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Lightning as an Alternate Energy Source

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Abstract - Power crisis is the major issue of the world. There have been lot of many invention and conceives but those innovation has been endanger, because of simple fact of non availability of energy resources. The nature offers us one such option is the power of lightning it is known that lightning can produce huge amount of power. This paper describes about the method for harvesting the new source of renewable energy from lightning strokes.

Index term- electricity lightning, power crisis, renewable energy

1. INTRODUCTION- Now a days the world facing the power crisis and consequently a renewable energy requires as energy contributes to solve the crisis. It is very important to find out the renewable energy sources for domestic as well as small commercial purpose. In 1980's, there have been several attempt to examine the possibility of collecting energy from lightning. A single bolt of electricity (approximately 5bilion joules or about energy tic as well as small commercial purpose. In world, more than 60% of people and in India nearly 70% of people are not getting electricity for daily use [2]. For providing power to consumer all conventional as well as non conventional resources are used. it is believe that lightning strokes is a good future to be free and natural source of energy clouds and hence clouds may possesses either positive or a negative charge, depending upon charge they contain. The charge on a cloud may be release to another cloud and we call it discharge of lightning. There are three primary types, from intra cloud, from one cloud to another cloud and finally between cloud and earth. Out of three, CG lighting is the most originate in a cumulonimbus cloud and terminates on the ground. Even though IC and CC are more common. The lightning occurs approximately 40- 50 times a second resulting in nearly 1.4 billion flashes per year. stored in 145 liters of petrol) [4]. It has been proposed that the lightning we use to generate hydrogen from water by electrolysis process, or to harness the energy from water by rapid heating, to tap the lightning by lightning arrester and it stores into capacitors or batteries [1]. It is known that to obtain the real lightning strokes energy is very difficult task as well as very dangerous. According to previous studies, tesla coil is a high voltage coil that produces ionic emission in the form of electrical discharges in many times. Usually it is used to generate high voltage by using mock lightning which is produced by mock generator and that can harvest lightning energy [1].

2. LIGHTNING HARNESSING PLANT

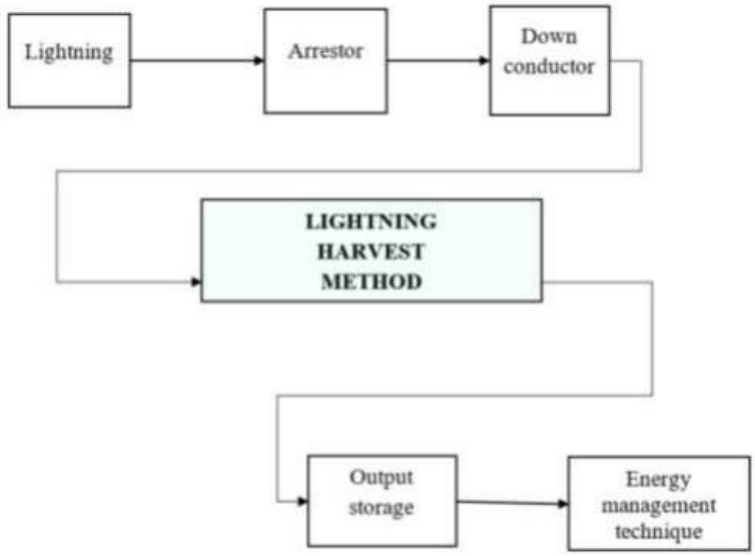
A) Lightning -Lightning is an electrical discharge between electrically charge region within cloud or between cloud and earth or between clouds. When the clouds are charge to the high potential with respect to ground or neighboring clouds a huge spark takes place between it. When there is friction between up-rush hot moist air and a tiny particle of water causes the building of charge. When water drops are formed and accumulated, they form a typical thunderstorm has three or more strikes to the earth. Lightning primarily occurs when warm air and cold air are mixed together resulting in atmospheric disturbances. It can also occur during forest fire, tornadoes, and volcanic explosion.

B) Lightning Rod- The principle of lightning rod was first developed by Benjamin Franklin in 1749 and further improvements towards a reliable system around 1760. A Lightning rods metal rod or metallic rod which is made by copper or aluminum. And it is mounted on the roof of building, a ship or even a tree. The diameter of rod is 2 cm. It

connects to a piece of copper wire and the wire is buried in the ground or earth. The purpose of lightning rod is to tap lightning strikes and provide low resistive path to the ground.

C) Methodology- Harnessing the lightning energy is somewhat difficult to tapped for the later use. As it is in tremendous amount but it is not impossible. We can't store the large amount of electricity tapped from lightning for later use Electricity can be stored by the new technologies such as utility scale battery technology or other energy storage technology such as capacitor or flywheel. We can use this energy for grid. In frequent thunderstorm region, such as Florida, lightning capturing power plant would become practical. As a lightning occurs, it is tapped by lightning rod and this lightning rod is used as a source of energy about 1 mw of electrical discharges can be tapped with the help of lightning rod after that it is fed to the isolator circuit further it is step down by number of tesla coil step down transformers upto 10 volts, 10 mega amps for 20 ms and this power is directed under the ocean. In ocean electrolysis of water is done in order to produce large amount of hydrogen and oxygen gas. Then numbers of turbines are connected to the generator which produces more amount of continuous power and this power is transferred to the large storage devices.

Lightning Harvest Process- Block diagram showing generalized lightning energy harness process



Capturing: The CG lightning discharges energy from the cloud to earth through a point of contact on ground surface. This contact point can be determined by the highest conducting point within a region covered by the down streamer, or it could strike directly to ground in open fields. This can be better understood with knowledge of upward streamer (concentrated amount of charged particles which creates the lightning discharge path). With the knowledge of highest conducting point as illustrated by Benjamin franklin in 1752, custom points are being created using arrestors. Arrestors are the vshaped devices at the top of building or structures which capture and channeling lightning to ground with the aim of protecting the structure. This arrestors have a region of coverage dependent on the height of the arrestor from the ground (Coverage Radius, R = 2 x height of arrestor from ground).(Dwyer & Uman, 2014

- Channeling: This involves the pathway of the captured lightning from arrestor to ground. This is essential, as the captured energy would choose an alternate path if not provided. And this must be a highly conducting path in-order to reduce the amount of heat generated along this path due to resistance. A copper strip is usually used.

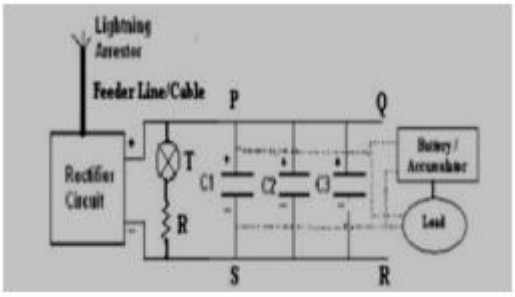
• Harvesting method: This involves rectification and/or conversion of lightning energy to storable or usable form. Lightning energy is an impulse or static energy and this is to be converted to conventional energy form for use. Various methods have been proposed to effectively harness lightning enormous energy, with some being direct and others indirect.

• Storage: This step involves storage of the converted captured energy. The converted energy is stored with appropriate mechanism for utilization.

• Utilization mechanism: The stored energy is then converted to usable energy for homes or cities depending on the amount or capacity of storage.

3. ELECTRICITY TAPPED BY LIGHTNING ARRESTER

Lightning sources possesses much more amount of electricity than any other. This process of using renewable lightning energy source for the human use would be proved advantageous.



Generally in stormy whether natural disaster such as lightning is often happening problem. As the very high voltage produced by the lightning is wasted in the ground. We have to use this energy as electricity for our day to day life. For this, we fit large number of lightning or catchers at the roof of multistoried building, trees and towers etc. every lightning arresters is connected to a common transducer placed at the particular location by the copper wire having sufficient thickness. When the lightning occurs very high amount of electricity is catch by the lightning arrester and it is flowing through the conducting feeder or cable and the circuit. Then this DC voltage is fed to the capacitors namely C1, C2, C3. This capacitors are having with high capacitance range which are used in HT lines. Hence this charged capacitors or the batteries act as a DC voltage source and they are fed to the load.

4. POWER OF LIGHTNING At any given moment, there are about 1,200 thunderstorms occurring all over the Earth, and it's estimated that each second, there are about 100 lightning flashes somewhere over our planet. A typical lightning bolt contains about 15 million volts of electricity and instantly heats up the air around it to over 60,000 degrees, with some reaching more than 100,000 degrees. That's why the total energy of a strong thunderstorm can exceed the energy released during an atomic explosion.

5. HARVESTING LIGHTNING ENERGY A technology capable of harvesting lightning energy would need to be able to rapidly capture the high power involved in a lightning bolt. Several schemes have been proposed, but the ever-changing energy involved in each lightning bolt render lightning power harvesting from ground based rods impractical – too high, it will damage the storage, too low and it may not work. Additionally, lightning is sporadic, and therefore energy would have to be collected and stored; it is difficult to convert high-voltage electrical power to the lower-voltage power that can be stored.

6. CONCLUSION The present work has been directed a better understanding of harvesting the lightning energy in a small scale system. In order to achieve the above work was focused on the development of a small scale laboratory experiment. It was done by injecting capacitor, which represent an energy storage device. Lightning rods have proved themselves to be the source in command in realizing the solution for this issue.

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