

Energy: Growing Demands on NOAA and our Oceans

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Overview of Presentation

- Key Messages and Overview of NOAA's Involvement in Energy Issues by Sector
- Opportunities and Challenges Posed by NOAA's Expanding Role in Energy
- Energy Legislation: Impacts on NOAA

Key Messages

- NOAA currently has a significant regulatory role in energy through hydropower, LNG, and oil and gas, as well as providing critical data and forecasts related to the energy industry. NOAA envisions an even greater role as renewable ocean energy develops.
- Regulatory, environmental, and social uncertainties are associated with expanding renewable ocean energy development.
- NMFS is working proactively and cooperatively with industry and federal and state regulatory agencies to assist with siting and design of marine energy projects as to minimize potential impacts living marine resources and their habitats.
- Its important for Congress to recognize the environment of uncertainty as they consider regulatory issues and funding for various energy programs.

NOAA's Statutory Responsibilities for Energy Issues

- Magnuson-Stevens Fishery Conservation and Management Act (Magnuson)
- Endangered Species Act (ESA)
- Marine Mammal Protection Act (MMPA)
- National Environmental Policy Act (NEPA)
- Fish and Wildlife Coordination Act (FWCA)
- National Marine Sanctuaries Act (NMSA)
- Coastal Zone Management Act (CZMA)
- Ocean Thermal Energy Conversion Act (OTEC)
- The Federal Power Act (FPA)
- Oil Pollution Act of 1990 (OPA90)
- Deepwater Ports Act (DPA)

Energy Issues by Sector

TRADITIONAL:

- Oil and Gas
- Liquefied Natural Gas
- Hydropower
- Nuclear Power

NEW ALTERNATIVE FORMS:

- Offshore Wind
- Hydrokinetic (Ocean Current, Tidal, Wave, and In-Stream)
- Ocean Thermal Energy Conversion

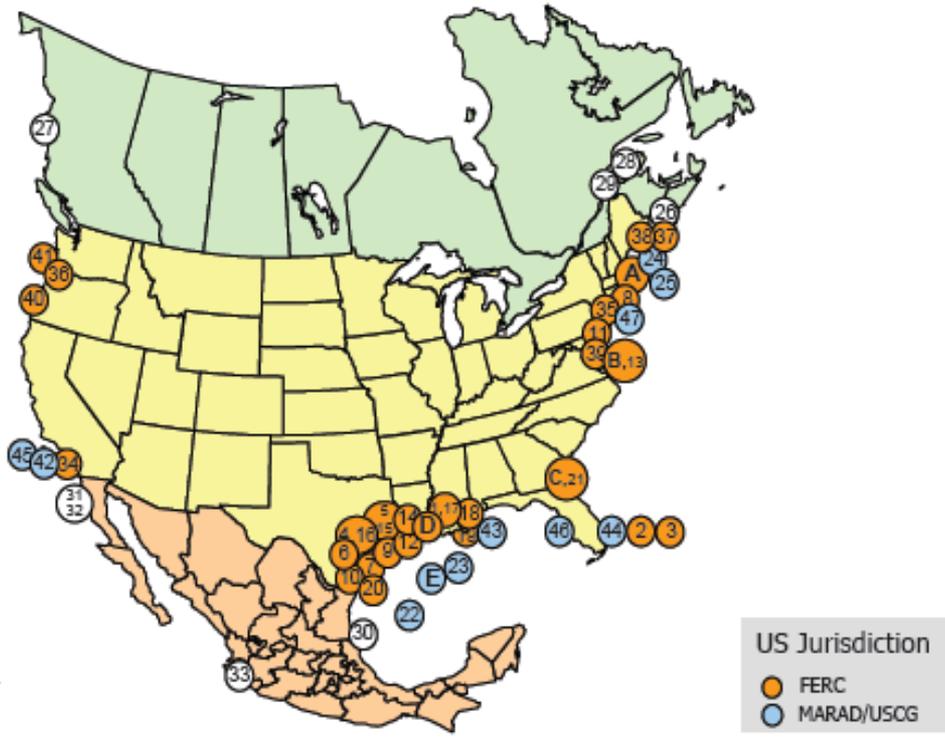
NOAA and Offshore Oil and Gas

- Oil and gas in the seabed: exploration and production has traditionally been in state waters and shallower outer continental shelf waters. However, new technology is allowing for deep water drilling and expansion into new areas.
- NOAA issues permits and conducts consultations on activities that could impact living marine resources.
- NOAA concerns include:
 - Acoustic impacts
 - Potential for aquatic pollution, discharge, spills
 - Impacts on Alaska Native subsistence uses of marine mammals



NOAA and Liquefied Natural Gas

Existing and Proposed North American LNG Terminals



LNG = natural gas cooled to -260°F and converted to a liquid for easier shipping.

15% of the U.S. LNG supply is imported - expected to rise significantly.



NOAA and Liquefied Natural Gas

More U.S. facilities are necessary to regasify increasing amounts of imported LNG. Most of these terminals are sited in the ocean or coastal zone.

NOAA Concerns:

- Dredging of living marine resource habitats
- Seawater intake and possible associated damage to marine species
- Vessel collisions with marine species
- Exclusion of fishermen
- Discharges



NOAA and Hydropower

- More than 1000 FERC-licensed hydropower projects provide ~10% of the nation's electricity.
- Licenses range from 30-50 years: the licensing process provides critical opportunities for NMFS to issue mandatory fishway prescriptions and provide conservation recommendations.
- NOAA Concerns:
 - Blocked migration to spawning grounds and rearing habitat
 - Alteration of river flows results in habitat impacts
 - Lack of adequate upstream/downstream passage



NOAA and Nuclear Power

- Nuclear energy accounted for 19.4% of total U.S. electricity generation in 2006. Potential for long-term expansion.
- NOAA currently expecting to review multiple applications for license renewal, expansion, and new nuclear power plants.
- NOAA concerns related to water usage.



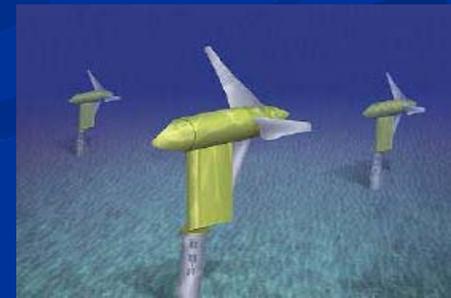
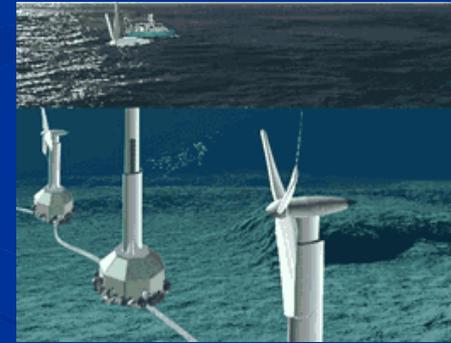
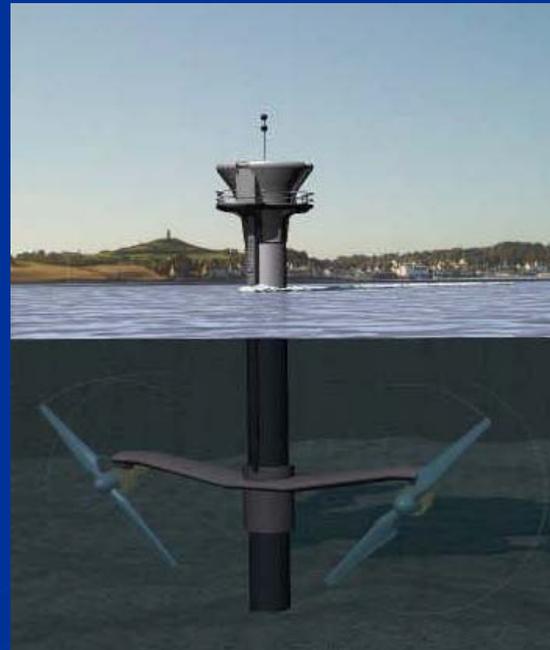
NOAA and Offshore Wind Energy

- More than 900,000 MW of potential wind energy exist off the U.S. coast – more than half of this is in the North Atlantic.
- Currently no commercial wind facilities operating on the U.S. Outer Continental Shelf, but proposals are being discussed. NOAA provides consultations on the impacts of any proposals on agency trust resources.
- Potential NOAA Concerns:
 - Noise and vibration from construction and operation
 - Alterations to benthic habitats and migration patterns
 - Interference with maritime commerce



NOAA and Hydrokinetic Energy

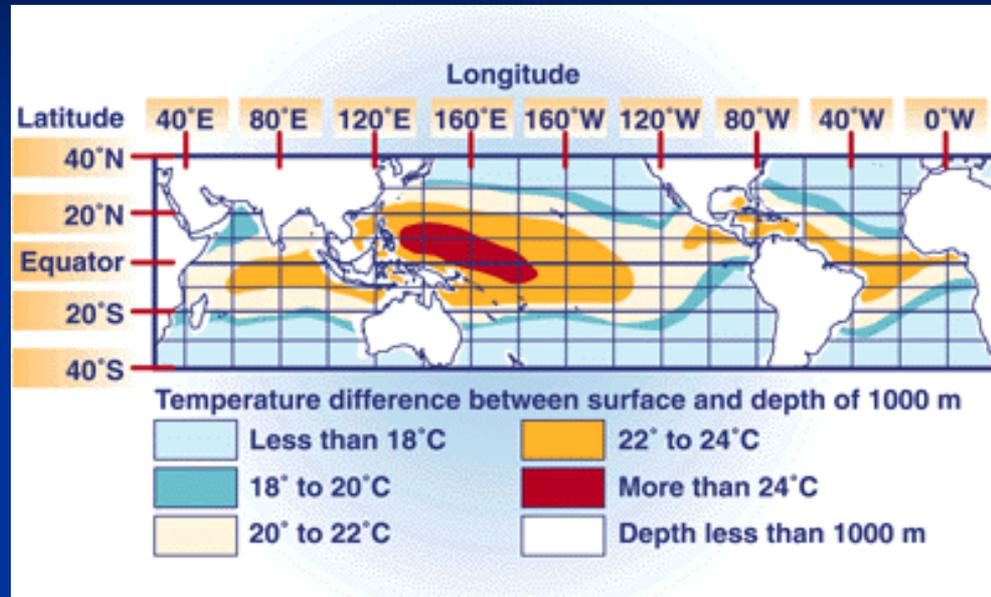
Projects that generate electricity from waves or directly from the flow of water in ocean currents, tides, or inland waterways.



NOAA and Hydrokinetic Energy

- Potential NOAA Concerns:
 - Scientific uncertainty and lack of information associated with technologies' direct and cumulative impacts on the physical and biological marine environment.
 - Present potential lethal and non-lethal impacts to living marine resources and their habitats from contact with turbines, impingement, entanglement, construction and operational noise, and electromagnetic fields.
 - Conflicts with navigation and other coastal/ocean marine-space users, such as fishing, commercial shipping, and recreational boating, especially due to exclusion zones.

NOAA and Ocean Thermal Energy Conversion (OTEC)



- OTEC uses differences in temperature between warm ocean surface waters and cold deep ocean waters to generate power (need a difference of $\sim 40^{\circ}\text{F}$).
- Proven technically but not commercially.
- NOAA licenses facilities under the OTEC Act.

Impacts Across Energy Sectors

- Biological and Environmental Impacts
 - Living marine resource impacts, including habitat degradation
- Social Impacts
 - Fishing access, navigation, archaeological and historic preservation
- NOAA Specific Impacts
 - NOAA staff and resources

Opportunities and Challenges

NOAA's Opportunities: New Energy Sectors

- Opportunity for NOAA to work with new energy sectors: new industries are actively inviting NOAA participation in discussions.
- Rare opportunity to assess, avoid, and mitigate impacts at early stages.
- NOAA is providing input into the design of regulatory processes for new energy sectors.
- NOAA has significant amounts of data and data collection expertise that can assist the design of new energy sectors.

NOAA's Energy Challenges

- Energy issues represent a substantial workload for NOAA staff. Traditional energy sectors remain and continue to expand, but now there is a need for greater effort related to new energy sectors. Increased agency capacity and resources are critical to this expanding role.
- Need for new forms of collaboration with outside partners.
- Difficulty in balancing multiple uses of the marine environment.

Impacts of Energy Legislation on NOAA Programs

Energy Independence and Security Act of 2007

Section 633: Marine and Hydrokinetic Renewable
Research and Development Program

Section 633: Marine and Hydrokinetic Renewable Energy
Report to Congress

Section 634: National Marine Renewable Energy
Research, Development, and Demonstration Centers

Section 712: Carbon Capture and Sequestration

Pending Energy Legislation