



MHK Program Area Overview: Technology-Specific Design and Validation

Marine and Hydrokinetics Program

Wednesday, October 9, 2019

Lauren Moraski Ruedy,
Technology Manager

Water Power Technologies Office

Marine and Hydrokinetics (MHK) Program Strategic Approaches

Data Sharing and Analysis

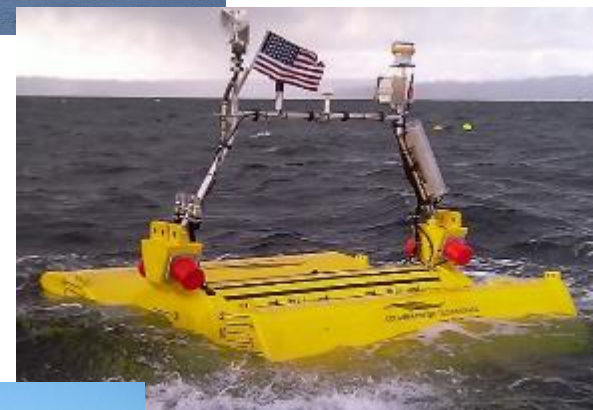
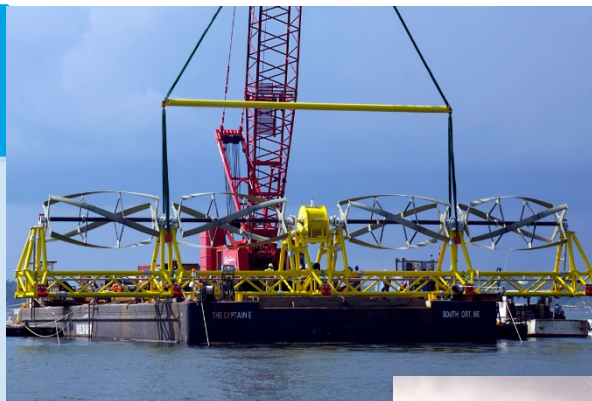
Foundational
and
Crosscutting
R&D

Technology-
Specific
Design and
Validation

Reducing
Barriers to
Testing

Technology-Specific Design and Validation

- Validate **performance and reliability** of systems by conducting in-water tests of industry-designed prototypes at multiple relevant scales
- Improve methods for safe and cost efficient **installation, grid integration, operations, monitoring, maintenance, and decommissioning** of MHK technologies
- Support the development and adoption of **international standards** for device performance and insurance certification
- Evaluate current and potential future needs for MHK-specific IO&M infrastructure (vessels, port facilities, etc.) and **possible approaches to bridge gaps**



Technology-Specific Design and Validation Presentations: Wednesday, October 9th

Start	End	Agenda Session	Presenter	Affiliation	Track
1:15 PM	1:35 PM	Overview of Technology-Specific Design and Validation	Lauren Moraski Ruedy	WPTO	Foundational R&D
1:35 PM	1:45 PM	Introduce FOA Projects	Erik Mauer	WPTO	Foundational R&D
1:45 PM	2:05 PM	HydroAir Power Take Off System	Rod Blunk	Siemens Government Technologies	Foundational R&D
2:05 PM	2:25 PM	Demonstration of the Ocean Energy (OE) Buoy at US Navy's Wave Energy Test Site	Erik Mauer (on behalf of OE)	Ocean Energy USA	Foundational R&D
2:25 PM	2:45 PM	Joint Q&A for Siemens & OE			Foundational R&D
2:45 PM	3:00 PM	Coffee Break			
3:00 PM	3:30 PM	Azura Demonstration at the Navy's Wave Energy Test Site (WETS)	Bradley Ling	Northwest Energy Innovations	Foundational R&D
3:30 PM	3:35 PM	Introduce Lab Projects	Carrie Schmaus	WPTO	Foundational R&D
3:35 PM	4:05 PM	WaveSPARC	Jochem Weber	NREL	Foundational R&D
4:05 PM	4:35 PM	Flexible Material WEC Technology Techno-Economic Performance	Jochem Weber	NREL	Foundational R&D
4:35 PM	5:05 PM	Standards Development for Marine Energy	Walt Musial	NREL	Foundational R&D
5:05 PM	5:25 PM	End-of-Session Networking Activity	All recent presenters	All recent presenters	Foundational R&D
5:25 PM	5:55 PM	Peer Reviewer Only Meetings			

Technology-Specific Design and Validation Presentations: Thursday, October 10th

Start	End	Agenda Session	Presenter	Affiliation	Track
9:00 AM	9:05 AM	Introduce FOA & Lab Projects	Carrie Noonan	WPTO	Foundational R&D
9:05 AM	9:35 AM	Kinetic Hydropower System (KHPS) TriFrame Mount Integrated Development and IO&M Testing at RITE	Dean Corren	Verdant Power, Inc.	Foundational R&D
9:35 AM	10:05 AM	CalWAVE Open Water Demonstration	Thomas Boerner	CalWave Power Technologies Inc.	Foundational R&D
10:05 AM	10:35 AM	A Hermetically Sealed Magnetically Geared Marine Hydrokinetic Generator	Jonathan Bird	Portland State University	Foundational R&D
10:35 AM	10:45 AM	Coffee Break			
10:45 AM	11:15 AM	Robotic Juggler Offshore WEC	Vassilios Vamvas	Enorasy LLC	Foundational R&D
11:15 AM	11:45 AM	Techno-Economic Analysis and Program Support	Scott Jenne	NREL	Foundational R&D
11:45 AM	12:05 PM	End-of-Session Networking Activity	All recent presenters	All recent presenters	Foundational R&D
12:05 PM	12:25 PM	Closing Remarks on Foundational R&D	Lauren Moraski Ruedy & Bill McShane	WPTO	Foundational R&D
12:25 PM	1:15 PM	Lunch			

Wave Energy

FY17 FOA 1663: MHK Tech Development

AquaHarmonics – WEC device at WETS

Resolute Marine – seawater pump

Oscilla Power Inc. – linear PTO

FY18 FOA 1837: MHK Tech Adv & Regulatory

Oscilla Power Inc. – controls with Triton WEC

Atargis Energy Corporation – tank test axial WEC

Columbia Power Technologies, Inc. – PBE dataRAY

University of Hawaii at Manoa – tank test WFEC

Texas A&M University – surface riding WEC

FY19 FOA 2080: WPTO (included MHK AOI for WECs)
selections TBD



Program Portfolio

Current Energy

FY15 FOA 1310: Durability & Survivability

Igiugig Village Council – ORPC device test

FY17 FOA 1663: MHK Tech Development

ORPC – CEC foil design

UAF – refine & test CEC

FY18 FOA 1837: MHK Tech Adv & Regulatory

Littoral Power Systems Inc. – CEC design

NC State – CEC kite test

FAU – small CEC for UV recharge station

FY19 FOA 2080: WPTO (included MHK AOI for CECs)

selections TBD

Resource Agnostic

IEC TC 114, IEA-OES

FY19 FOA 2012: TEAMER Network Director

Prizes: Waves To Water & Ocean Observing



RivGen® Power System Celebration including representatives of DOE, Alaska Senator Lisa Murkowski's office, First Alaskans Institute, Alaska Governor Mike Dunleavy, and ORPC CEO Chris Sauer. Credit: Austin McDaniel, Governor Dunleavy's Office



Program Management Approach

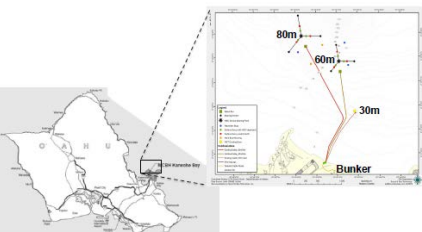
FY17-FY19 MHK Program Budget by Activity



Program Management Approach

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



- FOA 705: “In-Water Wave Energy Conversion (WEC) Device Testing Support” Issued – May 2012
- FOA 1081: “Marine and Hydrokinetic (MHK) Demonstrations at the Navy’s Wave Energy Test Site (WETS)” Issued – April 2014
- Wave Energy Prize Launched – April 2015
- Wave Energy Prize Winner Announced – Nov 2016
- RFIs on Draft MHK Strategy – Sept 2016 / Feb 2017
- WPTO Stakeholder Public Webinar – Feb 2019
- PBE Report Released – June 2019
- U.S. Testing Expertise & Access for Marine Energy Research (TEAMER) Network Director Announced – September 2019



Stakeholder Engagement, Outreach, and Dissemination

- 2 RFIs issued on draft MHK Program Strategy (2016/2017) identifying challenges and approaches
 - Last update provided: Sept 2019 at OREC
- HQ information disseminated via:
 - Stakeholder email updates (Water Wire, Tethys Blasts, Tethys Engineering Blasts)
 - Conference presentations (Waterpower Week, OREC, EWTEC/AWTEC, OEE)
 - Monthly webinars with MEC
 - Workshops as needed (e.g. Maritime Markets)
 - RFIs (Ocean Energy Performance Metrics, MHK Strategy)
 - WPTO Stakeholder Public Webinar
- WPTO funded developer/researcher information disseminated via:
 - Stakeholder email updates (Water Wire, Tethys Blasts, Tethys Engineering Blasts)
 - Data repositories (MHKDR, PRIMRE, Tethys, Tethys Engineering)
 - Monthly webinars with MEC
 - Workshops as needed (e.g. MHK Materials)

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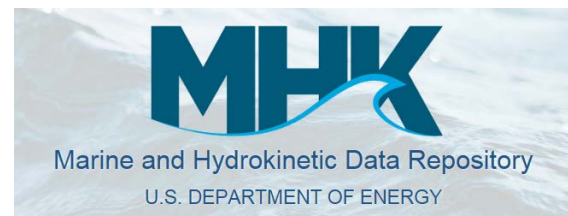
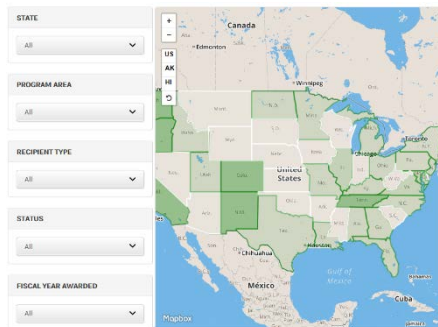
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Stakeholder Engagement, Outreach, and Dissemination

- Project Map
 - <https://www.energy.gov/eere/water/water-power-technologies-office-projects-map>

- Data Repositories
 - <https://mhkdr.openei.org/>
 - <https://openei.org/wiki/PRIMRE>



- Subscribe to the Water Wire:
 - <https://www.energy.gov/eere/water/subscribe-water-power-technologies-office-news-updates>
 - MHK Composites Webinar (July 2018)
 - <https://www.energy.gov/eere/water/articles/now-available-recorded-marine-hydrokinetic-advanced-materials-webinar>
 - 2018 WPTO Highlights (Jan 2019)
 - <https://www.energy.gov/eere/water/articles/look-back-water-power-2018>
 - IEA-OES 2018 Annual Report (March 2019)
 - <https://www.ocean-energy-systems.org/news/the-oes-2018-annual-report-is-launched/>
 - TEAMER Network Director Announced (Sept 2019)
 - <https://www.energy.gov/eere/articles/energy-department-announces-network-director-marine-energy-research-and-testing>

- ICOE 2020 Call for Abstracts
 - [ICOE2020.org](https://www.icoe2020.org)
 - Updated submission deadline: **November 15, 2019**
- TEAMER Next Steps
 - Establish Facility Network
 - Release Requests For Technical Support (RFTSs)
- Prizes
 - <https://www.energy.gov/eere/water/water-power-technologies-office-prizes-competitions>
 - Collegiate Competition:
[https://openei.org/wiki/PRIMRE/STEM/Marine_Energy_Collegiate_Competition_\(MECC\)](https://openei.org/wiki/PRIMRE/STEM/Marine_Energy_Collegiate_Competition_(MECC))
 - Applications must be submitted: **October 18, 2019**
 - Waves to Water Prize: <https://americanmadechallenges.org/wavestowater/>
 - CONCEPT Stage Winners Announcement: October 2019
 - **DESIGN Stage: October 2019 – January 2020 (anticipated)**
 - Ocean Observing Prize: <https://americanmadechallenges.org/oceanobserving/>

