Report to Congress on the Potential Environmental Impacts of Marine and Hydrokinetic Renewable Energy Technologies

Energy Efficiency & Renewable Energy

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Energy Independence and Security Act of 2007 (EISA)

Sec 633 (b). The Secretary of Energy, in conjunction with the Secretary of Commerce… and the Secretary of the Interior… shall provide to the Congress a report that addresses—

(1) the potential environmental impacts, including impacts to fisheries and marine resources, of marine and hydrokinetic renewable energy technologies…

`marine and hydrokinetic renewable energy' defined as following:

(1) waves, tides, and currents in oceans, estuaries, and tidal areas;
(2) free flowing water in rivers, lakes, and streams;
(3) free flowing water in man-made channels; and
(4) differentials in ocean temperature (ocean thermal energy conversion).

Explicitly excludes "energy from any source that uses a dam, diversionary structure, or impoundment for electric power purposes."

Outline of the EISA Environmental Report

- Introduction
- Description of the technologies
  - Wave energy
  - Current energy
  - Ocean thermal energy conversion
- Potential environmental impacts, minimization, and mitigation measures
- Monitoring and adaptive management

Current and Wave Energy Technologies

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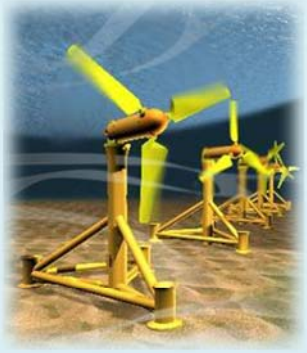
Current Energy Converters

Oscillating Hydrofoil (Stingray)
Source: The Engineering Business



Horizontal Axis Turbine (DEEP-Gen)
Source: Tidal Generation

Vertical Axis Turbine
(Blue Energy Ocean Turbine)
Source: Blue Energy

Ducted Horizontal Axis Turbine
(Open-Centre Turbine)
Source: OpenHydro

Wave Energy Converters

Submerged Pressure Differential
(Archimedes Wave Swing)
Source: AWS Ocean Energy

Oscillating Water Column (OEBuoy)
Source: Ocean Energy

Overtopping (Wave Dragon)
Source: Wave Dragon, Ltd.

Oscillating Wave Surge Converter
(Wave Roller) Source: AW Energy

Attenuator (Pelamis)
Source: Pelamis Wave Power

Point Absorber (AquaBuOY)
Source: Finavera

Ocean Thermal Energy Conversion (OTEC)

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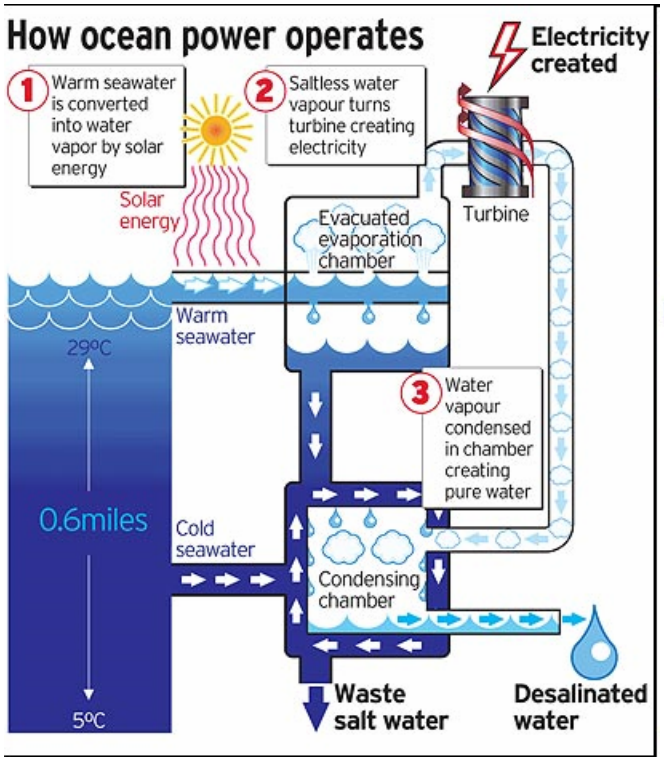

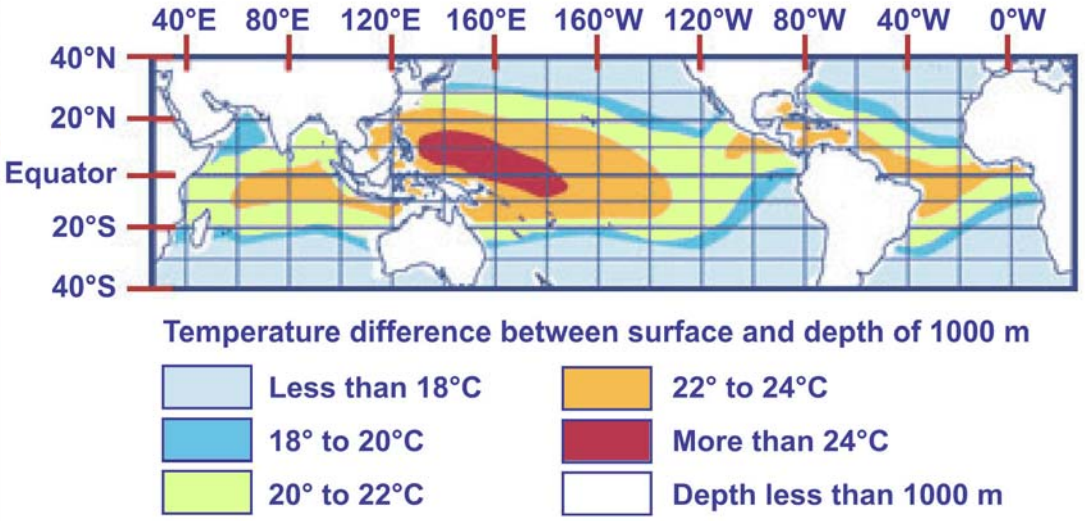

Environmental Issues

- Alteration of currents and waves
- Alteration of substrates and sediment transport and deposition
- Effects of habitat alteration on benthic organisms
- Noise
- Electromagnetic fields
- Toxic chemicals
- Interference with animal movements or migrations
- Strike
- Impingement
- Effects of single units vs. cumulative effects of multiple units
- Unique effects of OTEC

Environmental Assessment, Monitoring, and Adaptive Management

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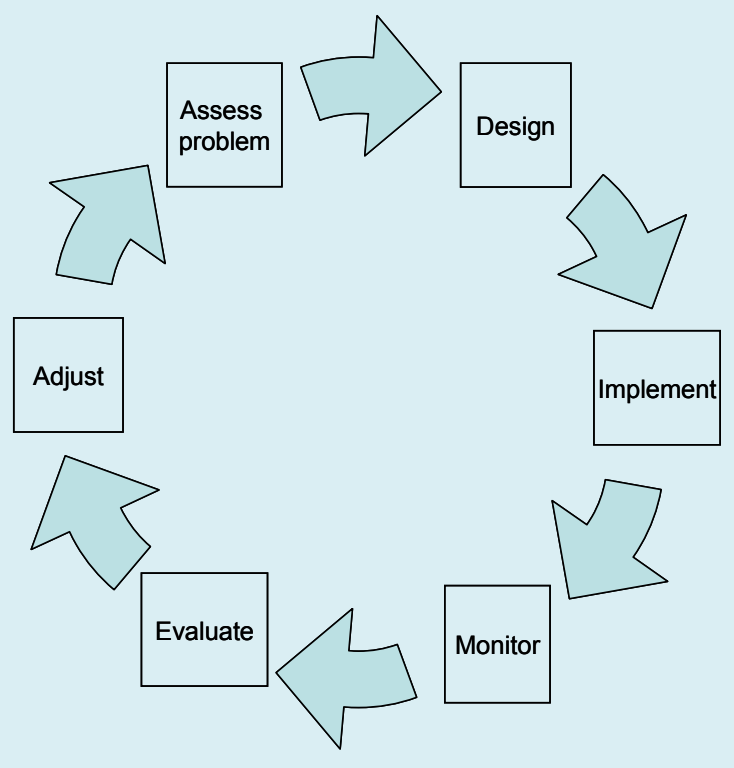

EISA Report Approach and Schedule

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- Literature Review
- Contacts with technology developers, regulatory agencies, resource agencies, academia, and non-governmental organizations
- Major input from NOAA and Department of Interior
- Draft reports for public and agency review, webinar
- EISA Report Due to Congress in June 2009
- Will be posted to www1.eere.energy.gov/windandhydro/

Questions and Comments?