

# Wave and Tidal Energy

Turning the energy of the [ocean's](#) waves and tides into power that we can use is a new and unproven technology. However, the potential is there for a significant renewable and environmentally clean energy source.

What is wave energy?

**Wave energy is energy harnessed from the [waves](#) of the ocean. Waves are formed by wind moving across the surface of the ocean. A large amount of [energy](#) is stored in waves.**

What is tidal energy?

Tidal energy is energy produced by the tides of the ocean. Tides are produced by the pull of [gravity](#) from the Moon as well as the spin of the Earth. There is a lot of energy in the movement of that much water.

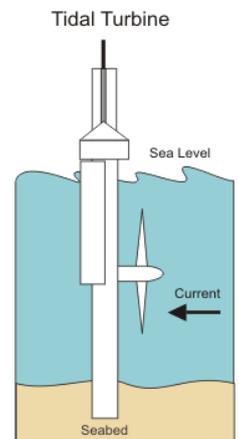
## Renewable Energy

Wave and tidal power is considered renewable energy because we don't "use up" anything when we convert their energy to something usable like [electricity](#).

## How do we get power from waves?

There are three main ways that scientists think we can capture the power of waves:

- Surface devices - These devices gain power from the waves moving them up and down on the surface of the ocean.
- Underwater devices - These devices range from balloon type objects attached to the ocean floor to long tubes that stretch over a long distance. When the waves cause them to oscillate, they move a turbine and create electricity.
- Reservoir - These devices take advantage of the waves moving water into a reservoir on the coastline. As water moves back out into the ocean it is forced down a tube and turns the blades of turbine. The turbine then converts the energy into electricity.



## How do we get power from the tides?

There are also three main ways that tidal energy is harnessed:

- Tidal Barrages - A tidal barrage works like a dam. When the [tide](#) goes high, the reservoir fills up. When the tide drops, the dam lets the water out. In both directions the moving water can spin the blades of turbines to create electricity.
- Tidal Fences - These are smaller structures than a barrage. Several vertical turbines form a fence between two land masses. When the tide moves in or out, the turbines spin and generate electricity.
- Tidal Turbines - These are individual turbines placed anywhere there is a strong tidal flow.

- **History of Wave and Tidal Energy**

Concepts for wave energy have existed since the 1800s, however modern wave technology began in the 1940s with the experiments of scientist Yoshio Masuda.

Funding into wave energy technology has recently increased due to the need for renewable energy sources. The first wave power plant in the world opened in 2008 at the Agucadoura Wave Farm in Portugal.

Tidal power to turn water wheels and grind grains was used as far back as Roman times and the Middle Ages. The idea of using tidal power for electricity is fairly recent, but the costs have been too high to make it a major energy source. Recent technological advances have shown that it could become a competitive and viable source.

## **ADVANTAGES:**

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- Tidal turbines are more expensive to build and maintain than wind turbines but produce more energy. They also produce energy more consistently as the tide is continuous while the wind doesn't always blow.
- Wave and tidal energy converters are located near the coastline. It is easier to install, maintain, capture the energy, and retrieve the energy when they are located close to the coast.
- Spain has no tidal power plants.
- There are two existing large tidal barrages in the world today. One is in France and the other in Canada.

## **DISADVANTAGES:**

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The main disadvantage to these technologies today is cost. The cost of installing and maintaining a large wave or tidal power plant is too expensive versus other alternatives such as wind farms. Another drawback is the limited number of locations where current technologies can be economically installed.

Both wave and tidal energy can also have some effect on the environment. Large tidal barrages can make it difficult for migrating fish. Also, spinning turbines can injure animals and fish.

## **GLOSSARY:**

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