

Cyber Physical Infrastructure and Energy Horizons Distinguished Seminar

Abstract:

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Advancing marine renewable energy technologies to commercialization: Opportunities and challenges

The global need to diversify energy portfolios, expand energy supplies and reduce carbon emissions, has motivated research and development (R&D) of marine renewable energy (MRE) technologies that can capture and convert the energy contained in ocean waves, tidal and ocean currents, and offshore wind into usable energy streams or storage. This presentation reviews the opportunities and challenges for advancing these technologies globally and efforts by the US Department of Energy's (USDOE) Water Power Technologies Office and the National Laboratories to support this emergent renewable energy industry. Specific projects that are highlighted include: 1) The reference model project (RMP) that disseminates detailed open-source non-proprietary MRE technology designs for research, and estimates of annual energy production (AEP) and costs for initial benchmarking of levelized costs of energy (LCOE); 2) The development of open-source modeling tools, e.g., CACTUS, for the design and analysis of MRE technologies; 3) The creation of resource atlases, including maps and databases that provide critical data inputs on resource attributes and extreme load conditions to support siting, technology design, project development and regional energy planning.

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Biosketch: Dr. Vincent Neary has spent the last dozen years working on a wide-range of topics advancing marine renewable energy, including modeling and measuring tidal and wave environments for resource characterization and assessment, experimental testing and numerical modeling of marine energy conversion technologies, and benchmarking their techno-economic performance. His recent work is focused on tidal and wave energy resource characterization and classification to support regional energy planning, project development and type-certification. Dr. Neary is a registered professional engineer and a Fellow of the American Society of Civil Engineers (ASCE) recognized for the breadth of his contributions to research, teaching, and practice in fluid mechanics and hydraulic engineering.

- Marine energy technology lead for Sandia National Laboratories, US Department of Energy (USDOE)
 - Wide range of marine energy research and development topics, including wave and tidal resource characterization, numerical modeling and experimental testing of conversion technologies, and benchmarking techno-economic performance
 - Lead and point of contact for USDOE's reference model project: <http://energy.sandia.gov/rmp>, which developed six reference model technologies to support open-source research and development of marine energy technologies.
 - Fellow, American Society of Civil Engineers and registered professional engineer
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