RENEWABLE ENERGY INFORMATION FROM THE PIER AQUARIUM LABYRINTH

Hydropower is energy from water sources, such as the ocean rivers and waterfalls. There is enough energy in ocean waves to provide two trillion watts of electricity.

1. The tidal power process utilizes natural motion tides that make electricity.
2. The USSR used tidal power to produce 300 MW in its Lumkara plant.
3. Hydroelectric energy comes from the damming of rivers.
4. Hydroelectric energy is then utilized by the potential energy from the water.
5. The high pressure released from the dam, its kinetic energy, is then moved to turbines. The turbine blades then help to generate electricity.
6. Hydroelectric energy has relatively low maintenance costs and provides power cheaply.
7. In the U.S. 180,000 MW of hydroelectric power potential is available. Currently, only about one third of that is being used.
8. Ocean Thermal Energy Conversion (OTEC) makes electricity using the difference in temperatures.
9. The ocean covers 70% of the Earth's surface making it the world's largest solar collector.
10. OTEC uses the difference of warm water and cold water to run a heat engine.
11. The difference between the warm and cold water needs to be 36 degrees to produce power.

12. This temperature difference exists within 20 degrees of the equator.
13. If only a small portion of this energy is converted into electricity, it would be significant.
14. It would be so significant that it could supply more than 20x the amount of electricity we use!
15. OTEC is a vast renewable resource with the potential to produce billions of watts of electricity.
16. Within OTEC's water pump plan are 3 basic systems:
    - Closed cycle system takes warm seawater and pumps through a heat exchanger. The system then vaporizes a low boiling point liquid which turns a turbine to make electricity.
    - The cold water is pumped through a 2nd heat exchanger where it is reused in the system.
    - Open cycle systems take warm seawater and subject it to low pressures, boiling it. The expanding steam turns a low pressure turbine which generates electricity.The steam, almost fresh water, is then condensed by passing through the cold seawater.
17. Hybrid systems use both open and closed systems.
18. Warm seawater enters a vacuum chamber and is flash evaporated into steam. The heat from the steam vaporizes a low boiling port fluid that drives a turbine.
19. Fresh water from seawater is a by-product of an Open or Hybrid OTEC.
20. Cold seawater from the OTEC plant can be used for air conditioning.
21. The nutrient-rich cold seawater can feed salmon and lobster.