THE REQUISITE OF INSOLATION

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Abstract - *"Alternative energy is a future idea whose time is past. Renewable energy is a future idea whose time has come."*- **Bill Penden**
Humans require and utilize energy in all walks of life. Energy is the dynamism derived from the usage of physical or chemical means, especially to work automobiles. Energy is an essential element of a man`s life. Energy can be broadly classified into two types: Renewable energy and Non-renewable energy. Solar Energy is a type of renewable source of energy. Solar Energy is the energy derived from the sun's radiation. It is mobilized using the latest technological devices and apparatus. Solar energy is necessary for the survival of man and is vital to support life on earth. Solar electricity helps man to provide a source of clean and low cost renewable energy. Since, India is a rapidly growing market of mobile phones initiatives are being taken by leading companies to induce Solar Powered Mobile Phones in the market. These mobile phones are being introduced in the markets in order to reduce the usage of chemicals, fossil fuels and alternative fuels. This Research Paper discusses about the forms of energy and focusses on the concept of Solar Powered Mobile Phones and the methods to store solar energy for its usage in the future. It even aims to find solutions to the problems faced by countries devoid of solar energy.

Index terms- Heat, Non-renewable energy, Renewable energy, Solar energy

I. INTRODUCTION

"We should increase our development of alternative fuels, taking advantage of renewable resources, like using corn and sugar to produce ethanol or soybeans to produce biodiesel."- Bobby Jindal

Humans need and utilize energy in all walks of life. Energy is used for the well-being of mankind. Energy is the dynamism derived from the usage of physical or chemical means, especially to work automobiles. It is one of the most significant inputs for growth of all sectors including agricultural, industrial service and transport sectors. Energy is being used at the national & global level for the development of society since several decades. The demand for energy all around the world is increasing. Energy is broadly classified into two types: Renewable and Non-Renewable sources of energy.

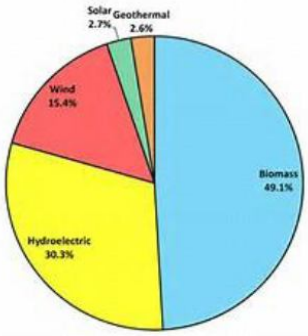


Renewable energy is a source of energy which is collected from inexhaustible resources. They are naturally replaced, such as solar energy with the help of sunlight, wind energy with the help of wind, tidal energy by the tides and geothermal energy by the heat.Non-renewable energy is called as a finite source of energy. Non-renewable energy resources are exhaustible. They are minifying every day. Fossil fuels like coal, petroleum, natural gas and metal ores are not renewable sources of energy.

II. MEANING AND DEFINITION OF RENEWABLE SOURCES OF ENERGY

"Just as fossil fuels from conventional sources are finite and are becoming depleted, those from difficult sources will also run out. If we put all our energy and resources into continued fossil fuel extraction, we will have lost an opportunity to have invested in renewable energy."-David Suzuki

Renewable energy can be defined as "an energy from a source that is not depleted when used, such as wind or solar power."According to Dictionary.com, "Renewable energy is any naturally occurring, theoretically inexhaustible source of energy, as biomass, solar, wind, tidal, wave, and hydroelectric power, that is not derived from fossil or nuclear fuel."



Renewable energy is, "Any energy resource that is naturally regenerated over a short time scale and derived directly from the sun (such as thermal, photochemical, and photoelectric), indirectly from the sun (such as wind, hydropower, and photosynthetic energy stored in biomass), or from other natural

movements and mechanisms of the environment (such as geothermal and tidal energy). Renewable energy does not include energy resources derived from fossil fuels, waste products from fossil sources, or waste products from inorganic sources."

III. MEANING AND DEFINITION OF SOLAR ENERGY

Solar energy is beaming light and heat from the Sun. It is mobilized using the latest technological devices and apparatus like solar panels, solar heaters, photovoltaic cells, solar thermal energy and artificial photosynthesis. Solar energy can be defined as the "radiant energy emitted by the sun."[1]



"Energy derived from the sun's radiation. Solar energy is used on Earth in various ways. It is used as a passive source of energy."[2]



Electromagnetic energy (solar radiation) transmitted by the sun (approximately one billionth of which reaches the earth) that is the basis of all terrestrial life. It amounts to about 420 trillion kilowatt-hours, and is several thousand times greater than all the energy used by all the people. Solar energy is harnessed by capturing the sun's heat (through solar heaters) or light (through photovoltaic cells). It is estimated that one square kilometer (about 0.4 square miles) of land area receives some 4000 kilowatts (4 megawatts) of solar energy every day enough for the requirements of a medium-sized town.[3]

[1] Oxford Dictionary

[2] www.thefreedictionary.com/Solar+energy

[3] http://www.businessdictionary.com/definition/solar-energy.html

Renewable energy will approximately reach 25% of the world`s power generation by 2018. Germany is the largest solar electricity producer in the world. It has bountiful solar sufficiency installed than the rest of the world.

IV. USES OF SOLAR ENERGY

"I've been very passionate about renewable energy for many years, particularly solar energy and its capacity to bring abundant clean, sustainable energy to millions around the globe."

-Richard Branson

Solar energy is an integral part of man`s life. It is necessary for the survival of man. It is vital to support life on earth. It helps for the growth of our food, to light our days, to provide heat, to influence weather patterns and also can be used to for the generation of solar electricity. Humans have used energy from the sun to provide electricity for many years be it in the form of solar cookers or in the form of solar cell calculators or any other apparatus. Solar electricity helps man to provide a source of clean and low cost renewable energy. The sun is even responsible for heating the ground beneath our feet to a significant degree in order to support the use of geothermal, ground source heat pumps. Without the existence of solar energy, human life would become impossible. We will study in detail about the new form of usage of solar energy i.e. solar powered mobile phones.

V. SOLAR MOBILE PHONES

"Solar power is not about fashion, it`s about survival."

- Sir Norman Foster

(i)Introduction to Solar phones

India is a rapidly growing market of mobile phones. It has the second largest number of subscribers in the world. There are more mobile phones in India than the toilets.[4] Shashi Tharoor[5], a noted Parliamentarian in his speech on why nations should pursue soft power says, "In India more than 50 million cell phones are sold in a month. India is the larger than US as a telephone market."[6]Mobile phone has even reached to the poorest of the poor. The crucial problem with mobile phones is its charging. It needs to be charged in order to be used. But charging facility is not available everywhere. There are many interior parts of India where people have to face the problem of load-shedding. So it is not possible for them to charge their mobile phones. It is the greatest hurdle in connecting the world together as a global village. Even in cities

[4] https://www.greenchipstocks.com/articles/solar-powered-mobile-phones/2062

[5] A noted Parliamentarian of the Congress Party of India, currently the leader of opposition

[6] https://www.ted.com/talks/shashi_tharoor

there are power cuts ranging to 20 hours a day. Charging of phones is the biggest hurdle on the path of development that we need to overcome. Initiatives are being taken by leading companies to induce solar powered mobile phones in the market.

(ii)A Progressive Step by Mobile Phone Companies

These mobile phones are being introduced in the markets at low costs with affordable call rates. Samsung has introduced a phone called 'Blue Earth' which is similar to a smartphone with a full solar panel on its back. It helps in generating adequate power to charge the mobile phone. It is easy to carry and is made up of plastic bottles which are recycled and used.



ZTE is a Chinese mobile company that initiated a slim model solar powered mobile phone called 'Coral-200' costing only 40$. The phone allows you to talk only for 15 minutes if charged in sunlight for an hour. Micromax a leading mobile phone manufacturing company in India launched a solar powered mobile phone by the name 'X259 and X258.' The mobile phone is cheap and gets charged using solar energy. It has a 1000 mAh battery. It is similar to other mobile phones and even has an inbuilt solar panel. It has various features like a micro sd card slot, bluetooth, music system and other features too.

LG mobile phones are embedded with solar cells. It is a slim mobile phone having a battery which is a solar cell allowing gadget geeks charge up the battery with sunlight. It allows users to talk time of 2.25 minutes or 180 minutes of standby for every 10 minutes of sunlight.



Sharp is a leading mobile phone company of Japan which has also launched a solar-powered waterproof mobile phone. The phone is designed to capture 80% of its charge from solar power alone.

(iii) How will solar powered mobile phones work when there is no sunlight?

There are many countries in the world like Norway, Greenland, Iceland where there is hardly any sunlight. So it becomes nearly impossible for people living in those countries to use solar powered mobile phones.

There is even a problem of charging our phones during the night. So what should be done in situations where there is no sunlight? There is a need to find out alternative solution to this problem. What can be done is we can store solar energy in various ways.

"We need to find a way to store massive amounts of electrical energy, that's the single biggest obstacle to getting a large fraction of our electricity from solar power." says Michael Aziz. [7]

Flow Batteries can be a solution to this predicament. Fuel cells have power space capsules and reactions that convert the chemical energy in small organic molecules like methanol into electricity.

If engineers create a cell that also runs in reverse—essentially converting energy back into chemical reactants—the resulting flow battery could store solar power using inexpensive, organic fuel.[8] These metal ion-based flow batteries are being used since 1980s. Rather than using chemical batteries a better alternative is quinones which is some small organic molecules that help plants store energy.

Two isomeric unsaturated cyclic compounds having the formula $C_6H_4O_2$, found widely in plants, especially in a yellow crystalline form, and used in making dyes, tanning hides, and photography is basically quinones.[9]It is usually found in red or yellow colours. Quinone-based flow batteries costs as little as 1/4 of a cent per kilowatt hour.

Another method to store solar energy for future consumption is by using Salt. Salt helps to convert sun`s energy into solar power or heat on a rainy day. This is then stored in thermal storage tanks. There are various countries which have built several solar power plants. These power plants store excess energy in molten salt which can later absorb extremely high temperatures without changing its state.

Example: Abengoa is a renewable energy firm based in Spain that is involved into this process. It has already built a salt-based 110 mega-watt solar storage plant in Chile, which can store 17 hours of energy in the power plant.

[7] A professor of energy technologies at Harvard University
[8]https://www.greenchipstocks.com/articles/solar-powered-mobile-phones/2062
[9] Freedictionary.com



Apart from using flow batteries, one can rely on hydrogen to store solar energy for later usage. "There are lots of clever people doing lots of clever things in the battery business," says Tom Meyer[10].



Converting solar energy to hydrogen instead of electricity is a viable way of storing solar energy.

"You start out with water and just break it into its elemental form, then collect that hydrogen in a tank and then burn it at night," says the chemistry professor.

All these methods can be even used to make a solar powered cell phone charger. Solar energy is stored in a portable solar cell phone charger so that mobile phones can be charged with Sun light and electric energy. It stores heat and energy from the sun and helps to charge phones. Solar cell phone chargers use solar panels to charge mobile phone batteries.

CONCLUSION

Solar powered mobile phones are viable. They help in maintaining a sustainable environment. They are the future of tomorrow. Solar power helps to reduce pressure on fossil fuels. It reduces dependence on non-renewable sources of energy. It makes human survival on this planet possible. Let`s take the initiative to use solar phones which are sustainable rather than the phones which are affecting our environment.



"I feel more confident than ever that the power to save the planet rests with me."

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[10] A professor of chemistry at the University of North Carolina