Case Study:

Addressing Power Reliability Concerns for Marine Energy Sources

Contact:

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Topic:

Can we address concerns of power reliability and blackout risk for systems that incorporate marine energy sources? Can we estimate the impact of generation uncertainty through a combination of engineering and policy principles?

Background:

The integration of renewable energy sources into the nation’s power system infrastructure challenges engineers to maintain an acceptable level of reliability. As it stands, renewable energy introduces new scenarios and uncertainty that affect the grid operator’s ability to properly meet irregular demand and modern loads. Additionally, a changing political and social landscape also impacts power system planners in the design and integration of new energy sources. Ocean wave energy is a new and developing industry, which introduces new technical and political challenges that must be well understood. Looking forward, one of the biggest technical concerns is the lack of power system data and accurate wave models used for power system planning and expansion.

This study will address these concerns by producing a well-being analysis model that power system planners and policy makers will use to make informed decisions. By leveraging engineering advances, students will open up long lasting channels of communication with policy makers and balancing authorities to further the field of marine energy. Through collaboration, potential students will leverage principles from electrical engineering, ocean sciences, and energy policy to generate a plan of action.

Existing Data:

* National Data Buoy Center (NDBC)
* IEEE reliability data for benchmarking test cases.

Data Needs:

Our data needs stem from the lack of communication between utilities and researchers at the early stages of work. The goal is to open up a channel of communication and collaboration, allowing reliability concern to be investigated. Furthermore, near and far term wave forecasting models need to be investigated and benchmarked for future grid planning.

Desired Area(s) of Expertise for Students:

This project will require understanding of power system analysis, reliability engineering, computer science, energy policy.