Social and Economic Effects of Marine Renewable Energy

RELEVANCE TO MARINE RENEWABLE ENERGY

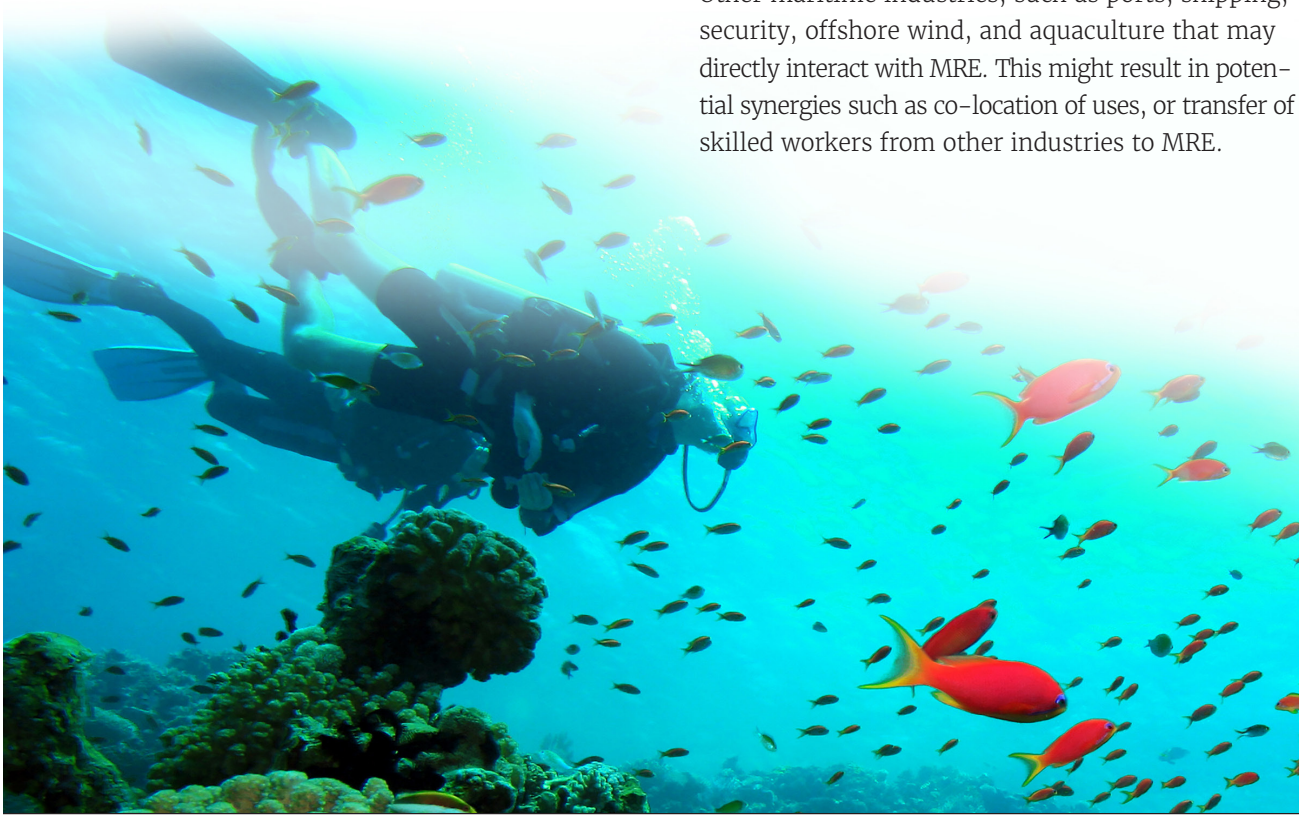
The social and economic effects of marine renewable energy (MRE) must be considered in consenting/permitting and strategic planning processes. MRE may accrue benefits or cause adverse effects on economies, communities, jobs, revenues, supply chains, social services, existing industries, local infrastructure, and community well-being. Social and economic effects of MRE are often tied to environmental effects and it is important to consider them together.

STATUS OF KNOWLEDGE

MRE projects have the potential to create significant social and economic benefits, but they may have adverse impacts if they are not carefully located, planned, and developed. Social and economic benefits can be enhanced, while negative impacts can be reduced or mitigated in a variety of ways, such as through compensation or community benefits, co-location with other industries or uses, comprehensive spatial planning, local business opportunities, workforce training programs, and collaborative planning and stakeholder engagement.

Various groups may interact with MRE projects. Some examples include:

- Fishers whose primary concerns are loss of fishing areas, loss of income due to reduced catch, or uncertainty around potential impacts on fish and ecosystem health.
- Other maritime industries, such as ports, shipping, security, offshore wind, and aquaculture that may directly interact with MRE. This might result in potential synergies such as co-location of uses, or transfer of skilled workers from other industries to MRE.



- Supply chain companies that are likely to benefit from new business opportunities but will require additional investment to service MRE needs.
- Indigenous communities who are likely to be affected by MRE development and will require meaningful engagement and sustained partnership opportunities. These communities may also provide important inputs and context including Indigenous knowledge and perspectives that should be incorporated into project design, siting, data collection, and assessment.
- Coastal communities who will need to play a significant part in project planning as they have a stake in MRE development and may react with a range of perceptions on social and economic effects, based on place attachment, values, visual impacts, and potential environmental effects.
- Tourism, which may be affected by spatial displacement or visual impacts; however, the presence of a new MRE technology may also generate additional tourism opportunities.
- Energy end-users who have a vested interest in the balance of benefits and effects, mainly if the energy produced from MRE projects will benefit local communities or if it is exported to other areas.

MRE projects will benefit from early, consistent, and transparent engagement with local communities, Indigenous groups, and other key stakeholders, in order to understand potential social and economic effects and how they might be addressed.

REMAINING UNCERTAINTIES

Significant challenges exist in identifying and measuring MRE-specific social and economic effects due to the early stage of the MRE industry with few long-term developments, little data from existing or past projects, and overall limited research on these effects. As the MRE industry scales up toward commercial arrays, it will be important to learn from past projects, identify how social and economic effects may change, and understand the cumulative effects of multiple projects (both MRE and other industries) occurring in the same space.

RECOMMENDATIONS

Continuing to advance research and understanding of social and economic effects is needed as the MRE industry continues to grow. Recommendations for strategic needs to improve understanding of social and economic effects of MRE include:

- Developing consistent requirements and regulations for social and economic data collection and assessments.
- Conducting long-term assessments and monitoring at the project and regional scale.
- Increasing understanding of cumulative effects of activities and uses in the marine environment.

Recommendations for additional research related to social and economic effects of MRE include:

- Using transdisciplinary methods that can support learning and co-production of knowledge, as well as address challenges through diverse perspectives.
- Increasing understanding of key indicators of MRE-specific effects.
- Applying quality controls to data collection to improve consistency and the ability to compare outcomes among MRE projects.
- Creating standardized methods for data collection that can be applied internationally.

Recommendations for MRE developers to improve knowledge, enhance benefits, and limit negative impacts include:

- Applying lessons learned from other industries to inform MRE projects until MRE-specific research increases.
- Striving for just outcomes and equitable energy transitions by understanding and incorporating diverse perspectives from different stakeholder groups.
- Partnering with other industries in the vicinity of an MRE project that may affect social and economic aspects to address effects and support sustainable development.

OES-Environmental 2024 State of the Science report and executive summary available at: *https://tethys.pnnl.gov/publications/state-of-the-science-2024*

Go to *https://tethys.pnnl.gov* for a collection of papers, reports, presentations, and other media about environmental effects of MRE.

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