Environment Technology

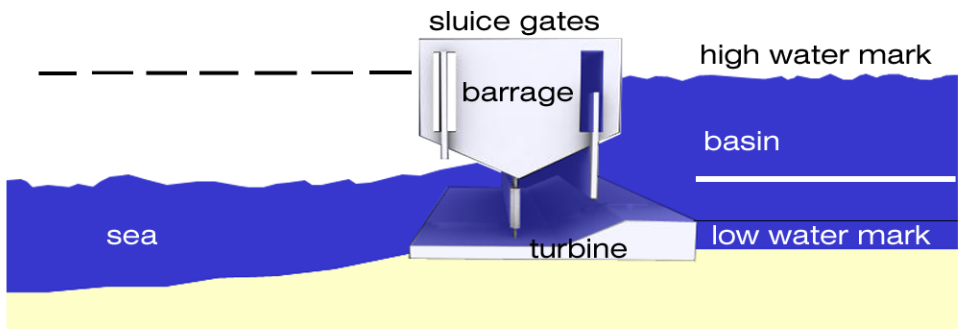
Power Generation with Using Water

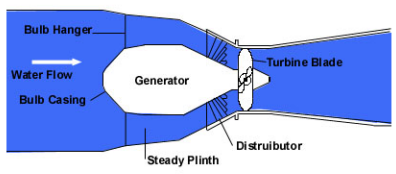
Among many kinds of power generation method, the power generatoin through wave and tide is more reasonable to use design project of the Great lakes because the MIchigan Lake's condition is similar to that of sea which has current tide and wave.

The Tide Power Generation System

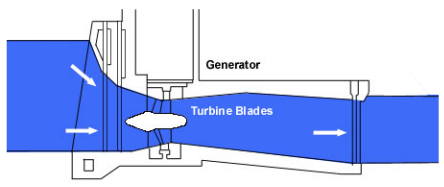
Ebb Generating System

The generation sysytem known as a barrage across an estuary. Sluice gates allow the tidal basin to fill on the incoming high tides and to exit through the turbine system on the outgoing tide.

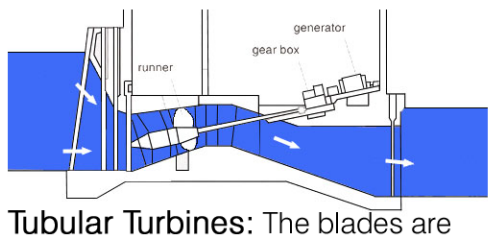




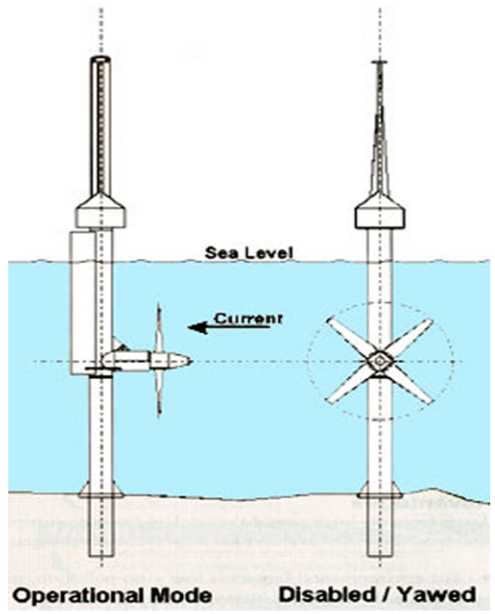
Bulb Turbine: Water flows around the turbine, making access for maintenance difficult, as the water must be prevented from flowing past the turbine.



Rim Turbines: It reduce bulb turbine's problems as the generator is mounted in the barrage, at right angles to the turbine blades.

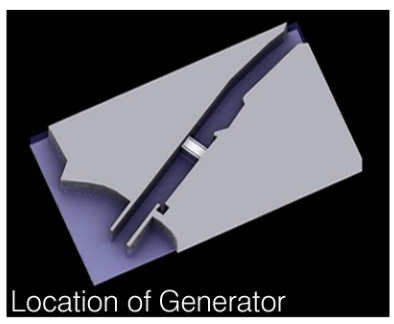


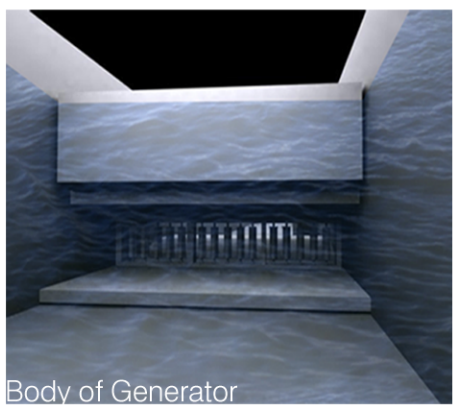
Tubular Turbines: The blades are connected to a long shaft and orientated at an angle so that the generator is sitting on top of the barrage.

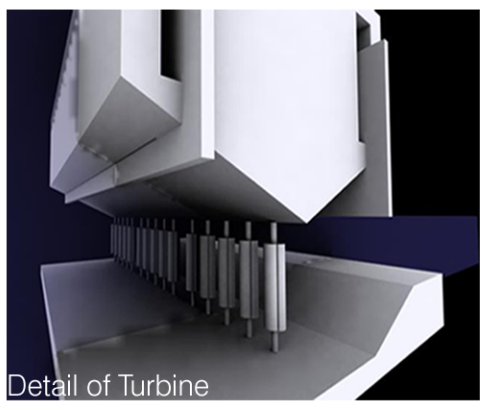


Tidal Turbines: It utilise tidal currents which are moving with velocities of between 2 and 3 m/s (4 to 6 knots) to generate between 4 and 13

Application

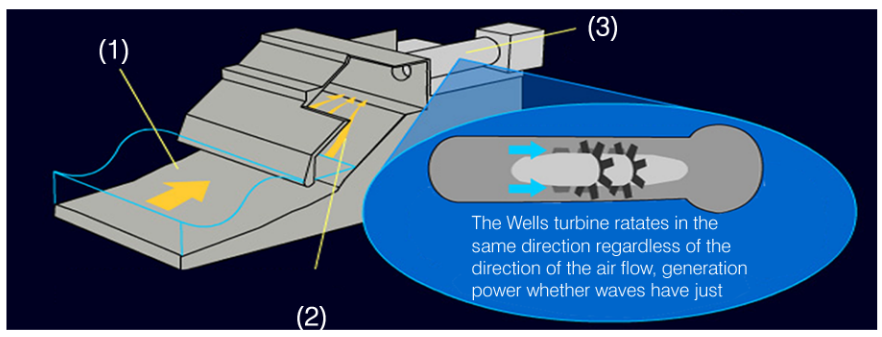






The channel is the most effective place to build a tide generator because its fast flow is available for power generation. However, if sea transportation through channel is considered, the location of tide power generator is unreasonable.

The Wave Power Generation System



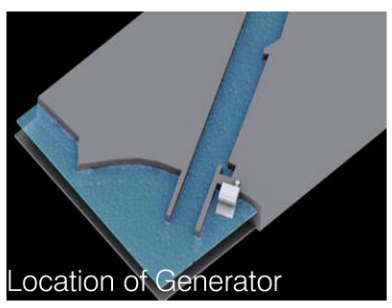
(1) Waves enter the shell chamber raising the water level.
(2) The increased water lever compresses air inside chamber, as waves leave the shell air decompresses
(3) The compression and decompression cause rushes of air which drive a Wells turbine.

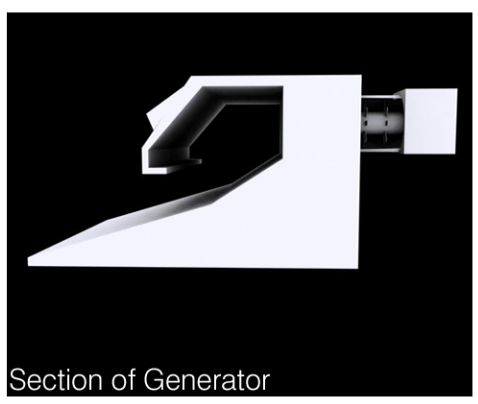
Swimming Pool Wave Machine

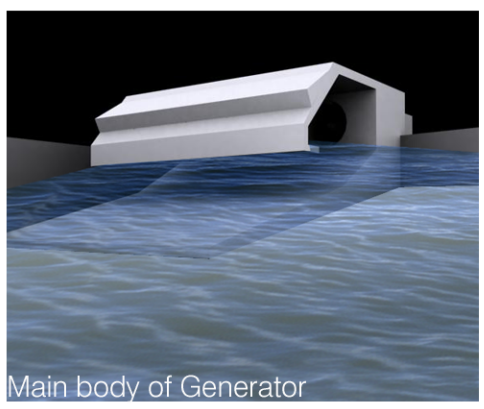
At a swimming pool, air is blown in and out of a chamber beside the pool, which makes the water outside bob up and down, causing waves. At a wave power station, the waves arriving cause the water in the chamber to rise and fall, which means that air is forced in and out of the hole in the top of the chamber.

Ocean Power Delivery: They are developing a method of offshore wave energy collection, using a floating tube called "Pelamis". This long, hinged tube (about the size of 5 railway carriages) bobs up and down in the waves, as the hinges bend they pump hydraulic fluid which drives generators

Applicatoin







The wave generator is possible to be built lakeshore. Among many alternative, the system is the most adequate to use the design project. It has appropriate size an do not obstruct sea traffic. It can be also use to make design vocabularies.

Reference: Principles of Water Resources-History, Development, Management, and Policy, Thomas V. Cech, 2003, Conservation and Utilization of Water and Energy Resources, American Society of Civil Engineering, 1979, http://reslab.com.au/resfiles/tidal/text.html, http://www.darvill.clara.net/altenerg/wave.htm, ,http://www.wavegen.co.uk/, ,http://www.treehugger.com/files/2005/04/wave_power_alte_1.php

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