Heaving Buoys

Heaving Buoys

Heaving buoys systems use flotation devices to utilize the vertical oscillation of ocean waves. Heaving buoy systems are moored to the seabed and uses a stationary portion that resists the waves vertical movements with a floating portion and the opposing movements provide the work to be captured. Most heaving buoy systems are classified as point absorbers because they only occupy a small area of ocean. There are many different methods of capturing the wave's kinetic energy using this method.

Finavera's "AquaBuOY" is one of many heaving buoy examples that pump high-pressure sea water through a hydroturbine which powers a generator. The electricity generated is carried to shore via submarine cables.

The AquaBuOY's modular design is important when scaling for future wave energy farms. This property also allows for a continual and reliable stream of energy. The wave farms can be scaled to produce hundreds of kilowatts to hundreds of megawatts with zero emissions.

Another similar approach is taken by CETO's wave power generator which pumps seawater directly ashore where the electricity is generated. The CETO is unique in that it desalinates the incoming seawater from the process. The CETO is also the first heaving buoys system to be completely submerged.

Both the CETO and AquaBuOY are equipped for stormy conditions because they don't use many sensitive parts and are therefore less likely to wear or break in extreme circumstances.

Another experimental device, a permanent magnet linear generator buoy, was conceived by Oregon State University and a prototype has not yet been created. In this device, a heaving buoy drives an electric coil up and down around a magnetic rod, thereby inducing voltage. The electricity generated is transferred to shore once again by submarine cables.
Oregon State University
Conceptual Wave Park

Magnetic Shaft
anchored to sea floor

Electric Coil
secured to heaving buoy

Permanent Magnet Linear Generator Buoy

1-2 miles offshore

100 ft

12 ft