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CALIFORNIA ENERGY COMMISSION

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Request for Information
Deep-Water High-Voltage Direct Current (HVDC) Substations for
Offshore Wind
Docket # 23-ERDD-01
Due Date: August 15, 2024

The California Energy Commission (CEC) is releasing this Request for Information (RFI) to gather information on critical challenges and research needs relating to offshore transmission and grid integration of floating offshore wind (FOSW) energy from California's Wind Energy Areas (WEAs). Innovations will be needed to optimize and deploy offshore HVDC substations and associated electrical infrastructure to reliably transmit FOSW generation to shore and decrease costs and environmental impacts from these systems. Responses to this RFI may inform a future grant funding opportunity addressing the [Electric Program Investment Charge \(EPIC\) 2021-2025 Investment Plan](https://www.energy.ca.gov/publications/2021/electric-program-investment-charge-proposed-2021-2025-investment-plan-epic-4) (<https://www.energy.ca.gov/publications/2021/electric-program-investment-charge-proposed-2021-2025-investment-plan-epic-4>) Topic 1 "Floating Offshore Wind Energy Technologies."

Stakeholders are encouraged to respond to the specific questions they feel most suit their knowledge and background.

General:

1. What information or analysis is needed to inform timely and cost-effective development and deployment of deep-water substations and associated offshore electrical infrastructure in existing and future California WEAs? How can publicly funded research and development (R&D) address technological, economic, and environmental uncertainties and better inform strategic technology advancement, feasibility, standards development, and component selection and procurement?
2. What key metrics or factors are required to inform systems integration of offshore wind components, deep-water substations, associated electrical infrastructure, communication networks, data collection, environmental monitoring, and ancillary services such as secondary generation, hydrogen production, and storage?
3. What specific technical, economic, or other factors are crucial for understanding the viability and success of offshore electrical infrastructure technologies for FOSW development in

California? What key performance characteristics and metrics are anticipated to be challenging for California's existing and future WEAs?

4. What environmental, ecosystem, health, and social impacts, including, both direct and indirect impacts, should be evaluated in deep-water substation and offshore electrical component design, procurement, and deployment for California's existing and future WEAs? How should knowledge about these impacts be used to better inform more sound design, procurement, and deployment of deep-water substation and offshore electrical components?
5. Are there other pressing needs or challenges relating to FOSW electrical infrastructure or transmission R&D that EPIC should consider?

HVDC Technology and Cost:

6. What technical barriers will have the largest impact on development of deep-water HVDC substations in California? How could publicly funded R&D be most effectively applied to help increase timely and cost-effective deployment of new offshore deep-water HVDC substations in existing or future California WEAs?
7. What key cost factors are critical to the timely deployment of deep-water HVDC substations and associated offshore electrical infrastructure that could be addressed through technology advancement or analysis?
8. What novel technologies or design concepts proposed for HVDC substations have been successfully demonstrated in a physical or simulated dynamic offshore environment and can provide economic benefits and costs savings for California ratepayers? Are there any specific substation platforms, mooring systems, HVDC electrical components, or other substation technologies that provide clear benefits and advantages for use in the existing or future California WEAs? How could R&D funding be most effectively applied to improve and optimize these technologies further to reduce cost and improve their technical suitability for California's WEAs?
9. What key technologies or capabilities are needed in-state, regionally, and nationally to facilitate supply chain, manufacturing, installation, and operations and maintenance needs for deep-water HVDC substations and associated electrical infrastructure? What are the environmental, ecosystem, health, and social impacts associated with these technologies or that should be evaluated for these technologies?
10. What technologies or processes can monitor the condition and performance of deep-water HVDC substations and offshore electrical infrastructure? What are the current resolution capabilities of these technologies? Are these technologies or processes adequate for application in existing or future California WEAs? What are additional operations and maintenance needs for deep-water HVDC substations?
11. Are there any other questions or information the CEC should consider for research on deep-water HVDC substations for offshore wind that is not otherwise covered by the questions above?

How to Provide Information

Respondents to this RFI should not include any proprietary or confidential information. Comments must be submitted by 5:00 p.m. on August 15, 2024, using the [e-commenting feature](https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=23-ERDD-01) (<https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=23-ERDD-01>) to submit to [Docket 23-ERDD-01](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-ERDD-01) (<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-ERDD-01>).

To use the e-commenting system, respondents will be asked for a full name, email address, comment title, and either a comment or an attached document (.doc, .docx, or .pdf format). After a challenge-response test is used by the system to ensure that responses are generated by a human user and not a computer, click on the "Agree & Submit Your Comment" button to submit the information to the CEC's Docket Unit.

Written comments, attachments, and associated contact information included within the documents and attachments will become part of the viewable public record and searchable on the internet.

Interested stakeholders are encouraged to use the electronic filing system described above to submit information. If you are unable to submit electronically, a paper copy of your information may be sent to:

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 23-ERDD-01
715 P Street
Sacramento, CA 95814-5512

Alternatively, you may email responses to docket@energy.ca.gov with the subject line "23-ERDD-01: RFI Deep-Water HVDC Substations for Offshore Wind".