

---

# *Permitting Assessment for Small-Scale Offshore Renewable Energy Projects*

---

**Student Proposers:**

**Wesley Noble** | Master of Environmental Science and Management 2026 | Bren School of Environmental Science & Management | [wnoble@bren.ucsb.edu](mailto:wnoble@bren.ucsb.edu)

**Gerald Clark** | Master of Environmental Science and Management 2026 | Bren School of Environmental Science & Management | [gerald\\_clark@bren.ucsb.edu](mailto:gerald_clark@bren.ucsb.edu)

**Client: Bureau of Ocean Energy Management**

**Emily Hildreth** | Supervisor, Renewable Energy Section, Bureau of Ocean Energy Management, Pacific Region | [Emily.Hildreth@boem.gov](mailto:Emily.Hildreth@boem.gov)

**Natalie Nguyen Dayal** | Renewable Energy Specialist, Bureau of Ocean Energy Management, Pacific Region | [Natalie.Dayal@boem.gov](mailto:Natalie.Dayal@boem.gov)

## Objectives:

The Bureau of Ocean Energy and Management (BOEM) is responsible for managing the development of the U.S. Outer Continental Shelf (OCS) energy, mineral, and geological resources in an environmentally and economically responsible way (BOEM, 2012). BOEM has seen very strong interest in offshore renewable energy projects on the OCS and is working closely with several states regarding offshore energy development. A summary of these activities, including planning efforts and active leases, can be found on [BOEM's website](#). As states increasingly adopt legislation to reduce carbon emissions and transition to cleaner energy sources, BOEM plays a crucial role in developing offshore renewable energy—particularly wind power—to meet these goals. The Department of the Interior has a five-year offshore wind lease schedule that includes up to 12 potential offshore wind energy lease sales through 2028 (Figure 1). Currently on the Pacific Coast, BOEM is managing federal oversight authority on five existing leases in California, two in northern California off Humboldt County, and three in Central California near Morro Bay (BOEM, 2024).

Meanwhile, BOEM's authority has also expanded to U.S. territories (the Commonwealth of Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands), regions where smaller energy grids and geographically isolated communities make large-scale utility projects less feasible. This shift underscores a growing need to accommodate smaller-scale renewable installations—a requirement that significantly broadens the scope of BOEM's mission beyond the continental United States. Islands like these have unique environmental contexts and limited demand profiles, making more compact, adaptable offshore energy solutions increasingly relevant to meet local energy needs.

The proposed project will analyze the current permitting framework to identify key challenges, opportunities for improvement, and potential pathways to facilitate the development and implementation of small-scale projects.

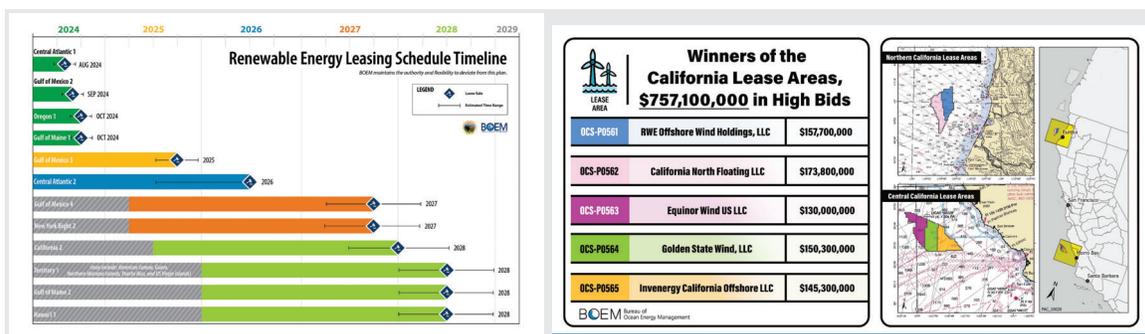


Figure 1(left): BOEM renewable energy lease timeline as of April 2024. Figure 2 (right): Winners of BOEM's offshore leases in California.

## Significance:

Offshore renewable energy has emerged as a key component in meeting state and federal carbon reduction targets, reducing fossil fuel reliance, and stimulating economic growth along coastal regions (National Renewable Energy Laboratory [NREL], 2022). While large-scale offshore wind projects have

garnered significant attention and investment—reflected in BOEM’s current leasing strategies and regulatory processes—the potential for small-scale offshore projects remains underexplored (BOEM, 2024). Small-scale projects, which may include pilot turbine designs, wave energy converters, or community-level renewable systems, can serve as critical testbeds for innovation, provide localized energy solutions, and spur equitable coastal development by engaging smaller communities, local businesses, and distributed energy networks (U.S. Department of Energy, 2021).

Despite these opportunities, the existing federal regulatory framework was recently revised with the revisions primarily designed around large, utility-scale offshore wind projects. In comparison, only a handful of small-scale projects completed BOEM’s permitting process over the last 15 years and BOEM’s regulations have not been updated to promote small-scale projects since their inception in 2009 (Department of the Interior, 2024). BOEM’s Notice of Intent (NOI) checklist for offshore wind developments (BOEM, 2023) exemplifies the extensive requirements that developers must navigate, including environmental impact reviews, stakeholder consultations, and engineering evaluations. These steps, while vital for mitigating ecological harm and ensuring stakeholder engagement, can pose significant barriers to smaller developers lacking the financial and administrative capacities of major industry players (Schwartz et al., 2020).

Evaluating how the current permitting and compliance procedures affect such projects is therefore essential to fostering an inclusive offshore renewable energy sector. In addition to aligning with the broader federal agenda of responsible resource development on the OCS, a clear pathway for small-scale initiatives can catalyze research and development, support local job creation, and enhance energy resiliency in coastal and island communities (Boehlert & Gill, 2018). This study’s focus on identifying both “pinch points” and potential regulatory flexibilities for smaller-scale developments directly addresses these challenges, providing data-driven recommendations that can inform BOEM’s renewable energy authorization processes and guide future offshore renewable energy projects.

## **Equity:**

---

BOEM is charged with ensuring that offshore energy development benefits a wide range of stakeholders, including historically underrepresented and frontline communities (Executive Office of the President, 2021). However, large-scale offshore energy projects can overshadow smaller-scale initiatives that may provide more accessible pathways to local economic development, workforce participation, and environmental co-benefits (U.S. Department of Energy, 2021). By assessing the regulatory and permitting obstacles that small-scale offshore projects face, this study seeks to uncover potential challenges—such as high permitting costs or disproportionately complex compliance requirements—that can prevent communities from pursuing localized renewable energy solutions (Schwartz et al., 2020).

In many coastal areas, community-led energy initiatives can address environmental justice concerns by offering regionally appropriate technology, protecting culturally significant areas, and advancing equitable resource management (Boehlert & Gill, 2018). While existing research already documents the needs of coastal communities, fishery groups, and low-income residents, our project will instead focus on stakeholder engagement from emerging small-scale energy providers—such as cooperatives, start-ups, and research & development firms—to explore how they navigate existing regulations. By tapping into the perspective of these businesses, we can gain practical insights into the financial, logistical, and policy barriers confronting smaller ventures, ultimately refining our

recommendations for a more flexible and inclusive permitting framework. The ultimate goal is to review BOEM's current regulations and permitting framework and help the agency identify ways to streamline processes for different project scales. By supporting the development of a wider variety of project sizes and technology types, we can promote solutions tailored to energy-scarce and geographically isolated communities, ensuring that the benefits of the clean energy transition are shared more broadly across the U.S. coastline.

#### Available data:

---

- [NREL Data & Tools](#): Provides a variety of datasets and analysis tools for wind, solar, and other clean energy technologies; includes resource assessments and grid integration models.
- [NREL Offshore Wind Resources & Publications](#): Offers detailed wind resource maps, cost analyses, and technical reports on offshore wind projects, potentially adaptable for small-scale applications.
- [NREL Island Energy Systems](#): Research focusing on energy resiliency and microgrid solutions for islands, which can inform strategies and best practices for smaller-scale offshore renewable deployment.
- [BOEM Renewable Energy Data & Information](#): Includes lease maps, environmental assessments, and project documentation for offshore renewable projects, along with regulatory checklists and compliance information.
- [BOEM TRiP](#): Summarizes environmental impact assessments, habitat evaluations, and data visualization tools for offshore energy activities, including resources that can inform the potential ecological impacts of smaller-scale projects.
- [BOEM Regulatory Framework and Guidelines](#): Established in 2009 under the Energy Policy Act of 2005, BOEM regulations provide a comprehensive process for issuing leases, easements, and rights-of-way for offshore renewable energy activities, including wind, wave, and solar projects.
- [Guam Power Authority \(GPA\)](#): Houses integrated resource plans and feasibility studies on renewable energy projects, offering insights into grid constraints and regulatory considerations in island contexts.
- [U.S. Department of Energy \(DOE\) Open Data Portal](#): Contains extensive energy-related datasets, including statistics on renewable capacity, grid infrastructure, and research on offshore wind technology and pilot projects.
- [Wind Energy Technologies Office](#): Features technical reports and policy guidance on wind power, including smaller-scale and demonstration projects, plus cost data and environmental studies.
- [Hawaiian State Energy Office](#) & [Hawaiian Electric](#): The Hawai'i Clean Energy Initiative aims to achieve 100% clean energy by 2045 through collaboration among public and private organizations, focusing on infrastructure development, technological innovation, and economic diversification..
- [U.S. Virgin Islands Water and Power Authority \(VIWAPA\)](#): Shares resource planning documents, feasibility studies, and resilience plans that showcase how small projects can be integrated within island grids, highlighting possible regulatory parallels.

- [Island Energy Snapshot \(DOE\)](#): Fact sheets summarizing energy supply mixes, policy contexts, and technology trends in various U.S. territories, useful for comparing small-scale project viability and regulatory landscapes.

### **Possible Approaches:**

---

- Regulatory Mapping
  - Create a detailed flowchart of the permitting stages required under BOEM’s framework, highlighting specific checkpoints (e.g., environmental impact statements, stakeholder consultations) that may be disproportionately burdensome for smaller developers..
- Stakeholder Interviews and Surveys
  - Engage small-scale developers, coastal community organizations, Tribal representatives, and industry associations to identify real-world administrative and financial barriers. These firsthand accounts will shed light on the resources needed—such as engineering expertise, legal counsel, or extended timelines—and help clarify how larger firms differ from smaller, community-driven initiatives in their capacity to absorb permitting costs and delays.
- Case Study Examination of Existing Small-Scale Projects
  - Investigate small pilot or demonstration-scale offshore projects (e.g., Pacwave, UMaine Deepwater Offshore Wind Test Site) that have navigated BOEM’s current regulations through literature review and analysis. Document their permitting timelines, legal hurdles, and funding gaps. By comparing these experiences with larger-scale efforts, the project can illuminate which regulatory requirements are size-agnostic and which may inadvertently inhibit smaller ventures.
- Policy Scenario Modeling
  - Develop scenarios exploring the impact of different regulatory reforms—such as tiered permitting processes, expedited review tracks, or flexible environmental assessments tailored to project size. Model the potential economic, environmental, and administrative outcomes of these policy adjustments to assess both feasibility and risk. This approach can guide BOEM in balancing robust environmental oversight with innovation-friendly regulations.
- Engagement Framework for Ongoing Innovation
  - Propose a structured mechanism (e.g., pilot project programs, specialized task forces) within BOEM to encourage experimentation with small-scale offshore energy technologies. This might include targeted grant funding, technical guidance, or “sandbox” regulatory pathways to lower initial barriers. Periodic evaluations of these programs can feed back into the broader regulatory framework, promoting iterative improvements and accommodating emerging clean energy solutions.

## Deliverables:

---

1. **Regulatory Analysis Report (to be made publicly available)** summarizing key findings and insights. This report would systematically map all relevant regulations, permitting steps, and compliance requirements. It would identify specific challenges and opportunities for smaller ventures and offer a comprehensive checklist tailored for small-scale developers. The report would conclude with actionable policy recommendations, grounded in real-world case studies where applicable.
2. **Policy Scenario Analysis and Implementation Roadmap (for internal BOEM use):** supplementary report outlining different scenarios for regulatory adjustments—such as simplified permitting tracks, tiered environmental review requirements, or targeted financial incentives. Each scenario could include potential pros, cons, and indicative costs or resource requirements, helping BOEM decision-makers weigh trade-offs. This could then be translated into a phased action plan for BOEM. The proposed roadmap might identify near-term steps (e.g., pilot projects or interim policy adjustments), mid-term strategies (e.g., data-sharing platforms or updated guidelines), and long-term goals (e.g., legislative amendments) that collectively support an inclusive, innovation-friendly offshore energy environment.
3. **Pilot Technology Index (to be made publicly available)** serving as a comprehensive database highlighting innovations within the global offshore renewable energy sector. This resource would catalog advancements aimed at enhancing technological performance and efficiency, with a particular focus on small-scale pilot studies relevant to BOEM's interests. This index would incorporate a detailed technical analysis of energy production across various project scales and types, providing BOEM with valuable insights into the profitability and feasibility of such ventures. By leveraging this database, BOEM could systematically evaluate and engage with emerging technologies to drive progress in offshore renewable energy development. The index could facilitate site suitability analysis, identifying specific BOEM regions where these technological advancements could be feasibly deployed, thereby optimizing resource allocation and fostering strategic innovation adoption.

## Internship:

---

The client (BOEM) is willing to host one intern (potentially two) to support this project over the summer. Internship funding is currently pending, but BOEM is working on finalizing funding for a 10–12 week summer position.

## Budget and Justification:

---

This project should not need funding beyond the given \$1,300 from the Bren School. However, to support these summer 2025 internships we plan to collaborate with the Bren School's Development Team to secure funding through on-campus fellowship opportunities.

## References:

---

1. Boehlert, G. W., & Gill, A. B. (2018). Environmental and ecological effects of ocean renewable energy development: A current synthesis. *Oceanography*, 23(2), 68–81.  
<https://doi.org/10.5670/oceanog.2010.46>
2. Bureau of Ocean Energy Management (BOEM). (2010). Home, about.  
<https://www.boem.gov/about-boem>
3. Bureau of Ocean Energy Management (BOEM). (2024). California Activities.  
<https://www.boem.gov/renewable-energy/state-activities/california-activities>
4. Bureau of Ocean Energy Management. (n.d.). Lease and grant information.  
<https://www.boem.gov/renewable-energy/lease-and-grant-information>
5. Bureau of Ocean Energy Management (BOEM). (2023). Notice of Intent (NOI) Checklist for State Activities.  
<https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/BOEM%20NOI%20Checklist.pdf>
6. Department of the Interior. (2024, May 15). Renewable Energy Modernization Rule (Final rule, Docket No. 2024-08791). *Federal Register*, 89 FR 42602.  
<https://www.federalregister.gov/documents/2024/05/15/2024-08791/renewable-energy-modernization-rule>
7. Executive Office of the President. (2021). Executive Order on Tackling the Climate Crisis at Home and Abroad.  
<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>
8. National Renewable Energy Laboratory (NREL). (2022). America’s offshore wind energy potential. <https://www.nrel.gov/wind/offshore-wind.html>
9. Schwartz, M. S., Bird, L., Bolinger, M., Wiser, R., & Weimar, M. (2020). Overcoming barriers to distributed wind deployment. National Renewable Energy Laboratory.  
<https://www.nrel.gov/docs/fy20osti/77067.pdf>
10. U.S. Department of Energy. (2021). Offshore wind market report: 2021 edition.  
<https://www.energy.gov/sites/default/files/2021-08/Offshore%20Wind%20Market%20Report.pdf>

## Glossary of Acronyms:

---

**BOEM:** Bureau of Ocean Energy Management

**DOE:** U.S. Department of Energy

**GPA:** Guam Power Authority

**NOI:** Notice of Intent

**NREL:** National Renewable Energy Laboratory

**OCS:** Outer Continental Shelf

**R&D:** Research and development

**TRiP:** Tools, Resources, and Publications

**VIWAPA:** U.S. Virgin Islands Water and Power Authority

**Client Disclaimer:**

---

Limited Intellectual Property License By participating in the Group Project, the client agrees that: (1) its logo and other "publicly available" intellectual property may be used by the Bren School (e.g., its students, faculty and staff) solely in connection with the specific Group Project in which the client participates, and (2) any Group Project's deliverables containing the client's logo or other intellectual property may be made publicly available via the Bren School's website and other formats. Upon written request by the client, a Group Project incorporating the client's intellectual property will include a disclaimer identifying the client as the owner of the intellectual property and that all rights are reserved by the client. The client may, upon written request, withhold consent to use certain intellectual property owned by the client.



United States Department of the Interior  
BUREAU OF OCEAN ENERGY MANAGEMENT  
Pacific OCS Region  
760 Paseo Camarillo, Suite 102  
Camarillo, CA 93010-6064

**January 10, 2025**

Group Project Committee  
Bren School of Environmental Science & Management  
2400 Bren Hall  
UC Santa Barbara, CA 93106

Dear Group Project Committee:

On behalf of the Bureau of Ocean Energy Management (BOEM) Pacific Region, I am pleased to express our support for the proposal, “Permitting Assessment for Small-Scale Offshore Renewable Energy Projects.” BOEM is a federal agency within the U.S. Department of the Interior whose mission is to manage development of U.S. Outer Continental Shelf (OCS) energy, mineral, and geological resources in an environmentally and economically responsible way. This project offers a timely opportunity to analyze the current permitting framework to identify key challenges, opportunities for improvement, and potential pathways to facilitate the development and implementation of small-scale projects.

Notably, BOEM’s authority recently expanded to include the U.S. territories (the Commonwealth of Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands), regions where smaller energy grids and geographically isolated communities could make smaller-scale renewable installations feasible. Islands like these have unique environmental contexts and limited demand profiles, making more compact, adaptable offshore energy solutions increasingly relevant to meet local energy needs. Gaining deeper insights into potential barriers—and identifying actionable solutions—could help streamline permitting processes consistent with the potential impacts of small scale offshore renewable energy projects.

BOEM’s Pacific Region staff will assist the Bren student team with access to relevant data and key regulatory documents. We welcome the opportunity to share our experience in permitting and compliance processes and the evolving nature of offshore energy development. By fostering transparent communication with multiple stakeholders—particularly small-scale developers—this project may inform updated permitting processes and policies that protect the OCS environment while encouraging technological advancement and equitable economic growth. Recognizing the value of practical experience for emerging environmental professionals, we can provide workspace for 1-2 internships for Bren student(s). The internship(s) will focus on analyzing regulations, permitting and compliance requirements, engagement with stakeholders, and contribute to the creation of data and analysis driven recommendations. The interns work product(s) will inform BOEM’s capacity to refine policy approaches, streamline processes, and has the potential to improve opportunities across the offshore renewable energy sector.

Ultimately, large and small-scale offshore renewable energy projects have the potential to compliment each other and to support achievement of the broader public policy goals of obtaining reliable, cost-effective and low-greenhouse gas emitting power supplies for our nation. We believe the deliverables—detailed regulatory analyses, recommended policy adjustments, and an index of potential small-scale technologies—will help us advance our mission of responsible resource management. We look forward to collaborating with the Bren School team on this important initiative. If you have any questions or need additional details, please contact me at [Emily.Hildreth@boem.gov](mailto:Emily.Hildreth@boem.gov) or (571) 491-7505.

Sincerely,

Emily Hildreth  
Renewable Energy Section Supervisor  
Bureau of Ocean Energy Management