

# Electricity Generating Water Faucet with Three-Inflow Pipes Generator

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**Abstract**— This study developed a hydro-electric energy device that harvests energy by means of flowing water which makes the turbine rotates continuously. The device is intended to be used as a water faucet which can be a viable energy source for small appliances rated five volts. It is composed of a generator, turbine, step down voltage, charger module, rechargeable battery, and volts booster converter. From the different tests conducted, the device was able to generate an average voltage, current and power of 4.705 V, 399 mA and 1.877 W, respectively. The power efficiency of the device was 18.77%. The percent charge of the built-in battery increases after an average of 25.5 minutes. The device was able to generate enough power to charge low voltage devices such as smartphones, power banks, portable lamps, and portable electric fans.

**Keywords**— generator; turbine; water faucet; power efficiency

## I. INTRODUCTION

As of today, the energy demand remains the same which means it is dramatically increasing and it will rapidly expand with time. The non-renewable energy sources like oil, coals and natural gases are commonly used in generating energy in power plants. This energy cannot be created or regenerated as quickly as possible to keep up with its consumption. Moreover,

this type of energy is limited and will eventually be gone because of much consumption. Natural resources like non-renewable energy must be conserved and carefully used because the future depends on it [1]. The constantly growing difficulties in power generation using non-renewable energy are very alarming, therefore; renewable energy sources should be advocated. One of the renewable energies that is used in many places today is hydropower. The hydropower represents a green renewable energy source that does not pollute the environment if proper measures are applied [2].

Engineers and researchers had developed alternative solutions to make sure that the supply of electricity is enough for all. They developed machines and devices related to renewable energy which is continuously improving as time has taken over by modernization. Solar, wind, and hydroelectric energy are some forms of renewable energy which is very popular nowadays [3]. Some researchers prefer to use hydroelectric energy [4] before nuclear energy was discovered because it is abundant and it is advantageous to the consumers. In the year 1880s, the first hydroelectric power plants have been developed, and according to the International Energy Agency (IEA), around 16% of the electricity supply has been developed. This form of renewable energy is more efficient



### III. RESULTS AND DISCUSSION

The capability of the electric generating water faucet shown in Figure 4 was tested. It was connected in a water pipe to serve as a faucet. Every 30 seconds the output voltage and current were measured and this was done in 20 trials. After measuring the voltage and current output, the power output and power efficiency are computed. The results are shown in Table I.



Fig. 3. The electricity generating water faucet with three-inflow pipes generator.

The device was able to generate an average voltage, current, and power of 4.705 V, 399 mA, and 1.877 W, respectively. The average power efficiency of the device is 18.77 %. The highest current produced by the device was measured in the first trial and it varies all throughout the trials due to change in pressure of the water flowing out from the pipelines or faucet.

TABLE I. POWER EFFICIENCY OF THE DEVICE

Trial	Voltage (V)	Current (mA)	Power (W)	Efficiency (%)
1	4.72	560	2.64	26.4
2	4.69	480	2.25	22.5
3	4.71	310	1.46	14.6
4	4.70	340	1.60	16.0
5	4.71	310	1.46	14.6
6	4.69	350	1.64	16.4
7	4.71	370	1.74	17.4
8	4.71	400	1.88	18.8
9	4.71	360	1.70	17.0
10	4.69	400	1.88	18.8
11	4.69	350	1.64	16.4
12	4.70	360	1.69	16.9
13	4.71	400	1.88	18.8
14	4.72	450	2.12	21.2
15	4.70	480	2.26	22.6
16	4.69	360	1.69	16.9
17	4.70	430	2.02	20.2
18	4.71	460	2.17	21.7
19	4.70	410	1.93	19.3
20	4.72	400	1.89	18.9

Table 2 shows the change in charge of the built-in battery in the device as time goes by. Initially, the built-in battery is a 50% charge. Every time the power bank charges, the time in minutes was recorded. The percent charge of the built-in battery increases after an average of 25.5 minutes. It can be deemed from the table that the change in charge is directly proportional to time. This means that the device was able to charge the power bank constantly.

TABLE II. CHANGE IN CHARGE OF THE DEVICE

Trial	Time (min)	Charge (%)	Change in Charge (%)
1	28	51	2.00
2	52	52	4.00
3	78	53	6.00
4	102	54	8.00
5	125	55	10.00
6	152	56	12.00
7	175	57	14.00
8	201	58	16.00
9	227	59	18.00
10	255	60	20.00

The portable micro-hydroelectric generator developed in the device features a three-inflow pipe generator that existing devices [7-8] don't have. The three-inflow pipe will significantly help in the conversion of energy from water flow into electricity. The average voltage of 4.705 V generated by the device is capable of charging devices [9] that connects through USB ports.

### IV. CONCLUSION

This study developed an electric generating water faucet that was able to generate current which is enough to sustain or to charge small devices rated 5 volts. It can be used to charge smartphones, power banks, portable lamps, and portable electric fans. The device was able to constantly charge the built-in battery within an acceptable period of time considering the size the size of the turbine used.

The device can be modified and installed in different pipe systems where there is a continuous flowing water like irrigation systems and rain pipes. Also, the idea of using three-inflow pipes on the device can further be used into a micro-scale generator that can power up a small community.

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