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E90 TOPIC SELECTION

Advisors: Professor Carr Everbach

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Project Title:

Solar Heat-Engine Water Pump

Description:

We intend to build a Solar-powered heat engine water pump. The device would absorb solar energy, convert it into electric power to run the heat engine which will drive a pump able to raise water to about 5-6 feet. In addition, the water that is pumped will be boiled by focused sunlight using thermo-collectors. Our initial discussion with Carr revealed several types of heat engine designs that could be built. Our choice of a particular design would depend on the minimum power we would need to achieve the required height. This project will involve a lot of mechanical engineering theory, ie, thermodynamics, energy cycles and solar systems as well as design. There will also be some Electrical Engineering applications as well in modeling the system and in the energy conversions.

Motivation:

Residents of developing nations often cannot count on the availability of clean drinking water due to pollution of surface water sources such as rivers and lakes. In countries with plentiful sunlight, heat energy, powered by a constant supply of solar energy could be used to pump well water. Moreover, the water that is pumped could be boiled by the same focused sunlight thereby providing a continuous supply of clean water.