impacts of offshore wind energy development in U.S. waters and related monitoring and potential mitigation technology.

Background

While the development of offshore wind energy could afford significant national economic and environmental benefits, the anticipated implementation, supporting infrastructure build-out and future operation will have environmental impacts that need to be assessed and addressed. These impacts have siting, cost, and scheduling implications for offshore wind projects, their developers, and coastal communities.

In Europe, research on offshore wind environmental impacts has occurred and is ongoing. In the U.S., while there have been rigorous studies of the *potential* impacts of selected projects, field research on offshore wind facilities has been limited by the presence of a single 30 megawatt (MW) offshore wind project. That project has been extensively monitored through efforts, such as BOEM's Real-time Opportunity for Development Environmental Observations (RODEO). However, the growing pipeline of proposed offshore wind projects in various stages of planning poses potential environmental impacts and, likewise, opportunities for future environmental research, including:

- 1) Research on environmental impacts across a range of wind farm and turbine designs, as well as varying temporal and geographic scales, focusing on informing future siting, leasing, permitting, and operations;

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- 2) Demonstration, testing, validation, and improvement of environmental monitoring and mitigation technologies and methodologies, as well as validation of the costs and effectiveness of same; and
- 3) Validation of predictive impact models, including probabilistic risk-based approaches, to improve environmental assessments and minimize monitoring costs for future projects.

Purpose

The purpose of this RFI is to solicit input from industry, academia, research laboratories, government agencies, and the public on high-priority research needs, gaps and opportunities regarding environmental impacts of offshore wind energy development and related monitoring and potential mitigation technology, as outlined in the research topic areas below. This is solely a request for information and not a Funding Opportunity Announcement (FOA). EERE is not accepting applications.

Respondents to this RFI may respond to one or more of the topics, or any number of the following questions.

Disclaimer and Important Notes

This RFI is not a Funding Opportunity Announcement (FOA); therefore, EERE is not accepting applications at this time. EERE may issue a FOA in the future based on or related to the content and responses to this RFI; however, EERE may also elect not to issue a FOA. There is no guarantee that a FOA will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants, should EERE choose to issue a FOA regarding the subject matter. Final details, including any anticipated award size, quantity, and timing of EERE funded awards, would be subject to Congressional appropriations and direction.

Any information obtained as a result of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. EERE will review and consider all responses in its formulation of program strategies for the identified areas of interest that are the subject of this request. EERE will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that EERE is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind EERE to any further actions related to this topic.

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Proprietary Information

Because information received in response to this RFI may be used to structure future programs and FOAs and/or otherwise be made available to the public, **respondents are strongly advised to NOT include any information in their responses that might be considered business sensitive, proprietary, or otherwise confidential.** If, however, a respondent chooses to submit business sensitive, proprietary, or otherwise confidential information, it must be clearly and conspicuously marked as such in the response.

Responses containing confidential, proprietary, or privileged information must be conspicuously marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Federal Government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose.

If your response contains confidential, proprietary, or privileged information, you must include a cover sheet marked as follows identifying the specific pages containing confidential, proprietary, or privileged information:

Notice of Restriction on Disclosure and Use of Data:

Pages [List Applicable Pages] of this response may contain confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for the purposes described in this RFI [Enter RFI Number]. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.

In addition, (1) the header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: “Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure” and (2) every line and paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

Evaluation and Administration by Federal and Non-Federal Personnel

Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to EERE providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to

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being given the access. Submissions may be reviewed by support contractors and private consultants.

Request for Information Topic Areas and Questions

EERE is seeking input on high-priority research needs, gaps and opportunities regarding environmental impacts of offshore wind energy development and related monitoring and potential mitigation technology, as outlined in the research topic areas below.

This RFI seeks input on whether the following research objectives are of highest priority with respect to both understanding and the management of environmental impacts of offshore wind development:

- 1) Research to fill high-priority knowledge gaps that are central to evaluating the environmental impacts of offshore wind and enabling the siting and permitting of offshore wind projects across a range of temporal and geographic scales;
- 2) Improvement and validation of monitoring and mitigation technologies and methods, as well as assessments of their costs and effectiveness;
- 3) Validation of predictive impact models, including probabilistic risk-based approaches, to improve environmental assessments, point to cost-effective solutions, and minimize monitoring costs for future projects.

Additionally, DOE is seeking input on whether the research topics identified below are of the highest priority for research on the impacts of offshore wind development.

1) Bird and bat collision and avoidance research:

Background: Quantification of collision risk for birds and bats with offshore wind turbines is one question that could benefit from a focused research campaign. In Europe, avian collision risk models have widely been used to predict collision risk at offshore wind projects. Such models use various inputs, such as turbine parameters, bird size and flight speed, and avoidance rates, to predict collision risk. Of all variables used to predict collision risk, avoidance rates will have the largest impact on the predicted magnitude of collisions and, therefore, are central to understanding of avian collision risk.

Understanding collision risk offshore has benefited from intensive research studies seeking to quantify avoidance rates and behavior and, in some cases, seeking to measure collision risk directly. Studies such as the ORJIP (Offshore Renewables Joint Industry Programme)

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Bird Collision and Avoidance study, found high rates of seabird avoidance of offshore wind projects, with the majority of avoidance occurring prior to birds encountering the rotor swept zone of the turbine (at macro and meso-scales)¹. Such results speak to the need for research to cover larger geographic scales to understand collision risk, since measuring rates of avoidance rates at the turbine will likely overestimate collision risk. They will fail to account for birds that have already avoided either the wind farm or the turbine.

To date, there are a number of technologies under development that measure collisions directly, but further research and development (R&D) and validation is needed before a commercially ready system can be fully vetted and ready for use, especially for measurement of small volant animals (such as bats or migratory passerines). For bats, very little is known about collision risk offshore. Initial studies on post-construction activity, as measured by rates of acoustic activity, may help us understand whether this question requires further or dedicated research efforts.

Knowledge and research gaps:

- a) Research to understand collision risk and further quantify collision impacts through quantification of bird collision avoidance rates (at macro-, meso-, and micro-scales) and measure collisions across sites encompassing different species' mixes, flyways, and geographies. Research to establish avoidance rates for species or species groups and quantify differences in such rates during different times of day, weather conditions, and seasons.
- b) Research to estimate bat collision risk exposure by measuring post-construction activity rates during periods of turbine rotation.
- c) Validation of technologies/methodologies for addressing key questions and assess their cost-effectiveness. This may include systematic and comparative validation of collision measurement systems, including validation of event detection and species ID under a range of light and weather conditions.
- d) Validation and refinement of collision risk models, including empirical data on model inputs (e.g., flight height distributions, speeds, size, and measured avoidance rates) to inform future collision risk models and evaluate the predictive quality of baseline pre-construction data to assess post-construction flight risk.

¹ Skov, H.; Heinänen, S.; Norman, T.; Ward, R.; Méndez-Roldán, S.; Ellis, I. (2018). ORJIP Bird Collision and Avoidance Study. Report by Offshore Renewables Joint Industry Programme (ORJIP). Report for Carbon Trust.

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2) Construction noise monitoring and mitigation:

Background: Concern regarding impacts of noise from siting (e.g., geophysical survey efforts) and construction activities (e.g., pile driving) have been central to discussions regarding timing and methods of offshore wind development in the U.S., with a particular focus on potential impacts to the critically endangered North American Right Whale.

Animals use sound in the marine environment for communication, as well as to aid in navigation, hunting and feeding, and predator evasion. Effects of noise on marine organisms are dependent on the location of the individual, the species' sensitivity to noise, and the characteristics of the noise produced. Impulse noise has the potential to affect a range of species, with the preponderance of research to date focused on fish and marine mammals. Concerns regarding impacts of noise from offshore wind construction on marine mammals range from hearing damage (permanent or temporary threshold shifts) to changes in behavior patterns or chronic stress levels to the point of affecting biological fitness of exposed individuals.

While there has been research on noise impacts of offshore wind development in Europe, the unique complement of species in U.S. waters, particularly the prevalence of Mysticete (Baleen) whales, raises novel questions regarding impacts. In U.S. waters, there are also questions regarding potential impacts to protected species, such as sea turtles. Research might focus on both tools to increase protection of vulnerable species during construction activities or assessments of impacts to inform the methods and timing of future activities.

Knowledge and research gaps:

- a) Evaluation of the impacts of noise on marine organisms, with an emphasis on protected species.
- b) Research to compare the effectiveness of various approaches for verifying marine mammal exclusion zones, with an aim of developing techniques that will allow for greater flexibility in allowable construction windows at multiple sites.
- c) Evaluation of the effectiveness of noise abatement and noise impact mitigation solutions, as well as their associated costs.
- d) Validation of noise propagation models for construction of a range of different turbine foundations and/or anchoring systems.

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3) Habitat changes and habitat use changes:

Background: There are questions regarding how the installation of offshore wind projects may alter habitat, biological communities, species-use, distribution, and abundance patterns. These questions include, but are not limited to, potential impacts on fish stocks, displacement and attraction of seabirds, changes in use patterns by protected species, including marine mammals. Ultimately, there are questions about whether changes in biological communities, and associated changes in prey bases, use patterns, or other changes, affect the populations of the various species of interest.

Knowledge and research gaps:

- a) Measurement of changes to habitat and marine species' use of areas around wind facilities, in the context of broader spatial use changes, with an emphasis on protected species, especially marine mammals, protected birds, and managed and unmanaged fisheries. Includes:
 - i. Comparisons of monitoring data with existing or new pre-construction baseline data to understand responses in context of other environmental changes.
 - ii. Quantifying behavioral and physiological responses (attraction, displacement, barrier effect, changes in behavioral use patterns of sites).
 - iii. Demographic and population-level responses.
- b) Evaluations of the effectiveness and cost effectiveness of different monitoring approaches to addressing this question and development of standardized methodologies for monitoring.

This RFI also seeks input on any or all of the following questions:

- a) What are the highest-priority offshore wind environmental research needs? Are these needs adequately addressed in the opportunities, objectives, topics, knowledge and research gaps, as outlined above? If not, what is missing?
- b) Are research questions pertaining to fisheries, particularly a focus on evaluating changes to commercially important species, best answered by distinct species research questions, or might they be appropriately addressed in broader research efforts on effects on habitat and associated changes in community structure and changes in species abundance and distribution patterns?

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- c) Is the development and validation of probabilistic risk-based approaches, which seek to quantify probability of an event and the potential magnitude of its consequences, a relevant risk assessment approach and a high priority research need? If so, for which issues or uses are such approaches likely to be most relevant and needed? By extension, should such approaches be used, as well, for addressing large, complex and integrated Environmental Impact Statements?
- d) Is the development of new methodologies for assessing cumulative impacts a high priority research need?
- e) Are the research topics outlined above regarding impacts on marine mammals of construction noise too narrow? If so, how might they be otherwise expanded and in which ways?
- f) Are the research topics outlined above oriented too much toward known kinds of impacts? Should there be a wider focus, emphasizing reducing uncertainty?
- g) Should there be an added emphasis on collecting baseline data for frontier areas of offshore wind development?

Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to WindEnergyRFI@ee.doe.gov no later than 5:00 pm (ET) on July 7, 2020. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 5 pages in length, 12 point font, 1 inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to specific Topic Area(s) and/or Question(s), as may be applicable. Respondents may address or answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the start of their response to this RFI:

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- Company / institution name;
- Company / institution contact;
- Contact's address, phone number, and e-mail address.

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