

WHO

SYSCOM: MCSC
Sponsoring Program: Marine Corps Logistics Combat Element Systems
Transition Target: Marine Corps System Command
TPOC: sbir.admin@usmc.mil

Other Transition Opportunities: The technology developed will support DoD groups that require power generation in the field. The dimensions of the system may be modified to fit on a wide range of military transport vehicles.

Notes: The Modular Collapsible Hydro-Electric Generator (MCHEG) improves on existing hydrokinetic turbines by offering a lightweight collapsible solution designed specifically for rapid deployment and transport. Existing turbines are too heavy to relocate and transport in the field. The MCHEG system modules can be linked together in a variety of configurations to generate the maximum amount of power over a range of river and stream geometries to meet unique mission requirements.



Image Courtesy of Physical Sciences, Inc.

WHAT

Operational Need and Improvement: The Marine Corps need power generation solutions to recharge batteries and ancillary equipment in the field. The state-of-the art is to support missions by carrying extra batteries or fuel. The ability to generate power in the field will increase the range of these forward operating missions.

Specifications Required: The system must generate 500 W power in streams flowing as slow as 1 m/s and stow within a volume of one cubic meter. It should be able to be deployed by two operators in less than 30 minutes. Individual components may not weigh more than 88 pounds, enabling a two person lift.

Technology Developed: The Modular Collapsible Hydro-Electric Generator (MCHEG) can be deployed by two operators in less than 15 minutes to generate 500 W power from any stream or river source at last 1 m/s and up to 1500 W power for streams flowing faster than 1.5 m/s. The modular system is configurable to a wide range of streams that have a minimum depth of 0.5 m and width of at least 1.2 m. The system includes features to shed debris in the stream, offering continuous uninterrupted power generation in harsh environments.

Warfighter Value: Warfighters will benefit from increased mission range. The MCHEG reduces the need to carry extra batteries and compliments solar power generation solutions by providing the ability to generate power continuously under canopy and at night without detection.

WHEN

Contract Number: M67854-23-C-6529 **Ending on:** Sep 01, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Turbine performance validated	N/A	Shaft power of 125 W per module demonstrated in laboratory tow tank testing	3	1st QTR FY23
Turbine-generator system performance demonstrated	Low	Electrical power of 125 W demonstrated in a laboratory flume tank using a prototype floating turbine module paired with a compact, high efficiency generator	4	4th QTR FY24
Field deployment of a single turbine module	Medium	Deployment and retrieval time of less than 30 minutes achieved for a single floating turbine prototype module at a river site with flow up to 0.5 m/s	5	1st QTR FY25

HOW

Projected Business Model: The MCHEG is a standalone device that may be fielded by the Marine Corps, Navy and Army. PSI has the capacity to assemble up to 100 units per year for a period of three years when the product initially launches. PSI will identify a manufacturing partner to assist in longer-term production as demand increases.

Company Objectives: Founded in 1973, Physical Sciences Inc. provides advanced research and design to government and commercial customers. PSI completes technology transition and product development for government and industrial customers, prototyping for commercial applications and limited production of special instruments. PSI has completed technology and product licensing with many strategic partners and has launched four spin-out companies to date.

Potential Commercial Applications: Commercial markets include off-grid & sustainable living, outdoors and recreational power. The turbine design and materials used in construction can be scaled to optimized system cost, power generated and required maintenance interval for unique power generation applications.