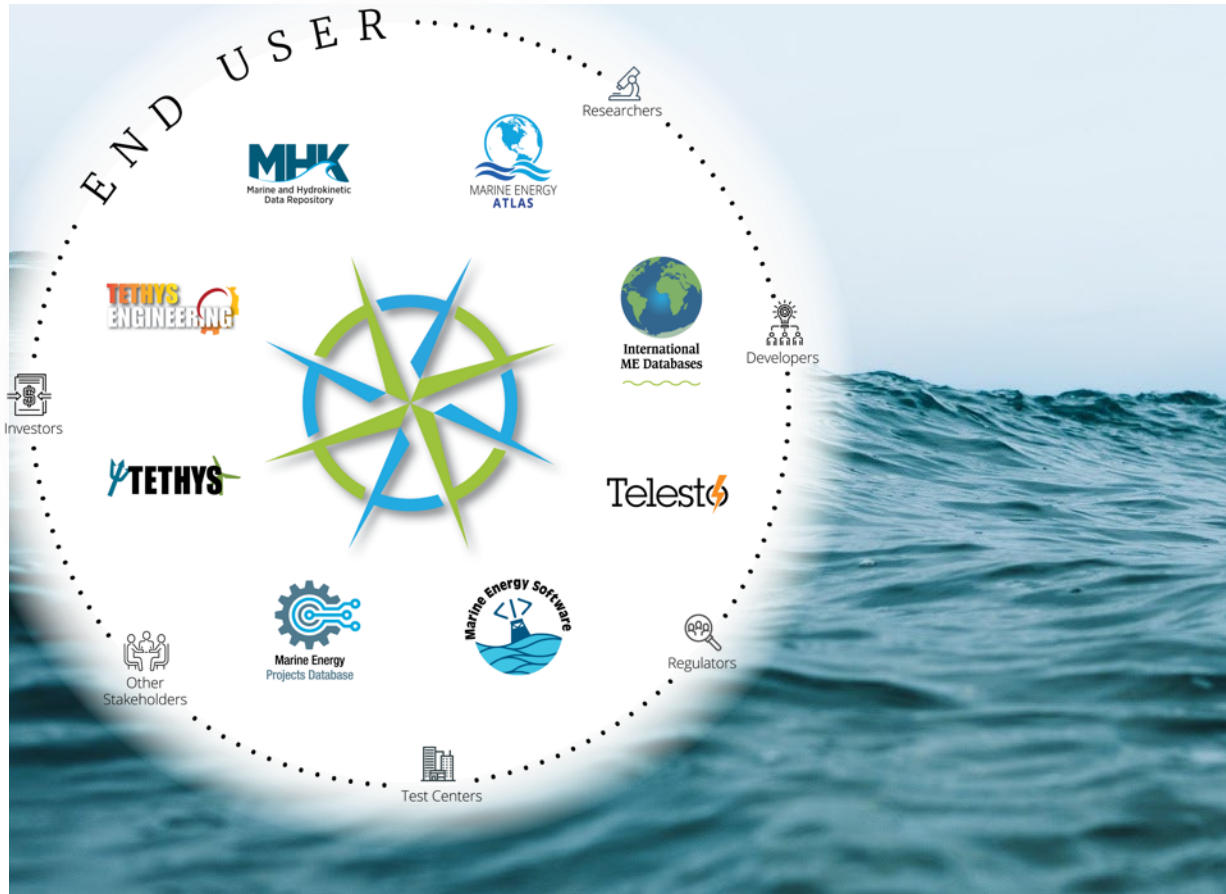


2.4.1.401 – PRIMRE



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July 21, 2022

<https://primre.org>

Project Overview

Project Summary

The **Portal and Repository for Information on Marine Renewable Energy (PRIMRE)** provides centralized access, standardization, community building, and integration of WPTO-funded marine energy data repositories and knowledge hubs. By bringing key databases together, knowledge will be increased by reducing redundancy, ensuring information and lessons learned in this sector are captured, made publicly available, and the efficiency of data searching and analysis will be enhanced.

Intended Outcomes

Data and information available and readily extractable from PRIMRE will help the marine energy community to build on past experience, investigate promising lines of research and development, and increase awareness of the value of marine energy. Taken together, these outcomes will help establish robust, sustainable, and responsible marine energy as a significant part of the nation’s renewable energy portfolio.

Project Information

Principal Investigator(s)

- Andrea Copping (PNNL)
- Jon Weers (NREL)
- Cesar Castillo (Sandia)

Project Partners/Subs

- Collaboration with other national labs, universities, National Marine Renewable Energy Centers, and industry

Project Status

Ongoing

Project Duration

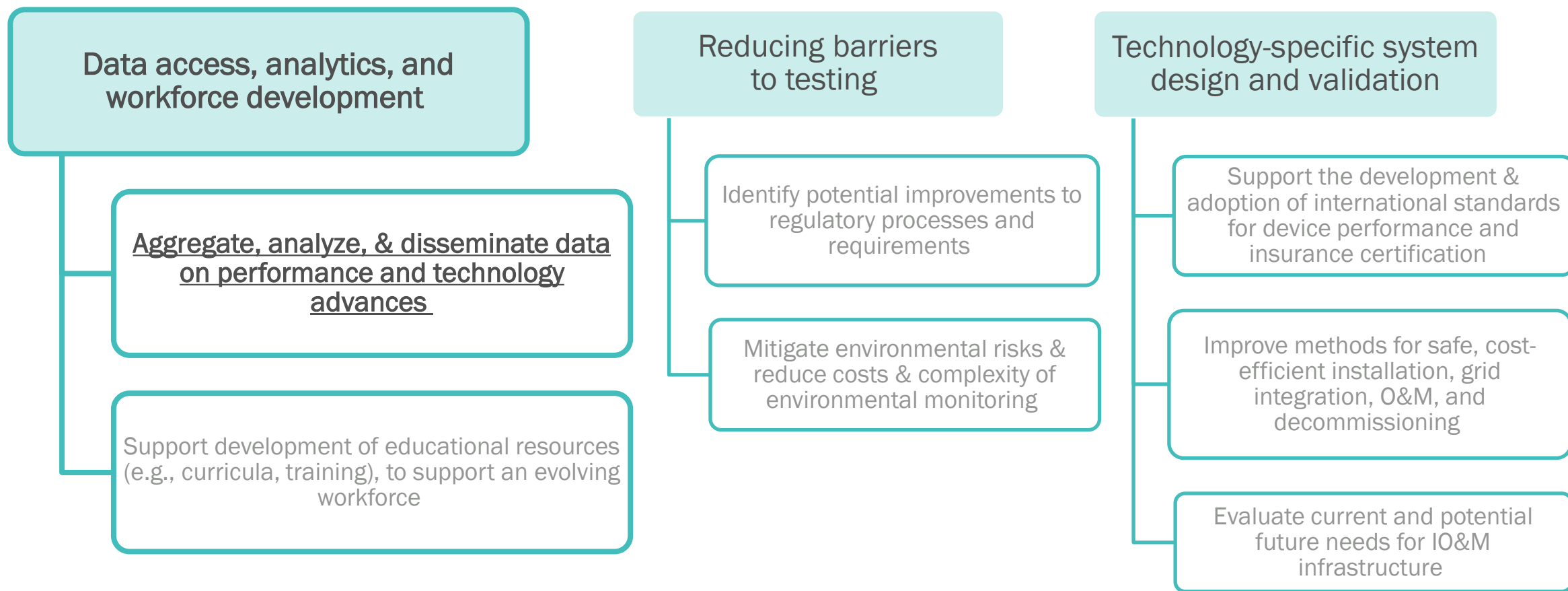
- Project Start Date: October 1, 2017
- Project End Date: September 30, 2024

Total Costed (FY19–FY21)

PNNL =	\$1,221K	Total = \$2,159 K
NREL =	\$579K	
Sandia =	\$880K	

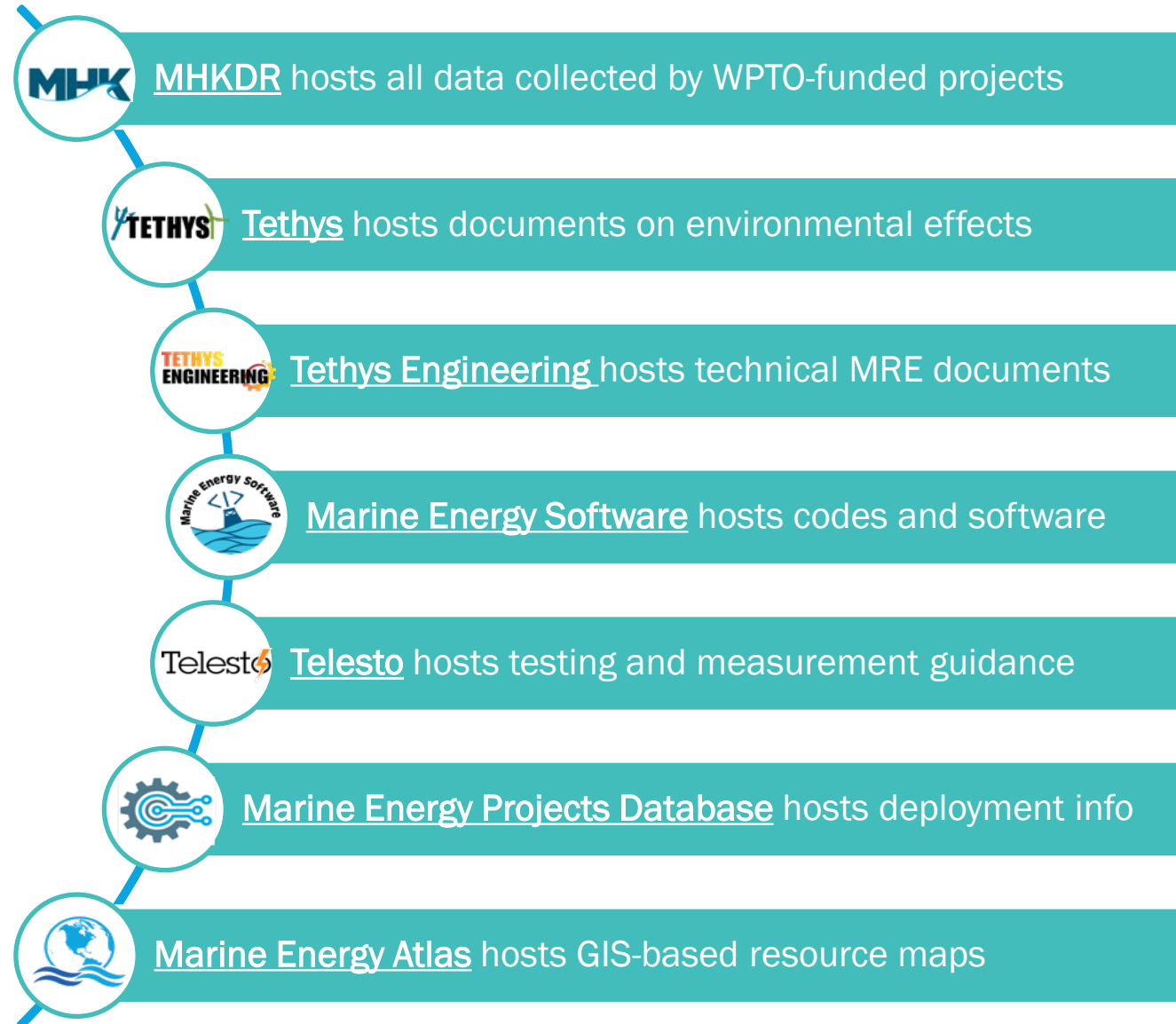
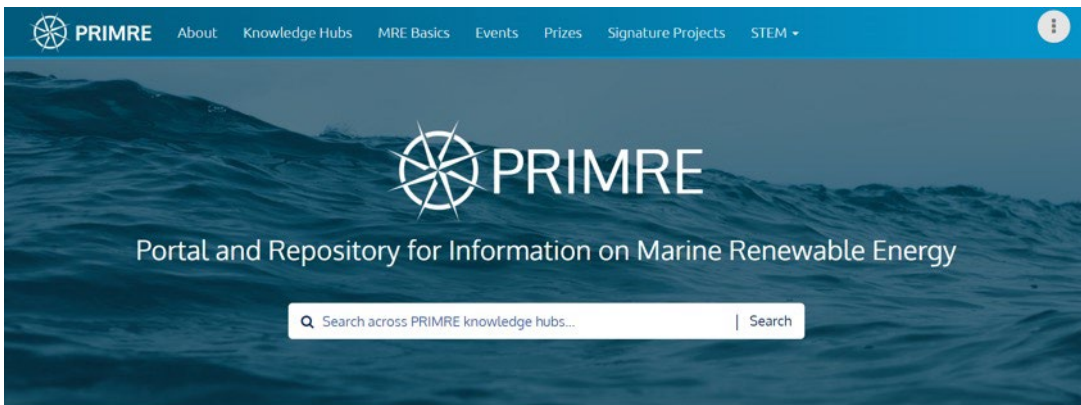
Project Objectives: Relevance

PRIMRE brings together data and information that supports WPTO marine energy program goals, enabling data accessibility and dissemination, as well as supporting the dissemination strategy for many other aspects of the program.



Project Objectives: Approach

- **PRIMRE** is the overarching system that brings together information from 7 Knowledge Hubs.
- Each **Knowledge Hub** houses a different type and format of information related to marine energy.
- Several Knowledge Hubs were developed under other projects, but all have been integrated (made interoperable), expanded, and improved under the PRIMRE project.
- PRIMRE has a **one-stop search** that allows users to find and contribute data in any part of the system.
- Value-added products developed based on access to all data and information types



Project Objectives: Expected Outputs and Intended Outcomes

Expected Outputs



PRIMRE
and 7
Knowledge
Hubs

Launched Tethys
Engineering, MRE
Software, and Telesto

International
data sharing
workshop
(OES)

Public
webinars,
workshops,
publications



Value
Added
Products

Lessons Learned
Signature Projects



Intended Outcomes

Improve
access to
US data and
information

Strengthen
links to
international
community

**Bridging
the gap
between
data and
people**

Retain
lessons
learned

Coordinate
across labs

Enable
forward-
looking
research

Facilitate
marine
energy
development

Project Timeline

- Continue collaboration and coordination among 3 labs (weekly meetings)
- Continue curating and maintaining the PRIMRE Knowledge Hubs
- Develop and implement Stakeholder Engagement activities

FY19

- Develop and launch Tethys Engineering
- Publish Data Guidelines and Best Practices for contributing and linking to PRIMRE
- Enhance search capabilities on MHKDR
- Develop Signature Project organizational structure for accessing related data and information

FY20

- Develop and launch MRE Software and Telesto
- Add 3 Signature Projects
- Establish consistent data standards and metadata across Knowledge Hubs
- Aggregate search across Knowledge Hubs
- Conduct user review of 2 Knowledge Hubs

FY21

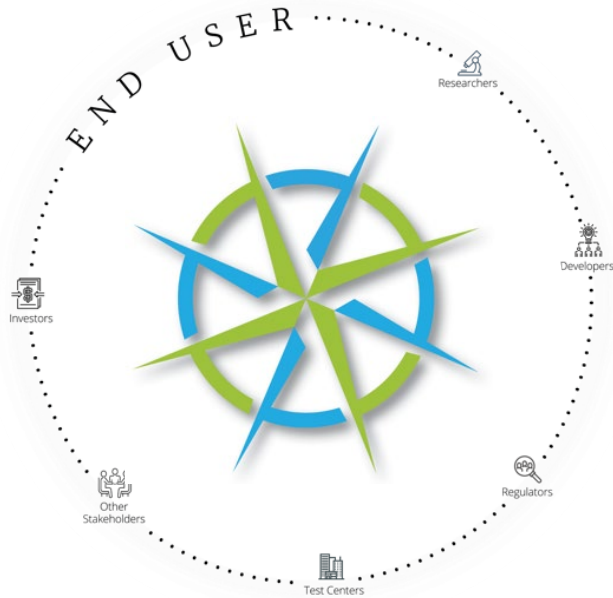
- Add 5 Signature Projects
- Launch Lessons Learned interviews with developers, researchers, test centers
- Conduct user review of 2 additional Knowledge Hubs
- Further integration of PRIMRE with WPTO-funded projects

Project Budget

Lab	FY19	FY20	FY21	Total Actual Costs FY19-FY21
	Costed	Costed	Costed	Total Costed
PNNL	\$478K	\$315K	\$428K	\$1,221K
NREL	\$155K	\$208K	\$216K	\$579K
Sandia	\$259K	\$210K	\$410K	\$879K
Total	\$892K	\$733K	\$1,054K	\$2,159K

- No changes in scope, overruns, budget reallocations, or missed milestones.
- Lead lab rotates to ensure strong coordination and shift in administrative load.
- External Steering Committee represents industry, academia, agencies, international reps, to ensure community input in decision making.
- Budgets for previous Knowledge Hubs development:
 - MHKDR: FY19=\$96K FY20=\$183K FY21=\$135K Total=\$413K
 - Tethys: FY19=\$197K FY20=\$103K FY21=\$151K Total=\$451K

End-User Engagement and Dissemination



PRIMRE is an outward facing data system to ensure awareness and access

- All aspects are geared towards end-users
- Design and content based on stakeholder inputs
- Cloud-based storage provides universal access without a paywall
- Allows engagement with smaller institutions, increased DEI access



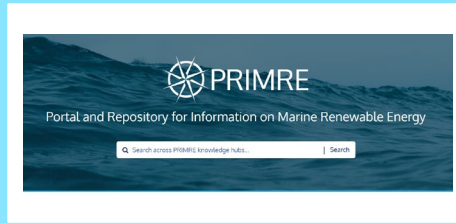
Performance: Accomplishments and Progress

Integrated Data System



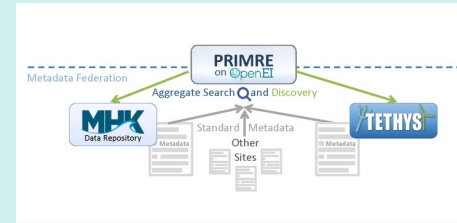
Brings together all US marine energy outputs from disparate systems

One-Stop Search



Improves discoverability of US marine energy data, information, and resources

Guidelines/Best Practices



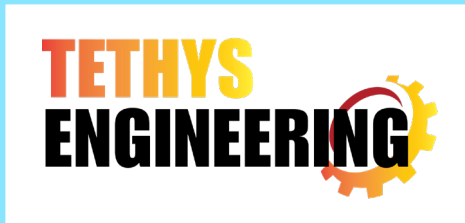
Enables sharing of data across US and international databases

Signature Projects



Allows access to all data and information from significant WPTO projects

Tethys Engineering



Hosts thousands of technical and engineering marine energy documents

MRE Software



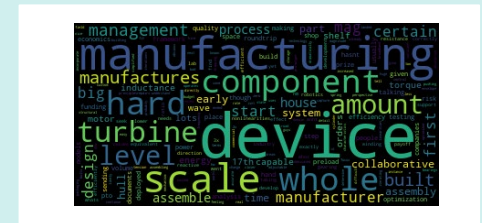
Systematically catalogues codes and software relevant to marine energy

Telesto



Provides guidance on marine energy testing, measurement, and analysis

Lessons Learned



Captures progress and caveats from US marine energy industry

Performance: Accomplishments and Progress

Papers & Presentations

- ICOE 2021
- EWTEC 2019
- EWTEC 2021
- WPW 2019
- PAMEC 2020
- OTC 2019

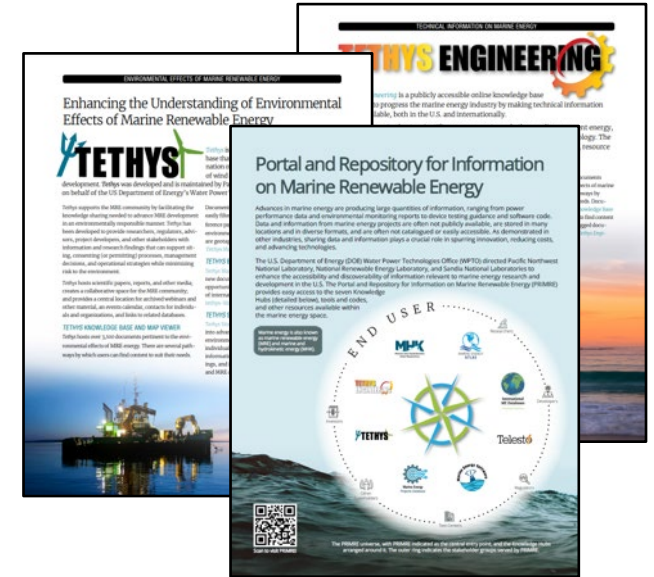
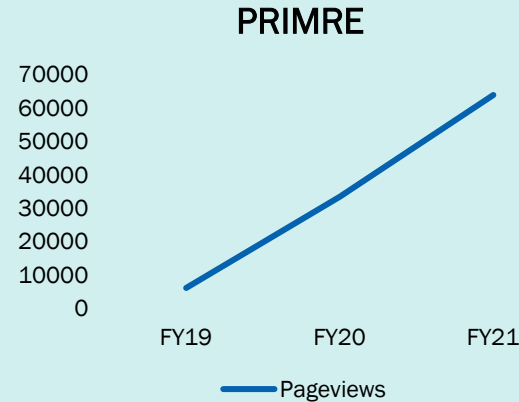
Workshops/Attendees

- OREC 2021/60
- OREC 2019/60
- OES 2021/27
- EWTEC 2019/43
- PAMEC 2020/38
- PAMEC 2022/32

Webinars/Attendees

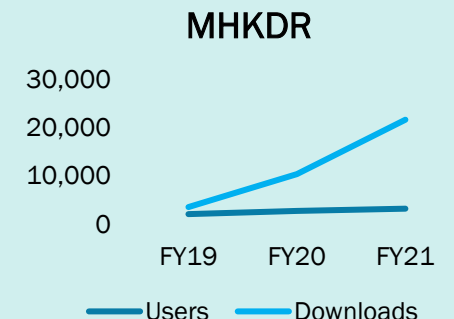
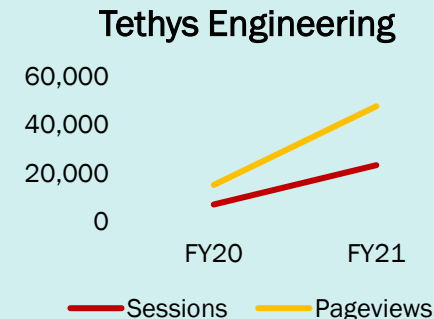
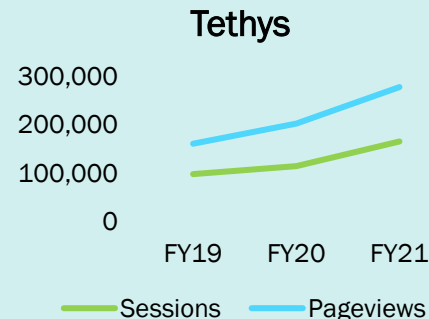
- MECC Webinar 2021/50
- WPTO R&D Deep Dive 2021
- 2 New PRIMRE Developments 2021/174
- National Lab Demos 2021
- MECC Webinar 2020/50
- Tethys Engineering 2019/37

PRIMRE Tracking Metrics

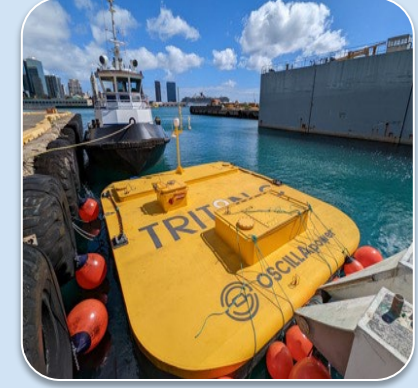
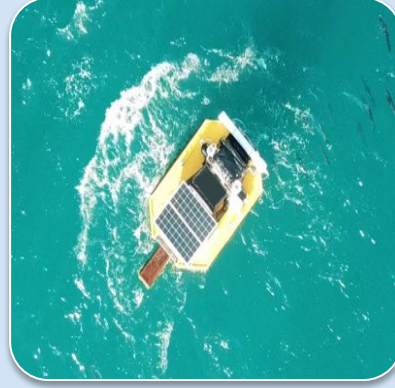


<https://tethys-engineering.pnnl.gov/summaries/primre-fact-sheet>

Knowledge Hub Tracking Metrics



Future Work – FY22



PRIMRE & Knowledge Hubs

- Added Marine Energy Atlas to PRIMRE
- Enabled aggregate search across the Tethyses & MHKDR
- Reviewed & increased access to MRE Software
- Overhauled Marine Energy Projects Database (new features, updates)

Coordination & Support

- Provided language & technical support for AOPs and FOAs
- Provided technical support for dissemination of WPTO funded projects (webinars, dissemination guide)

Value Added Products

- Supporting TEAMER & UMERG
- Added Signature Projects for TEAMER & UMERG
- Completed interviews for Lessons Learned
- Developed process for Lessons Learned data analysis

Outreach & Engagement

- Hosted 2nd International OES Workshop on Data Sharing
- Hosted webinars & workshops (PAMEC)
- Contributed to STEM page on PRIMRE
- Developed a PRIMRE Fact Sheet and video
- Conducted user review of Tethys Engineering & MHKDR

Future Work – FY23 & FY24



PRIMRE & Knowledge Hubs

- Enable aggregate search across all remaining Knowledge Hubs
- Update PRIMRE Events Calendar
- Continue updating Marine Energy Projects Database
- Update/reorganize Telesto
- Revamp OES GIS

Coordination & Support

- Provide ongoing technical support for AOP & FOA language
- Provide ongoing assistance with data & information dissemination
- Improve access to and awareness of data for underserved institutions

Value Added Products

- Assist WPTO with Lessons Learned integration into project close outs
- Enable data pipelines for all marine energy data
- Continue to expand Signature Projects for accessibility
- Analyze gaps & opportunities

Outreach & Engagement

- Host webinars and workshops, focus on underserved individuals and institutions
- Host annual international workshops on data sharing
- Establish linkages with international databases

Thank You

PRIMRE PIs:

- Andrea Copping (andrea.copping@pnnl.gov)
- Jon Weers (jon.weers@nrel.gov)
- Cesar Castillo (cesar.castillo@sandia.gov)

PRIMRE Team:

- **PNNL:** Jonathan Whiting, Lysel Garavelli, Hayley Farr, Dorian Overhus, Deborah Rose, Levy Tugade, and Chitra Sivaraman
- **NREL:** Jon Weers, Jay Huggins, Tom King, Hanna Fields, and Katie Peterson
- **Sandia:** Kelley Ruehl, Thushara Gunda, Will Peplinski, Alec Carruthers, and Rachel Homan



<https://primre.org>

Q&A