The Power Output of Hydroelectric Generator Prototypes

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This experiment was performed to investigate which of three hydroelectric generator prototype generated the highest power output by harnessing the energy from water. Different designs of generator prototypes perform in different water environments, some harnessing the potential energy of falling water and some harness the kinetic energy of waves and tides. A total of three hydroelectric generator prototypes were built: a water wheel turbine generator, a permanent magnetic linear generator buoy (wave buoy), and a piezoelectric disc generator. Each prototype was tested in its optimal water environment, either being a waterfall simulation or the waves of a town beach. For each prototype, three trials were conducted using a digital multimeter to collect the voltage and current generated. The power output was calculated from the voltage and current and it was determined which prototype had the highest average power output. The water wheel turbine generator produced the highest average power output, at 1.102 mW. Next was the wave buoy generator, with an average power output of 0.030 mW. The piezoelectric disc generator had the lowest average power output, at 0.002 mW. The data collected demonstrated the water wheel turbine had the highest average power output, followed by the wave buoy, and then the piezoelectric disc generator. The standard turbine generator harnessing potential energy from falling water performed the best; however the wave buoy harnessing kinetic energy from moving water supports this as a new viable emerging technology.