Wave Power Is Not Just for Surfers Any More Dude!

Source: solarthermalmagazine.com

Published: July 19, 2017

The power of wave energy will soon be for more than just surfers

Huge waves crashing into a beach. Imagine the power, the sheer force of the water as it spends itself on the sandy shore. Now imagine this happening in all the coasts all over the world! Now imagine if we could tap into this elemental force, this relentless, inexhaustible cycle of nature.

The thing is – wave energy is a great idea, but it is not a new idea. The first patent to use this energy was filed by a Frenchman named Girard way back in 1799! Another Frenchman, Bochaux-Praceique was using wave energy to provide power to his house in 1910!

AN UNLIMITED SUPPLY OF ENERGY! WELL, ALMOST

The question that everyone is asking is this – what impact can wave energy have on the global energy scenario?

To put it in perspective – experts claim that conservatively speaking, when properly exploited our oceans could end up supplying us with approximately 2 Terrawatts of power.

That's twice the amount of electricity being produced in the world today!

If we could utilize the potential of the sea, most of the energy requirements of the world can be met with wave energy alone. And if that's not all, you will have to remember that this energy is 100% renewable, with absolute 0% emissions.

Wave energy is converted into clean electricity in Brasil

WAVE ENERGY TECHNOLOGIES

But how do we transform this force of nature into energy that can power our homes? Well, let us look at some of the most commonly used technologies used to harness the power of the waves.

POINT ABSORBER BUOYS

At its simplest, these are buoys that float on the surface of the sea. As the sea waves crest and trough, these buoys move with them, rising and falling. This motion is then used to drive hydraulic pumps which in turn produce electricity.

SURFACE ATTENTUATORS

These generators are very similar to Point Absorber Buoys. This too has numerous floating parts. As they move up and down with waves, they drive hydraulic pumps which in turn create electricity.

OVERTOPPING DEVICES

As the name suggests Overtopping Devices are structures that are used to overtop a reservoir. This is generally done using wave velocity and the level of the reservoir is significantly higher than the ocean that surrounds it,

The reservoir at the higher level is a source of great potential energy which is then converted to electricity using low level turbines.

Ovetopping Devices can either be on shore of off shore in the sea.

OSCILLATING WATER COLUMNS

This works with the help of an air chamber. Thanks to the waves acting on the air chamber, it swells and then is compressed. As a result, air is pushed through a turbine which rotates to create electricity.

OSCILLATING WAVE SURGE CONVERTERS

One end of the Oscillating Wave Surge Converters is stationary. It is fixed either to a structure or the seabed. The other end of the device however is free to move. When one end of the device moves relative to the other one, energy is created.

Oscillating Wave Surge Converters come in many forms – floats, flaps, membranes etc.

CHALLENGES TO WAVE ENERGY

As we have seen, wave energy can solve the world energy crisis. However, scientists around the world advise caution in harnessing of this almost inexhaustible store of energy.

The biggest challenge that Wave Energy faces is environmental concerns. Existing wave energy can cause severe damage to the environment. Some of the major concerns are:

DANGER OF TURBINE BLADES: Marine animals including mammals, fishes and squid could get hit by the rapidly oscillating turbine blades. Over a period of time this can cause severe damage to the Marine Ecosystem.

EFFECT ON SHORLINE: Buoys and other floating devices can break the force of the waves and its effect on the shore. This can even change the coastline.

CHANGE IN WATER QUALITY: Wave Energy Technologies can disturb the sediments of the ocean floor, changing the quality and nature of local water.

ELECTROMAGNETIC FIELD: The EMF produced during the production of electricity has been found to have very negative effects on marine life.

Some of the technologies used in Wave Energy Production could also harm the environment.

POINT ABSORBER BUOYS can collide with fish and birds while affecting roosting sites. It has also been found that the waves dampened due to the buoys act on the shoreline differently, changing its nature.

SURFACE ATTENTUATORS can end up trapping marine animals in its joints and killing them.

OVERTOPPING DEVICES can entangle marine life in its mooring system. The noise created by this system can also disturb the organisms within hearing distance.

OSCILLATING WATER COLUMNS produce a lot of noise, which can disturb and chase away birds and aquatic animals from the vicinity of the device.

PIONEERING THE ENERGY OF THE FUTURE

Leading the way into the future are organizations and companies which are pioneering research and development in wave energy. Some of them are already producing significant amounts of energy. Let's have a look at some of them.

PELAMIS WAVE POWER

Established in 1998, Pelamis Wave Power is known for its Pelamis Wave Energy Converter. In 2004, they tested the prototype becoming the first ever venture to commercially generate and supply electricity to the national grid.

FINAYERA WIND ENERGY

Known better as a producer of wind energy, the company is also a pioneer in the field of Wave Power. They are known as the developers of the wave energy device known as AquaBuOY.

Islay LIMPET

The device of the same name is a Oscillating Water Column and drives air in and out of a pressure chamber.

OCEAN POWER TECHNOLOGIES

Ocean Power Technologies is known for their wave power generation device called PowerBuoy which is an easily scalable and practical solution. They are now engaged in projects around the world.

OCEANENERGY

Oceanenergy uses a device called the OE Buoy which is an advanced version of Backward Bent Duct Buoy invented by Japanese Naval Commander Yoshio Masuda.

SDE ENERGY LTD

This Israeli Company has tested twelve different versions of what is known as the SDE Power Plant. They are already in the process of setting up of working plants by the coast of Africa.

UPPASALA UNIVERSITY

The Centre for Renewable Electric Energy Conversion of the Uppasala University has made some exciting progress in their Lysekil Project which is their ongoing wave power project.

OCEANLINX

They have developed an advanced Oscillating Water Column Device. Thanks to a solid international support, this Australian project is absolutely in the forefront of wave energy technology.

SEABASED INDUSTRY AB

In collaboration with Fortum, this Swedish company has developed a wave power park. It became fully functional from 23rd March, 2015.

AQUAMARINE POWER

Their device called the Oyster is essentially a hinged mechanical flap attached to the seabed. This captures the power of near shore waves. As of November, 2009, they commenced commercial production.

WAVEBOB

An ocean going heaving buoy, with a submerged tank, this device captures the extra mass of seawater to maximize power production.

THE FUTURE IS WAVE

Wave Energy can easily replace most other forms of power production in the world. However it too can have grave and permanent environmental impact. Commercial exploitation therefore needs to proceed with utmost caution.