MARINE ENERGY RESOURCE LIBRARY

HIGH-LEVEL OVERVIEWS AND SUPPORTING MATERIALS

1. MHK 101 video: Broad introduction to marine energy.
2. Tidal power 101: Introduction to tidal power.
3. Powering the Blue Economy Appendix: Developed as part of the recently published Powering the Blue Economy Report, this appendix provides an overview of marine energy technology types, resource potential, energy costs, laboratories, testing facilities, industry standards, and more.
4. Renewable Energy Discovery Island: Interactive, web-based app with hundreds of educational resources on marine energy and hydropower technologies.
5. MHK device types: glossary of the some of the known device types for wave, current, tidal, and ocean thermal energy converters.
6. Marine Hydrokinetic Energy Site Identification and Ranking Methodology Part I: Wave Energy
7. Marine Hydrokinetic Energy Site Identification and Ranking Methodology Part 2: Tidal Energy
8. MHK Atlas
9. Marine Hydrokinetic Resource Assessment for Domestic Army, Air Force, and Coast Guard Facilities
10. EMEC List of Worldwide Wave Developers
11. EMEC List of Worldwide Tidal Developers
12. BOEM Renewable Energy on the Outer Continental Shelf
13. Ocean Energy Systems Annual Report 2018
14. MaRINET2 Short Courses on Offshore Renewable Technologies
15. ENCORE Program Offshore Renewable Energy e-learning modules
16. Fundamentals of Wave Energy Lecture 1
17. Fundamentals of Wave Energy Lecture 2

MODELING TOOLS

- Wave Energy Converter SIMulatore (WEC-Sim) - Open-source software for simulating wave energy converters. The software is developed in MATLAB/SIMULINK using the multi-body dynamics solver Simscape Multibody.
- OpenFAST can be used by marine turbine developers, in addition to wind turbine developers, to simulate how much energy different versions of designs might generate.
- MHKit - MHKiT is open-source marine renewable energy (MRE) software, developed in Python and MATLAB, that includes modules for ingesting, quality controlling, processing, visualizing, and managing data.
- Small WEC Analysis - Explore and compare small wave energy converter performance.
- Other tools – The PRIMRE website lists numerous tools for analyzing different aspects of a marine energy project.



DESALINATION

1. Powering the Blue Economy—Chapter 7: Desalination
2. Numerical Modeling and Dynamic Analysis of a Wave-Powered Reverse-Osmosis System
3. The cost of water from an autonomous wave-powered desalination plant

TECHNICAL DEEP DIVES

1. MHK databases: Quick links to open energy information on MHK, a central data repository, interactive mapping tools, and an environmental data site.
    a. Levelized cost of electricity (LCOE) guidance and supporting documentation
2. Reference Model Project: DOE's Reference Model Project was a partnered effort to develop open-source MHK point designs as reference models to benchmark MHK technology performance and costs, and an open-source methodology for design and analysis of MHK technologies, including models for estimating capital costs, operational costs, and LCOE. This project contains detailed reports for six types of marine energy devices including a: Tidal Current Turbine; River Current Turbine; Wave Point Absorber; Ocean Current Turbine; Oscillating Surge Flap; and an Oscillating Water Column.
    a. Project summary
3. Capture Width Ratio of wave energy converters
4. Numerical benchmarking study of a selection of wave energy converters
5. "International Levelized Cost of Energy for Ocean Energy Technologies," International Energy Agency, 2015

LITERATURE FOR FURTHER READING

41 Fundamentals of Ocean Renewable Energy: Presents the basic concepts of mechanics and introduces the various technical aspects of marine energy.

51 Handbook of Ocean Wave Energy: State-of-art research and applications in the two related and interdependent areas of ocean engineering and oceanography.

61 Ocean Wave Energy: Comprehensive description of marine energy conversion devices.

71 Ocean Waves and Oscillating Systems

81 Market Study on Ocean Energy by the European Commission

ADDITIONAL LINKS

1. DOE Water Power Technologies Office (WPTO) website
2. DOE WPTO Project Map: List of all projects funded by WPTO and high level descriptions
3. Collegiate Wind Competition Archives: Reports from past Collegiate Wind Competitions
4. Funding opportunities and where you can get DOE news:
    a. EERE Funding Opportunity Exchange: https://eere-exchange.energy.gov/
    b. Small Business Innovation Research/Small Business Technology Transfer solicitations: http://science.energy.gov/sbir/funding-opportunities/
    c. Advanced Research Projects Agency–Energy (ARPA-E) funding opportunity announcements: https://arpa-e-foa.energy.gov/

5. Subscriptions to Water Power Program "Breaking News" listserv (provides updates and notices for funding opportunities, program activities, events, and publications): http://water.energy.gov/subscribe.html
6. WPTO Semiannual Stakeholder Webinar
    d. Details on both WPTO's hydropower and marine energy programs along with ways to partner and get involved in new initiatives
7. PacWave Test Site: First grid-connected, full-scale test facility for wave energy conversion technologies.
8. DOE WPTO Standards Site