In-Line Turbine Network Based Hydro-Electric Power Generation System for Residential Application

Ahmad, Hasnat (School: Scarsdale International School)

The purpose of our project is to utilize the potential energy stored in residential water tanks and convert it into electrical energy using a network of small turbines installed in water pipes. The project will follow the engineering design process to design, create, test and evaluate a turbine which can generate electricity utilizing the water flow in the piping network. The components of this projects include multiple turbine systems connected to small generators which are further connected to a voltage control system used to charge batteries. These batteries can be used in residential units during times of power outage. The project will work around the design of different turbines designed for efficient output, linking the concepts of fluid dynamics to the nature of flows expected in a residential water piping network. This research will lead to the design of a turbine which can provide the best rpm at the expected water flows. The research tools involved in this project include research papers, books on fluid dynamics and turbine design and simulation softwares. We will also carry out research to develop the optimal voltage regulation system for our project as we will be getting current only when the consumer opens their water taps, we will require a voltage regulator which can convert this somewhat impulsive nature of EMF into a stable source of electricity to charge the batteries. Our research will focus on different electrical components and their functions to utilize them in our circuit design. Together these two components will be linked with a battery which will store the electrical energy and provide electrical current to the residential unit in times of power outage.

Awards Won: