

ENERGY STORAGE FOR ENABLING DISPATCHABILITY AND BASELOAD CAPABILITY OF TIDAL POWER GENERATION FACILITIES

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One of the greatest advantages of tidal energy resources is better predictability in comparison to other renewable resources (e.g., solar, wind). Having a better foresight of power profiles from a tidal generation facility could be particularly useful in dealing with variabilities caused by tidal cycles and other periodicities. As energy storage systems (ESS) are becoming cheaper and gaining more industry acceptance, the marine and hydrokinetic (MHK) energy community is considering adoption of ESS to mitigate variabilities. The idea of utilizing predictable nature of tidal resources, supported by co-located ESS, for achieving dispatchability or baseload capability is coming into consideration. While some degree of device-level ESS integration (e.g., supercapacitors with wave energy converters) is observed in the current MHK industry, wide-scale ESS integration with a variety of MHK devices is still a nascent topic. Integration of ESS with tidal power facilities will need research to understand suitable technologies, appropriate siting and sizing, and effective control strategies. This poster will present a work that will review predictability aspects of tidal resources, and characteristics of dispatchable and baseload generation facilities, to understand capability gap. Based on the gap analysis and current state of ESS technologies, suitability of ESS-supported tidal facilities as prospective dispatchable and baseload generation resource will be explored. This analysis will help to examine the value proposition of tidal resources as dispatchable and baseload generation. It will also support the development of general considerations for determining ESS technology, size, integration location/layout, and control strategies enabling tidal power plants to provide dispatchable and baseload power services. It is anticipated, such general considerations would provide premise for developing project specific detailed considerations and hence, would eventually support the advancement of MHK sector.

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