

# Analysis of energy generator prototype microhydro, based levers, high water lift (1.5 meters) without flow

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**Abstract.** Renewable energy sources, a future energy source should have developed in response to the problem of scarcity of fossil energy which will eventually run out. The study of science and technology as a solution, by utilizing the potential of all natural resources around us. Liquid substances, especially water, have properties that are always flat surface, can be used if you have a height difference, which is often called a potential difference, can be formed into a potential style by applying existing knowledge and technology. As applied by several researchers: Microhydro should require a minimum of falling water, dam, requires high costs and water source plant governance is maintained. Minimum wind speed, wind speed should fulfill. Solar power plants, constrains weather. All of that still utilizes the natural potential that can be influenced by climate, environmental damage, because it occurs due to natural processes. By utilizing artificial potential differences, we can utilize liquid fluid properties to be used as renewable energy sources. Through the construction of mechanical levers that can move energy can be generated. That since ancient times this simple plane has been applied a lot, but it is still on a balance (static) level. Based on this concept it can be developed that the support reaction has multiples of the weight and leverage force. Through this rule we develop it into a lever-based energy. A mechanic, which is can produce a reaction force and can move at a certain speed to produce energy. Therefore, it produces multiples of the reaction force from the water potential force due to its own weight.

## 1. Introduction

### 1.1. Background

Recently, there have been many reports of global energy scarceness, hence, solutions are required to deal through this case. There have been many solicitations of technology that produce renewable energy, but they still have obstacles in each of these technologies, for example windmills can only be applied in certain areas that have the potential for adequate wind speed to move the windmills and have a dependency with the seasons. There are areas that have high wind speeds if installed windmills can potentially cause the windmill quickly damaged, but in areas that have low wind speeds, so it is unable to move it.

Solar power has a weakness because it only occurs during the day and is affected by the rainy season for certain areas. The percentage of sunlight utilization that has the potential to produce electricity in 24 hours a day is around 30% or about one third is around 8 hours. Then, for the long term, it requires quite expensive maintenance, especially battery replacement. The filling of dam water is also affected by the



rainy season, abundant water and dry water supply decreases, energy sources decrease even in the long dry season, drought can occur, and consideration of logging of nearby forest plants can result in reduced spring water sources. The following is what underlies the concept of a lever-based micro-hydro energy research concept, the windlass, or other 12 PERPETUAL MOTION wheel, turned by applied force, lifts buckets from wells—raises stone, and elevates heavy bodies, if desired. Heavy bodies descending can be, and are used through means of machinery to make machinery run.

Recently in 2009, two scientists from Taiwan Chun Chao Wang, Yuh Suiang Wang have published their patent, where they have used the same principle to generate electricity [1]. And a Russian scientist, Mikhail Dmitriev on January 28th 2011 used the same principle to increase the torque of rotating devices [2].

Prof. Nagabhushan states that Energy demand is increasing day by day with rapid increase in industrialization as well as modern world [3]. But the energy resources are gradually decreasing at high extent. Within a few years the energy resources will be diminished and hence there will be lack of fuel (coal, wood, water, etc.) for power generation. The other renewable sources such as solar, wind, biomass etc. are available with certain drawbacks as they are dependent on atmospheric conditions. The perpetual based power generation i.e., using free energy available in nature for the power generation. Free energy also used to minimize the cost of energy consumption. The free energy generator is a decent, powerful and well-looking topology that can give benefit to human being.

This energy resource that has never been as widely commercialized as now is known as Zero Point field. And a generator based on this concept works itself without any breaks and hence can provide power of all your daily electricity requirements [4].

Some of these cases provide motivation to continue to conduct research on renewable energy, which is not affected by geographical and climatic conditions where the water with a height difference can be made as a renewable energy source. Artificial waterfalls with the ability of their own potential energy equipped with a lever can produce residual energy that is useful as a source of sustainable energy generation, without damaging the environment.

### *1.2. Basic theory*

The perpetual motion based power generation i.e., using free energy available in nature for the power generation. Free energy also used to minimize the cost of energy consumption. The free energy generator is a decent, powerful and well-looking topology that can give benefit to human being. The concept of this research energy generator is similar to perpetual motion and free energy, but utilizes the potential force of liquid fluid that is easily moved from one place to another. This concept applies physics, statics and dynamics to a mechanical system that works simulectically and utilizes leveraging forces. The prototype that has been made is proven that the leveraging force can produce a large resultant that can be utilized.

**Mechanical Energy in Rotational Motion** Mechanical energy is the combined energy of two forms of energy namely kinetic energy and potential energy, which can be utilized as a continuous energy source. As mentioned in perpetual motion that energy can be generated from magnets and potential forces that are equipped with mechanics that move each other.

The potential energy in this rotational motion is the same as the potential energy in translational motion which has the same distance and force. Potential energy is the energy possessed by objects due to objects having a certain height from the ground surface. If the object is moving downwards facilitated by an engine or aircraft that is controlled and directed using wheels, cam, hinges and arms, perpetual motion can be obtained without outside energy. Therefore, the mechanical energy produces rotating torque or rotates on its axis.

If a plane in the resultant rotational motion of the moment of the total external force is equal to zero, thus, it will apply the law of conservation of mechanical energy. Energy conservation law, the energy needed is the same as the energy produced. The change of potential energy into mechanical energy, which is moved by them due to their own weight and gravity, produces mechanical energy. In a prototype based energy generator the mechanical system lever can increase energy.

- Transformation potential energy into mechanics, an object is the energy possessed by an object due to the influence of the place or position of the object on the surface which causes the object to fall or move vertically. Potential energy is also called stationary energy because objects in a static position or in a stationary state can have energy. If the object moves, then the object undergoes a change in potential energy into motion energy which results in mechanical energy.
- Transformation potential energy into kinetic energy, the energy of an object that is preserved, because of the effect of its movement. In a moving object having kinetic energy, water in gallons moving vertically or horizontally has kinetic energy, its vertical motion due to gravity, if it has a height difference. Horizontal motion if someone moves.  $E_k = 1/2mv^2$
- Law of conservation of energy, "still applies to making prototypes. Energy cannot be created nor can it be eliminated". Therefore, the change in the form of energy from one form to another does not change the amount or amount of energy as a whole, however constructing a mechanical system that can develop energy can occur, the system can be designed so that a movement system has a greater resultant with the principle of moment and force.
- Energy, a quantity derived from units (N.m) or Joules. Energy and work have the same unit. Energy is defined as the power or force to do something, which is generally defined as the ability for something to do work to change. Whereas ordinary work is defined as an attempt to move objects as far as S (m) with force F (Newton). Forms of Energy, present in various forms, in this discussion indicated that energy form of mechanical energy, thermal, kinetic, potential, and chemistry.
- Mechanical energy, an energy that causes something to go through a certain total movement that is the sum of kinetic energy with potential energy. In the figure 1 shows the torque as the energy produced by objects to rotate with the force of action and reaction is not the same or not balance.



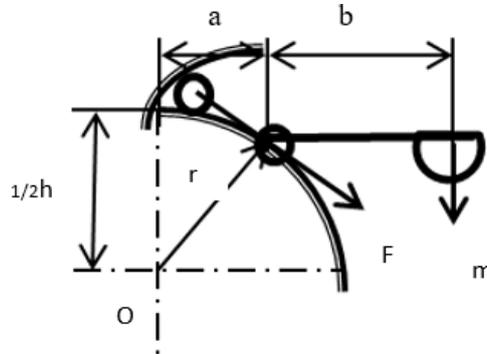
**Figure 1.** Static resultant.

- Transformation of potential energy into kinetic energy, if the energy of an object due to moving at a certain speed, as an example, a car that moves, objects fall and others. Potential energy, the energy stored in objects because of their position. For example, the potential energy of water is the energy that water has because of its height from the surface so that there is an opportunity to move. In the picture below shows the kinetic energy, with the construction of a tool that shows the result can move. This concept is used as a basis for thinking in research, lever-based micro-hydro energy generation.



**Figure 2.** The moving resultant.

Figure 2, presents the use of movable levers in general equipped with wheels to carry gallons, the energy to move is the same as the energy caused by load transfer. The forms of the lever above us change to the shape shown in figure 3.



**Figure 3.** Point of resultant for one force.

a, the distance of the footing to the resultant. b, load distance to the resultant. F1, load or style. R, the resultant with simple mathematics, the torque generated can be calculated from the product of multiplication, the resultant R as the force that moves the axis with the distance r as the radius. Torque on axis  $O = T.r$ .  $T = R \cos \gamma$   $R = b / a (F1)$ .

By constructing a mechanical construction to direct the resultant motion R so that it rotates by load F, then if the rotational speed n (rpm), the resultant R moves with a certain speed will be obtained with a power that can be measured.

$P = \pi d N F$ , if P, power (watt), resultant F as the rotating force, N number of revolutions per minute (rpm), D track diameter, F (rotational force)

*1.3. Lever-based micro hydro power (PLTMH) power plants*

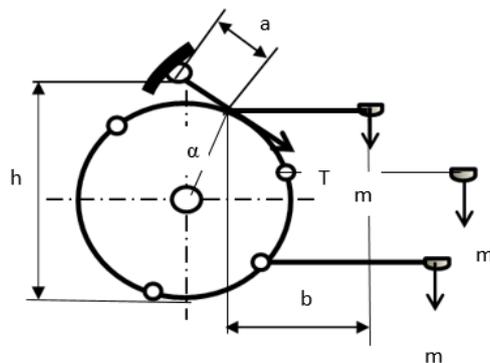
Water-wheel model so far as in the picture below, where each corner of the wheel develops a supply of water to generate torque. If one wheel performing on the wheel is filled with water with a density of  $\gamma$  of torque.

$$T = mg \cdot r$$

With the same height as the water lift h, with the same diameter as the pinwheel will presents the difference. By paying attention to the picture on each of the wheels obtained, the difference that can be calculated mathematically, can be seen in the description of the concept of the lever water wheel

The concept of micro-hydro-based levers, like the following picture:

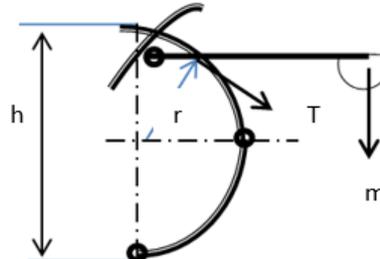
$T = m.g (a / b \sin \alpha)$  because in 3 pieces each lever can produce torque, this is as an excess in the lever system, so that:  $T = 3 mg (a / b \sin \alpha)$ , if h = height of water raised. P = large power T = torque, F = leverage



**Figure 4.** Point of resultant for three forces.

The hydroelectric generator is designed to have a rotating speed of 15 rpm as shown in figure 4, with dimensions:  $h = 100$  cm,  $M = 2$  kg,  $a = 10$  cm,  $b = 70$  cm,  $r = 50$  cm,  $N = 15$  rpm.

A fluid (water) with a mass of 2 kg slides down through a quarter circle arc. The radius of the circle is 0.5 meters



**Figure 5.** Load path as high as  $h$ .

If the object is released from A and the track is slippery, the rotational speed is 15 rpm, and the velocity around VB is:  $V_T = 15 \pi r \text{ m} / \text{s}^2$ , if mechanical efficiency due to friction is 60%. If the field has friction, it turns out the velocity of the object at B and C experienced a change in speed decrease of 60%. Movement occurs half a circle with a height equal to the diameter of the wheel. This is to make it easier to determine the dimensions of the experiment. A circular motion occurs by the force at work determined by the path bounded by the radius and the flanking angle of  $90^\circ$ .

Regular circular motion can be said as a regular accelerated motion of circular motion, bearing in mind the need for an acceleration of a fixed magnitude in a changing direction, which always changes the direction of motion of objects in order to take a circular path, but in this study as the delivery of ideas and ideas are still very simple, hopefully useful for further development.

## 2. Research method

To begin this research, material, supporting theories by adjusting needs are needed, identification of problems and in-depth studies are needed to obtain useful, applicable and simple research results. Create technological concepts that will be created by paying attention to relevant scientific principles and supporting them. Then make a prototype as a model tool to be tested as a research object to retrieve data, then, analyzed as evidence of proof of case studies in accordance with the research title.

In practice measurement and prototype observations are carried out as real measurements in accordance with the measurement results presented in the data. Therefore, the data shown is the result of real measurement.

The measurement is done by determining the pressure angle every 15 degrees. From observations and experiments will be obtained data that can show, that the energy generated 2.7 times the driving energy.

Archimedes law states that water conditions are always equilibrium, has the same surface pressure and Pascal's law shows that the surface pressure of water is the same, this is a reference in making prototype devices.

## 3. Data analysis and discussion

By create technological concepts that will be created by paying attention to relevant scientific principles and supporting them. Then make a prototype as a model tool to be tested as a research object to retrieve data, then, analyzed as evidence of proof of case studies in accordance with the research title.

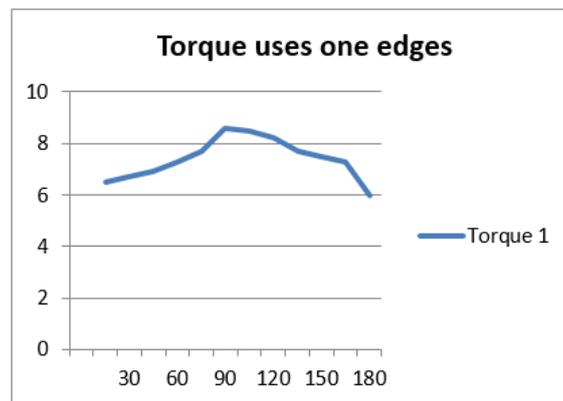
The discussion was carried out to determine the comparison between the effects that occur in each variation of treatment to get optimum power. The loading direction on the wheel movement shows the change in torque at each change in the angle of pressure, because of the semicircular shape that receives the treatment, where the trajectory is part which has a compressive force resulting in the shaft rotating

according to the torque generated by the load on the lever, the following is a semicircular path that has compressive power.

Observations and measurements applied to one corner, two-blade and three-blade with the press angle as formed in the above figure with the angular position corresponding tables treatment table produces the following data:

**Table 1.** Observation data table for one edge.

No	Viewpoint press ( $\gamma^\circ$ )	Load $F=mg$ (kg)	Thrust force $\times F$ (kg)
1	15	3	6,5
2	30	3	6,9
3	45	3	7,4
4	60	3	7,7
5	75	3	7,9
6	90	3	8,0
7	105	3	8,5
8	120	3	7,2
9	135	3	7,0
10	160	3	6,8,
11	175	3	6,7
12	180	3	0



**Figure 6.** Torque uses one edges.

**Table 2.** Observation data table for two edges.

No	Viewpoint press ( $\gamma^\circ$ )	Load $F=mg$ (kg)	Thrust force $\times F$ (kg)
1	15	3	8,5
2	30	3	8,9
3	45	3	9,4
4	60	3	9,7
5	75	3	9,9
6	90	3	10
7	105	3	8,5
8	120	3	8,2
9	135	3	7,0
10	160	3	7,8,
11	175	3	6,8
12	180	3	0

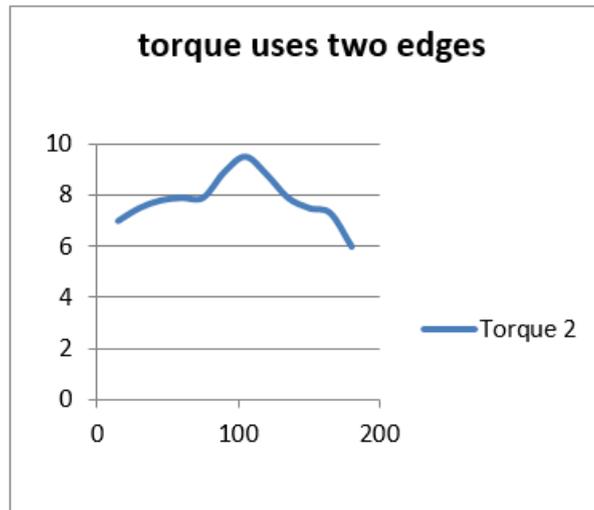


Figure 7. torque uses two edges.

Table 3. Observation data table for three edges.

No	Viewpoint press ( $\gamma^0$ )	Load $F=mg$ (kg)	Thrust force x F (kg)
1	15	3	9,0
2	30	3	9,5
3	45	3	9,4
4	60	3	9,7
5	75	3	9,9
6	90	3	10
7	105	3	8,5
8	120	3	8,2
9	135	3	8,0
10	160	3	7,8,
11	175	3	7,7
12	180	3	0

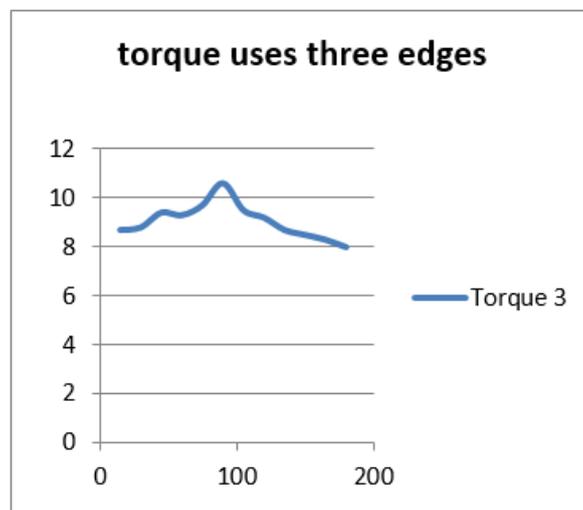
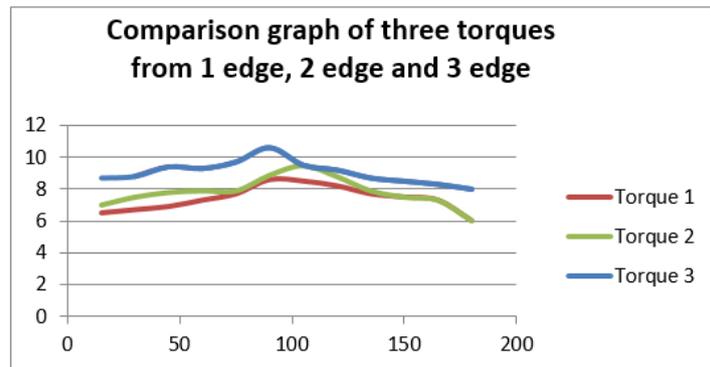


Figure 8. torque uses three edges.



**Figure 9.** Comparison graph of the three torques produced.

#### 4. Result and discussion

The result of this research is the use of the number of edges loaded is not directly proportional to the torque produced, so there are other factors that must be considered or considered. The ratio of energy produced in the generator of this system is between (60% -90%) compared to the source energy. To get better research results, further research must be done with different topics, but for the same object, among others, the comparison of the effective distance between the load distances to the resultant load compared to the distance of the lever to the resultant load as the generator driving torque.

Positive values obtained from the mechanical prototype generator include:

- The potential burden of water is easily moved
- Mechanical load and potential to form kinetic energy
- Power generated 3 times the initial power generation
- Can made on a large scale
- Buildable anywhere
- Easy and inexpensive material
- Not affected by natural conditions

Negative values in mechanical construction are:

- Complex mechanical sequence so that the frictional force is very influential

#### 5. Conclusion

The conclusion obtained from this study is that the utilization of energy sources (potential) of stationary water or potential energy can be used as a provider of future electric energy through lever-based micro hydro power generators, without the need for flow based on the result of this research that the use of the number of edges loaded is not directly proportional to the torque produced.

#### References

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