



AMERICA'S LARGEST SOURCE OF CLEAN, RENEWABLE ELECTRICITY

SUPPORT NAVAL MARINE HYDROKINETIC ENERGY TECHNOLOGY R&D DEVELOPMENT

NHA urges Congress to fund the Navy program at \$35 million for FY 2020.

MAKING THE CASE FOR NAVY R&D INVESTMENTS IN MARINE HYDROKINETIC TECHNOLOGIES

NHA calls for robust federal investments (\$35 million) in FY 2020 to support marine hydrokinetic (MHK) energy technology development for national security applications. These rapidly advancing water power generation devices can tap into vast amounts of globally available wave, tidal, current and riverine resources and are uniquely positioned to provide predictable power for persistent surveillance, unmanned vehicle recharging, communications nodes, or other applications where legacy methods of power delivery are not available or are significantly limited.

The FY2018 NDAA provides congressional direction on how marine energy is critical to developing the naval force of the future.

"The committee is aware of the U.S. Navy's vision in the 30-year research and development plan for supporting energy harvesting, undersea sensor nets, and unmanned underwater vehicle operations. In order to conduct many of the development and research projects planned by the Navy, the committee recognizes the need to have sufficient infrastructure to not only test, but also to do a broader range of experimentation, prototyping, and development that will be necessary for future naval capabilities. The committee encourages the Navy, in coordination with its other Federal partners, to continue its support for the development of marine and hydrokinetic technologies, including research, testing, and demonstration of maritime security systems, at-sea persistent surveillance and communications systems, and unmanned undersea vehicle charging. The committee believes that support from existing facilities, such as the Navy's Wave Energy Test Site in Hawaii and other research facilities that are supporting marine and hydrokinetic energy systems technology development, will be critical to developing the naval force of the future."

WHY MARINE ENERGY?

MHK systems are early stage technologies that are particularly relevant to applications requiring power in the open ocean and coastal areas, such as distributed sensor networks with onboard processing, as well as recharge nodes for unmanned vehicles used for surveillance, mapping, and/or environmental sensing. Small-scale MHK systems have the potential to enable broadly distributed sensor networks wherever there is moving water (river, tidal, and ocean currents) or waves for persistent domain awareness – an entirely new frontier in national security. Such applications function as small microgrids consisting of at least one source of marine energy generation, at least one load, and intermediate storage. As a component in larger, islanded microgrids, MHK systems can increase the resiliency and security of DOD facilities by decreasing the need for long supply lines through hostile operating environments and providing redundant generation options.

MHK technologies may be less vulnerable to disruption than other technologies. First, the high energy density in waves and currents enables small MHK converters to produce useful energy. Across the world's oceans solar resources vary from 50-500 W/m² of absorber area, while wave energy resources routinely exceed 20,000 W/m of wave crest. Second, many MHK systems can be easily adapted for concealment under water. Strategic action focused on critical issues related to electrical integration and in-field evaluation of marine energy technologies can expedite availability of these systems for defense applications.

BENEFITS TO U.S.

Demonstrates generation of efficient, readily-available, reliable, environmentally-compatible, scalable and deployable electric power, independent of fossil fuel sources, thus reducing vulnerability in time of conflict/fuel shortages, while geographically expanding the deployability of electricity-based systems.

Supplies power for communications, lighting, heating, cooling, desalination and other equipment at remote locations; with simple modular maintenance.

Establishes US leadership in blue microgrids before European or Asian players can leverage their larger public sector investments in utility-scale MHK technologies.

PROGRAM SCOPE

Phase I: Joint Industry Projects to support pre-commercial marine energy systems development for national security applications, procurement of supplies and equipment, design and installation of instrumentation systems, and test facility enhancement/modernization. Update Navy estimates of marine hydrokinetic resources at locations relevant to Navy/Marine Corps mission. \$20 million.

Phase II: Demonstrate coastal microgrids, including persistent surveillance and unmanned vehicle recharge capabilities. \$15 million.