

Quran as Inspiration for Implementation of Pico Hydro System

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ABSTRACT

Islam urges Muslims to protect and preserve the environment and not to ruin the nature. This is mentioned in the Holy Quran through several verses in many chapters. Therefore, when we talk about renewable energy such as Pico hydro, the green energy or technology suits the teaching of Islam. Allah the All Knowing emphasizes in the Quran the importance of knowledge. Similarly, in many Hadiths the Prophet Muhammad insisted for the Muslims to seek knowledge. Through the Holy Quran, Allah mentions all sort of knowledge such as science and technologies, commerce and economy, health and medicine, laws, history and philosophy, and astronomy. This paper discusses about the basic theories related to Pico hydro power engineering that is proved and mentioned in the Holy Quran. From the observation, it is found that many encounters from research works in the field of hydropower have been approved and produced; but Quran still the best as a reference. Thus, the Quran is clearly preserved by Allah S.W.T. and will be always becomes the main source of knowledge and guidance, as well as the inspiration to all humankind in every aspect of their life, including knowledge such as science and technology: the utilization of the water power for Pico hydro system.

Keywords— Al-Quran, Islam, water power, pico hydro, renewable energy.

1.0 INTRODUCTION

The Quran which was revealed gradually over 23 years during the prophet hood of Prophet Muhammad SAW is a revelation from Allah. It was sent down as one of the miracles to the Prophet Muhammad SAW which remained to this day. Quran that have a total verses number of 6236 is the word of Allah that can not be changed or amended. It is a guide to the human race about various aspects of life in this world, and becomes the most important source to the Muslim as a reference. Until to this day, what were stated and revealed in the Holy Quran over 14 centuries ago are still relevant and beneficial to the human race (Sohib Tohar, 2009). All knowledge available today has proved the truth of the Qur'an, and directly proves that Islam is the true religion and Allah is the one and only god.

There are verses in the Quran that mention about the water power or water energy known as hydropower. In order to get a better understanding on harnessing energy from water, this paper discusses the relevant verses in the Quran relating to the concept and work of pico hydro system.

2.0 PICO HYDRO

M.F. Basar (2011) mentioned that Pico hydro has its own strengths that have been identified by which the living standard of the community can be improved, especially in the remote area. Generally, Pico hydro regardless the size of the rivers generates electricity without relying on other sources of non-renewable energy that are often associated with pollution and negative effects on the earth and its contents (H. Zainuddin, 2009).

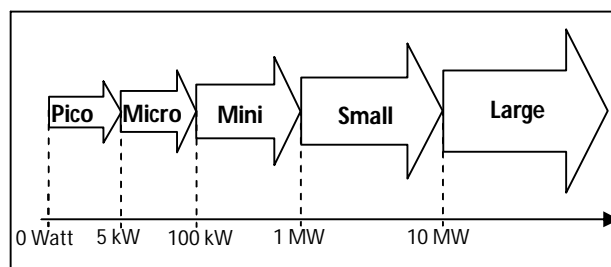


Figure 1. Classification of hydropower

With the use of the green technology, there is no longer anxiousness about the lack of fuel sources, pollution or high capital cost because for this scheme offers cheap energy, clean, efficient, high reliability and cost effective (M.B. Farriz, 2010). In most countries of the world particularly in Malaysia, almost 35% electrical energy is generated through hydropower system (MOSTI Hydro Road Map, 2010). Pico hydro can be classified as part of the hydro power, more exactly; Pico hydro is a subset of hydro families (M.F. Basar, 2010).

However, renewable source of energy such as the energy that generated from the ocean wave, tides coastal and sea water are not included in the hydro class even though hydropower is the center to the concept of energies (SA Abbasi, 2008). Figure 1 shows that the hydro power can be classified according to the capabilities of the electric power produced by a particular system. Most of the experts declare that more than 1 MW hydro such as large hydro does not fall in the category of renewable energy. This is due to the negative effects produced like environmental degradation for the development of dams and water storage reservoirs (M.I.Ramli, 2013).

3.0 CURRENT WATER SITUATION

On 5 June every year, the world will celebrate the Environment day; however, until now issue of the global warming is the main topic incessantly discussed and debated by many parties. In Islam, as the servant the human being is responsible to maintain the Microsystems environment from any environmental damage such as pollution and landslides. If talked about pollution, certainly it is the effect or outcome from the human's rapacious attitude, selfish and inconsiderate gives greatly negative effects on the earth and other creatures (Mohd Yusoff, 2009). Allah says in Surah Ar-Ruum verse 41 which means:

"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]."

There are two categories of pollutants; control pollution through natural systems (biodegradable Pollutants) such as human waste and the second is known as a material that can not be broken down by natural systems (non-biodegradable Pollutants) such as radioactive substances (Dr. Danial Zainal Abidin, 2007). Pollution from the second category often causes the temperature of the world increasing and causing global warming occurs, sea level rise and cause lack of food resources.

Farah Wahidah (2009) in her thesis states the main reason or the cause for river pollution is the consequences from the uncontrolled land development and disposal of industrial wastes that are not regulated. Utusan Malaysia on 5 June 2012 and Straits Times dated January 3, 2013 also report on the waste discharge from the pig farms that have caused several rivers 'died' and the water is stagnant and smelly. Among them are Klang River, Selangor, and Juru River in Penang.

4.0 PICO HYDRO TECHNOLOGIES INSPIRED BY QURAN

"Science without religion blinded, whereas religion without science lame", this is the expression that highlighted by some well-known scholars. Symbolically, science and technology can not ignore

and rule out religious, but should be used as a tool for the development of the religion itself (Mohd Yusoff, 2009). Referring to Danial Zainal Abidin (2007) and Ramli Awang (2003):

Religion born from the result of self-confidence that there is a supreme power that should be believed and complied, while science born from the curiosity about natural phenomena of nature developed by the ability of logical thinking mind and the ability to give reasons by human beings.

Islam encompasses all aspects of life in which much of the evidence in the Qur'an that preceded the discovery of science and even a lot of practice in Islam which is also proved by the scientific accurately. With a mind endowed by Allah, then a variety of equipment that is driven by a stream of water flowing was created. For example, watermill that used by farmers at a time long ago to irrigate their agricultural land. Moreover, there exist large dams for hydroelectric generation. In addition, there are the latest innovations projects that exploit streams (power of water) for the purpose of electricity generation in a small scale known as Micro and Pico-hydro.

Table 1: Surah in Al-Quran that related with Pico Hydro technology

Subject	Surah	Chapter : V. No
Water	Ar Ra'd	13 : 17
	Al Anbiaya'	21 : 30
	Al Hajj	22 : 63
	Qaaf	50 : 9
	Al Qamar	54 : 12
	An Naba'	78 : 14
River	Ibrahim	14 : 32
	An Nahl	16 : 15
	Al Israa'	17 : 91
Water Head	Al Hajj	22 : 63
	Az Zukhruf	43 : 11
	Qaaf	50 : 9
	An Naba'	78 : 14
Gravity	Al Hajj	22 : 63
	Al Mu'minun	23 : 18
	Az Zukhruf	43 : 11
	Qaaf	50 : 9
	An Naba'	78 : 14
	Abasa	80 : 25
Hydro Power	Al Anbiaya'	21 : 30
	Ar Ruum	30 : 48
	Qaaf	50 : 9
	An Naba'	78 : 14
	Abasa	80 : 25

Refer to the Table 1 above; there are many verses of the Quran which gives human a reminder and a description of the water, hydropower, water flow, water head and gravity. Referring to the concept and theory of the Pico hydro, these components are important in the implementation of the Pico hydro. Indeed, what is stated in the Qur'an provide inspiration and motivation to all researchers to explore deeper into this green technology.

Pico hydro uses a simple concept of hydro power. The water turbine is rotated by moving water so that the water turbine drives a generator / motor and finally electrical energy produced. The faster the water turbine spin, the more electricity that can be produced, and it is dependent on the components found in the Pico hydro system as shown in Figure 2. Two of the most important components are the water head and water flow. No electrical power that can be obtained by Pico hydro generation system without both components.

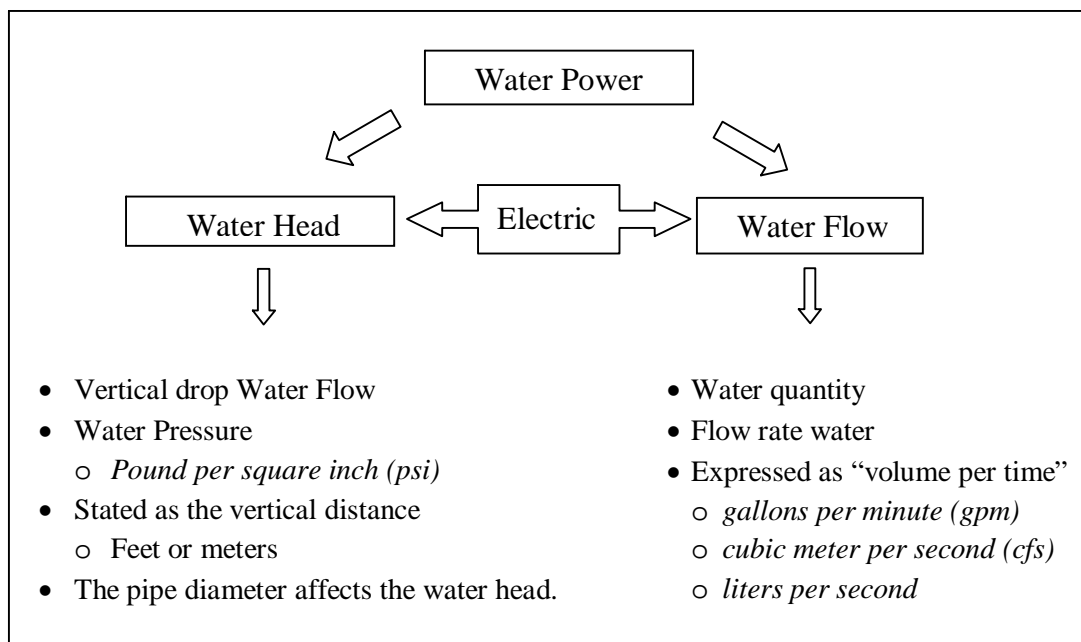


Figure 2. Water flow and water head in the water power

However, the application of water either from the sea or a river for any purpose to benefit human is not feasible without the consent from Allah that commands the creatures which are sea and river to be humble so that the existence will give convenience to the humans. This is shown in kitabullah in Surah Ibrahim verse 32 which says:

“It is Allah who created the heavens and the earth and sent down rain from the sky and produced thereby some fruits as provision for you and subjected for you the ships to sail through the sea by His command and subjected for you the rivers”.

These are the famous interpretation acknowledged by famous interpreter of water as beneficial source to human kind.

5.0 Water power

Water is the basic element for humans to survival on the earth. In short, water plays unsurpassable important role to complement our daily life. By the verse 30 Surah Al-Anbiyaa', Allah says:

"Have those who disbelieved not considered that the heavens and the earth were a joined entity, and We separated them and made from water every living thing? Then will they not believe?"

From this verse can be understood that, the water itself become one of the key elements in the creation of God's creatures. At the same time, it shall be construed that water is a basic requirement of all these creatures. Taking a human life, for example, water is needed for cooking, drinking, washing, medical purposes, energy, irrigation for crop cultivation, animal husbandry and so on.

Continuation of benefits from water and human dependence on water continue unraveled and can be seen in the modern era and this cutting edge. The role of water can be illustrated through Pico hydro system to generate electric power, and the ability to operate the system can only be viewed or interpreted as the availability of water resources. The electricity generated by this system will give power to variety of electrical equipment and thus giving chance for people to live better and have comfortable living. At any cost, as sophisticate as any owned hydro system, without water, Pico hydro will be futile.

Few evidences of Allah SWT contained in the Quran touched on water and related to its importance not just as a source of energy, even more. From Surah 13 (Ar-Ra'd) means thunder, in the 17th verse, according to the translation of the Quran Syaamil meaning:

"He sends down from the sky, rain, and valleys flow according to their capacity,

From this point, water or hydro as an energy sources which are inspired by this Kalamullah, can be seen in some of the last phrase in this verse as described by Sayyid Qutb in Zilal interpretation of scripture as follows:

“When rain fell then the several rivers flow freely, on the surface of the water could be seen drifting bubble-shaped object, with the tide to go, but it remains a bubble, while the water flowing beneath the serene look to the estuary. That is the water that brings with it advantages and benefits to human life.”

Apart from the parable of human condition whether they like foam (not beneficial to others) or water torrent (beneficial to others), can be also understandable, in this interpretation also argued whereas river water with constant current flowing into estuary is a resource that can be harnessed by human beings. Referring to Pico hydro system, it is known as a proportion of the water flow.

$$P = \rho \times Q \times g \times H \qquad \text{J/s or Watts} \qquad (1)$$

$$\dot{P} = \dot{\rho} \times \dot{Q} \times \dot{g} \times \dot{H} \qquad \text{Watts} \qquad (2)$$

- * Equation 1 = power formula for *Impulse Turbine*
- * Equation 2 = power formula for *Reaction Turbine*

At the beginning of the same verse has been inspired that the volume or the amount of water varies according to the number of rainfall fell and it depends on the valley condition that water traveled through it. It can be concluded that the current hardness measurements also varies according to the place of its path. As such, it is understood that the existence of streams of varying magnitude and vector, people with common sense can certainly inspired that the tide comes in different strength with it. Electric power (P or \dot{P}) refers to equation 1 and equation 2, in theory, it is clear that it is directly proportional to the water flow rate (Q or \dot{Q}), gravity (g), the elevation of the water (H) and water density (ρ). The higher the value of each component, and of course the more energy that can be harnessed by human beings. This condition proves that science can prove the truth of the Quran and allow the divinity of Allah Ta'ala.

According to verse 17, Surah Ar-Ra'd, said that Allah sends down rain from the sky. The sky can be understood as analogy to conditions or a high position (height). Thus, it is related to or associated with another factor, namely gravity and elevation of the water that affect the value of the power (P or \dot{P}) produced: it is directly proportional between each other. In addition, this reflects the importance of gravity in human life. What is interesting here, the components of which are mentioned in the Quran such as gravity, water level, water flow rate was ahead of what has been found in the field of engineering science in terms of Pico Hydro.

6.0 Conclusion

There is no doubt Quran verses give guide and guidance present to those who think. Thus, the application of water in hydro power generation also indirectly recorded in sacred Scripture through the word "for human benefit" refers to water flowing (stream) as one of the ways that can be utilized by human beings in the world of power generation today. Thus, it may be said here the water is a basic human need such as is used for drinking, cooking, washing, bathing and others for centuries. But in the age of modern humans ever even thought to mind in which Allah has to tap this stream of water flowing into energy generation that is able to build the civilization of the higher value. It proves that the Quran has remained relevant over time and serves as a guide to the way of life for the people who take Allah as the one God longer true.

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