

# **Mechanical Energy from the Ocean**

## **Resources from the Ocean**

**Physical resources – from materials deposited or accumulated in the ocean**

**Examples: Oil, gas, salt, minerals**

**Energy resources – extraction of energy from heat or motion of water**

**Examples: Wind, wave and tidal energy**

**Biological resources – use of living plants and animals**

**Examples: Fisheries**

**Nonextractive resources – use of ocean in place**

**Examples: transportation, recreation, waste disposal**

## **Types of Ocean Resources**

**Renewable resources – Are naturally replaced by growth or organisms or by natural physical processes**

**Example: Fisheries**

**- Renewable resources can be depleted if they are used too quickly**

**Nonrenewable resources – are present in fixed amounts and cannot be replenished over decades-centuries**

**Examples: oil and gas**

## **Topics for Midterm 3 - Marine Resources**

**Beaches and coasts**

**- recreation, real estate**

**Mechanical energy from the ocean**

**- wind and wave energy**

**Biological energy sources**

**- biofuels, including oil and gas**

**Marine fisheries**

**- food and raw materials**

**Marine pollution**

**-water quality**

Photo: J. Prado, courtesy of NOAA.

# **Ocean Energy Extraction**

- Drilling for oil and gas are currently the primary means of extracting energy from the ocean
- But.. There are a host of renewable technologies currently being deployed and developed

## The Sun and Moon are the Ultimate Sources of Marine Energy

- **Solar Power**
  - **Mechanical**
    - **Wind Power**
    - **Wave Energy**
- **Lunar Power**
  - **Tidal Energy\***
- **Hybrid wind, tide and/or wave systems**

## Energy Potential and Need

- **US electrical capacity in 2007: ~1 million MW**
- **39% of world population lives within 100 km of a coast**
- **25% of US population within 10 meters of sea level**

## Summary of Offshore Wind Power

- Offshore wind represents a potentially vast untapped energy resource.
- Offshore wind resources are geographically better situated to meet global energy needs than terrestrial wind resources.
- Technologies for shallow water deployments are in place with development still needed for deep water environments.

## Power from Ocean Waves

**Preview of Next Lecture**