Water and its (Renewable!) Energy



Presented by Prof. Spyros A. Kinnas Dept. of Civil, Architectural and Environmental Engineering



Still water with high potential energy



Moving water with high speed and high kinetic energy

What happens under the surface of a wave?



Tides



Water and its Energy - Presentation by Prof. S.A. Kinnas

Currents





A household in the US requires an average electrical power of 1-2 kW (kiloWatts)

A power plant that produces 1 MW (MegaWatt) = 1,000 kW can supply about 500-1,000 households

A power plant that produces 1 GW (GigaWatt) = 1,000MW = 1,000,000 kW can supply about 500,000 -1,000,000 households

Hydro-electic Power – How it works



Harnessing wave power Some innovative solutions

The "Oscillating Water Column" (OCW)



The "Sea-snake" (Pelamis)



A buoy Wave Energy Converter (WEC)



Harnessing ocean current/tidal power with marine turbines



Harnessing ocean current/tidal power with a kite and a turbine!



All innovative solutions to harvest the immense energy of water require knowledge of <u>fluid mechanics</u>, obtained through basics (theory), numerical, and experimental methods