

## Wave

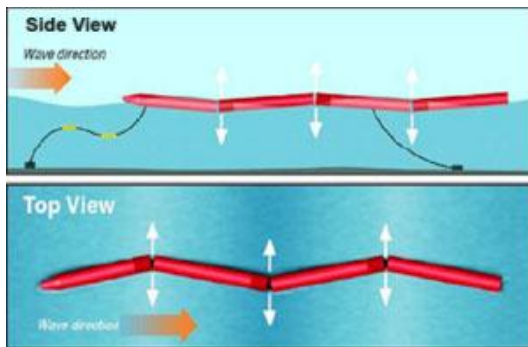
Wave energy is generated by harnessing the power of ocean waves. While still in early phases of development, wave energy holds a lot of potential for Oregon. (Tidal power is considered more viable in Washington, while wave energy is considered more viable in Oregon.)

Most of Oregon's electricity demand is west of the Cascades, while electricity generation is east of the Cascades. Transmission lines that cross the Coast Range are all owned by BPA and transfer power east-to-west. No significant power generation resources are located on the west side of the coast range.

The potential for generating wave energy off of Oregon's coast is strongest during the winter months, which coincides with peak electricity demand.

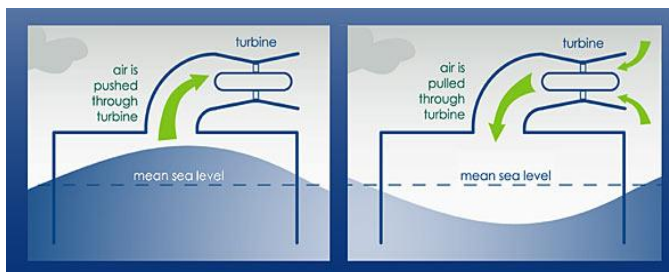
There are four primary devices that can be used to convert wave energy to electricity:

- *Attenuator*: Series of four tubes floating on surface oriented in the direction of incoming waves; wave action causes the articulated components to bend, which drives generators (Figure 1).



**Figure 1** Schematic of attenuator device; Electric Power Research Institute.

- *Oscillating Water Column*: Device contains a partially submerged chamber with air trapped above a column of water. As waves hit the chamber they cause the column of water to rise and fall, which pushes air through a turbine or generator to produce electricity (Figure 2). The structure can either be onshore or floating. This system is the design for Douglas County's proposed north jetty wave energy project.



**Figure 2** Schematic of Oceanlinx oscillating water column device; Hawaiian Electric Company.

- *Overtopping*: A device that funnels waves over a partially submerged wall and temporarily traps the overtopping waves in a reservoir; when the water runs back into the ocean it powers a hydropower turbine (Figure 3). These devices can be floating or shore-based.

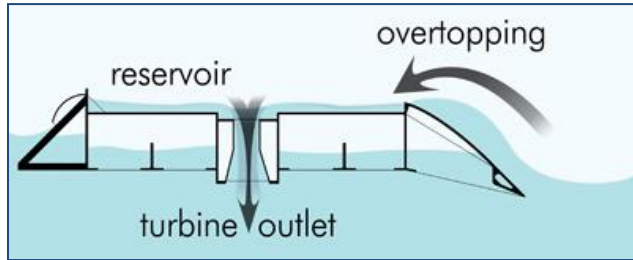


Figure 3 Schematic of Wave Dragon overtopping device.

- *Point Absorber*: A device that captures energy from the vertical motion of the waves; can be floating on surface or attached to the bottom (Figure 4). This is the technology being deployed by Ocean Power Technologies off the coast of Reedsport, Oregon.

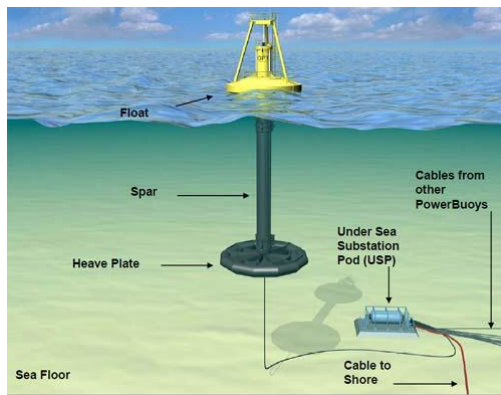


Figure 4 Schematic of PowerBuoy point absorber device; cleantechnica.com

While wave energy holds substantial potential, both off the northwest coast of the United States and worldwide, the wave energy industry is only in early stages of development, due to difficulty in capturing the energy in a usable form, the harsh marine environment, and competing uses of sea space.

### Oregon and Wave Energy

Oregon is home to the Oregon Wave Energy Trust (OWET), which works toward wave energy development in Oregon. OWET is a nonprofit public-private partnership funded by the Oregon Innovation Council.

Ocean Power Technology (OPT), headquartered in New Jersey, is expected to put a buoy in the waters off Reedsport in the summer of 2012. OPT is working on utility-scale wave energy converters.

Based in Corvallis, Columbia Power Technologies has tested a point absorber technology in Oregon State University's lab and field tested a scaled-down device in Puget Sound.

<http://www.columbiapwr.com/technology.asp>