# ELECTRICAL POWER GENERATION USING FOOTSTEPS.

## ABSTRACT:

Electricity is the most general forms of energy used across the world. This paper focuses on designing a setup that leads to the generation of electrical energy which is going to waste when humans are walking. Footsteps are an untapped natural resources. This generated energy is, however, costeffective and nonhazardous for human. Electrical energy can be produced by converting mechanical energy using footsteps. Generating the electric power through the fabrication of footstep arrangement by a prototype comprises of a pipe, nozzle, unidirectional valve, water reservoir, turbine, and DC motor. Whenever pressure is exerted on the reservoir, water flows through the nozzle into the turbine and generates electrical energy. This energy is stored in the battery. This project will reduce the global warming and load shedding in a much cleaner cost-effective way. Since this project is related directly to the human movement, the weight of the setup is a crucial factor.

The design is an innovative and iterative process. It is also a decisionmaking process. This design is subject to problem-solving constraints. In the design, the footwear consists of water cushioned soles. Thus, whenever we put pressure by the weight of the body on it, the water flows to the mini turbines and produce electric power. Each of the pairs of the shoes possesses its small generator to produce an adequate amount of electricity. Various types of devices were considered for generating electricity. Preferably, a dynamo would have been best suited for our intentions. However, due to their relative unavailability and high costs, various alternatives had to be considered. Running most electric motors in their reverse direction would serve our purposes equally well. Footsteps are an untapped natural resources. This generated energy is, however, costeffective and nonhazardous for human. Electrical energy can be produced by converting mechanical energy using footsteps. Generating the electric power through the fabrication of footstep arrangement by a prototype comprises of a pipe, nozzle, unidirectional valve, water reservoir, turbine, and DC motor

# INTRODUCTION:

The process of producing electrical power from different types of energy sources is called electricity generation. This type of energy is an essential part of nature. We generate electricity (secondary energy source) by converting primary sources of energy like atomic, gasoline, coal, and other natural sources. Fossil fuels pollute the environment. Atomic power plant requires careful handling

of both raw as well as waste material. From the birth of earth, man has needed and used energy at an increasing rate prior to his existence. The world has already used large amount of energy resources for power production. The extensive usages of available resources in recent years created a demand for the future generation (Magdum, Chikhale, Rajole, & Jedhe, 2017). After realising the availability issues of the non-renewable sources, the renewable sources of energy like wind, water, and sun are being consistently and increasingly used by people to generate power. Therefore, our focus now is on the renewable energy, which is essential and nonpolluting. Have we ever thought that we could generate electricity with our footsteps? Walking is a widespread practice every day. A person transfers energy through impact or vibration to the road surface. This energy can be converted to electrical energy by subsequent conversion of mechanical energy. Whenever we move on our feet, our kinetic energy is wasted as heat energy. In this project, we have originated electricity through the humanpowered mechanical energy. The waste energy of human during walking is used in this system. Footstep is an uninterrupted and renewable source of energy. The system repeatedly operates in a short duration of time and is not possible for the turbine to maintain a constant speed. As a result, voltage variation occurred which is controlled by a voltage regulator. The total system of the power generation using footsteps depend mainly on the angle of attack of the flowing medium. High voltage dynamo should be used to produce more electricity. Though many systems are available for power generation from footsteps, the proposed system is very economical and affordable. As Bangladesh is a developing country with a large population, we face difficulty day by day due to power shortage. Many people in our country cannot enjoy the facility used for generating electricity. Though power produced in this process is minimal, as a whole country, this will be a considerable source of electrical energy. This project also reduces global warming. generation using footsteps depend mainly on the angle of attack of the flowing medium. High voltage dynamo should be used .

## LITERATURE SURVEY.

The burning of coal, wood, diesel (generators) and so forth are used for traditional power generation method, which is continuously depleting our natural resources such as fossil fuels (Sekhar, kishore, & Raju, 2014). The demand for power rises with the increase in population. Besides, the traditional methods cause pollution and encourage deforestation (cutting of trees). Therefore, this results to consequences such as global warming, power shortage just like what we are facing in Bangladesh. Global warming indicates an average rise of the temperature in the atmosphere near the Earth's surface. The global surface temperature increased 0.74 ± 0.18 °C (1.33 ± 0.32 °F) during the 100 years ending in 2005 (Global Warming-Climate 365). Since the mid-twentieth century, the temperature rises with the intensity of anthropogenic greenhouse gas. Solar variation, volcanoes, and cooling effect contributes to the entropy rise from pre-industrial age to nowadays, IPCC indicate that average global surface temperature will likely rise further from 1.1 to 6.4 °C (2.0 to 11.5 °F) (Portal: weather/selected Article/6, 19) during the 21st century. Most studies up to 2100 show that entropy and sea level continuously rise. The rate of reaching equilibrium is slow due to the high heat capacity of the sea. Scientists have stated with 66–90% confidence that the effects of human-caused aerosols and volcanic activity have a significant effect on global warmings, and that greenhouse gases accelerate the warming. The steady decline of the depletion of ozone in the Earth's stratosphere is regarded as global warming.

## AIMS AND OBJECTIVES :

**Aims:**

1. To design and develop a sustainable and innovative system for harnessing kinetic energy from human footsteps.

2. To investigate the feasibility of using piezoelectric sensors and electromagnetic induction technology for electrical power generation.

3. To evaluate the potential of footsteps as a renewable energy source.

**Objectives:**

**Primary Objectives:**

1. Design and develop a prototype of the Step-Power system.

2. Conduct experiments to measure the efficiency of the system.

3. Evaluate the electrical power output of the system.

**Secondary Objectives:**

1. Investigate the effect of footstep frequency and pressure on power generation.

2. Analyze the economic viability of the system.

3. Assess the environmental impact of the system.

4. Develop a scalable and modular design for large-scale implementation.

5. Explore potential applications and integration with existing infrastructure.

## METHODOLOGY :

The methodology for this project involves a combination of literature review, system design, simulation, prototype development, and experimental testing. Initially, a thorough literature review will be conducted to study existing research on piezoelectric sensors, electromagnetic induction, and energy harvesting from footsteps. Following this, the Step-Power system will be designed and simulated using software tools such as MATLAB and Simulink. A prototype will then be developed using piezoelectric sensors, electromagnetic induction coils, power conditioning circuits, and energy storage units.Experiments will be conducted to test the prototype under various conditions, including footprint frequency, pressure, and surface materials. Data will be collected on power output, efficiency, voltage, and current, and analyzed using statistical software to evaluate system performance, identify optimal operating conditions, and compare results with theoretical simulations. Simulation tools such as COMSOL and SPICE will also be utilized for finite element analysis and circuit simulation.The experimental setup will consist of a footprint simulation mechanism, sensor placement and calibration, and a data acquisition system. Testing protocols will include static testing, dynamic testing, and durability testing. Measurement parameters will include voltage, current, power, and efficiency.

## BLOCK DAIGRAM:

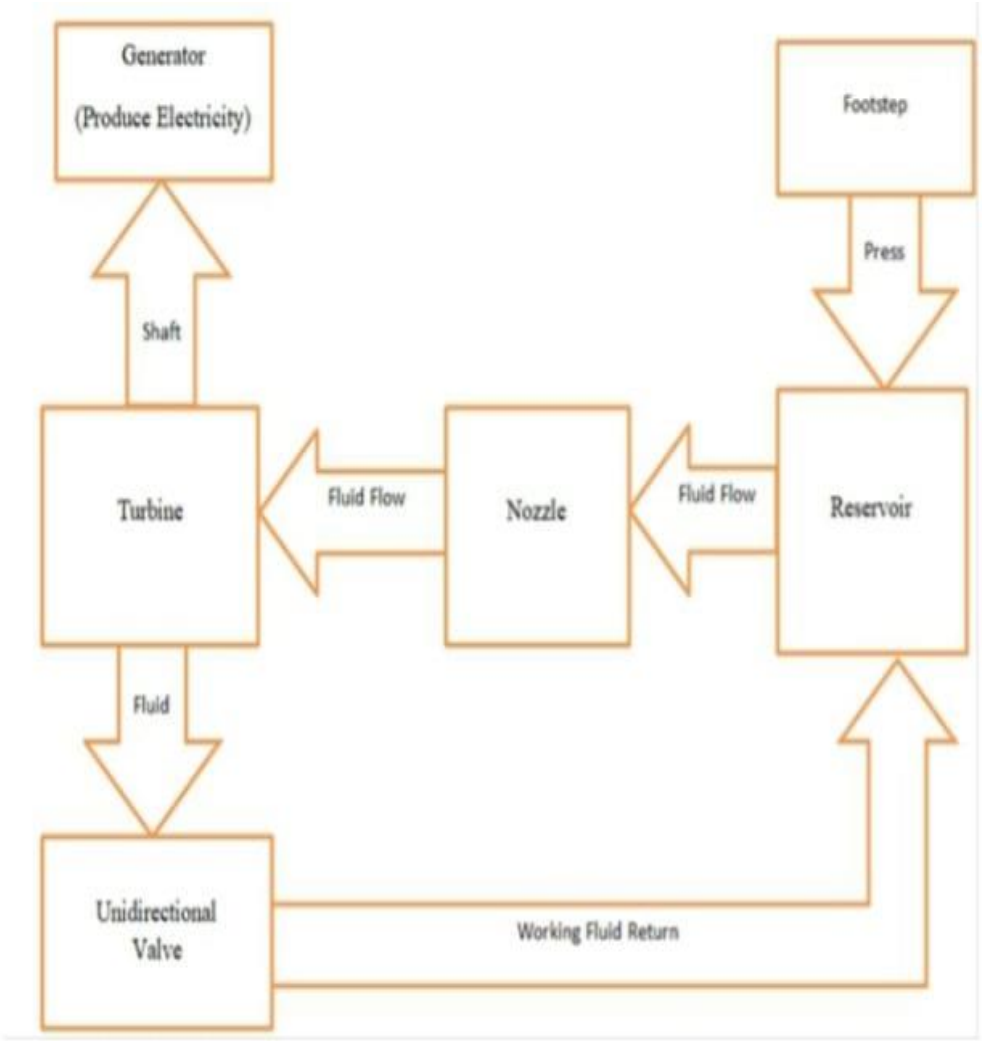


**Figure 1** : Block Daigram of Electrical Power Genaration UsingFootsteps.

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