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Vincent Neary, Marine Renewable Energy Technology Lead, Sandia National Laboratories, Albuquerque, New Mexico, USA

Keynote's short bio (5 lines): Dr. Vincent Neary has spent the last ten-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)
- Over ten-years working on 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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References (with links) :

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[3] V. S. Neary, K. A. Haas, J. A. Colby, "Marine energy classification systems: Tools for resource assessment and design," European Wave and Tidal Energy Conference (EWTEC), Naples, Italy, 2019.

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Abstract (300 words):

Marine energy resource and environmental conditions characterization and classification for project development and device design

Quality data on marine energy resources and environmental conditions is essential for advancing the marine renewable energy industry and other maritime industries of the Blue Economy. Resource and environmental conditions characterization (wind, wave, currents) is needed to assess project site opportunities to capture energy resources and risks to operation, maintenance, reliability, and survival. This process requires the selection, computation and cataloging of metrics that best represent and parameterize the main attributes of the energy resource and environmental conditions; as well as their spatial, temporal and statistical distributions. Best available data sources for computing these metrics are derived from validated model hindcasts and measurements. Characterization also supports the development of classification systems that emulate those developed for the wind industry: *Resource* (project) classification systems designed to support resource assessment studies for energy planning and projects, and *conditions* (device) classification systems designed to streamline and reduce costs for design, device-type certification, product-line development and manufacturing. This presentation will provide an overview of wave and tidal energy resource and conditions characterization efforts in the United States as part of a multi-laboratory project supported by the US Department of Energy, with a specific focus on wave energy. Methods described include those for generating resource and conditions data sources with high-resolution regional wave model hindcasts, statistical methods used to compute metrics characterizing extreme conditions, and the steps in building classification systems and incorporating them into international standards and certification.

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