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EMERGING HYBRID ENERGY SOURCES IN BIHAR

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Abstract - ***The world is increasing in every dimension with every passing day. The earth is currently a home to 7 billion people increasing every day. These people require energy for various uses right from cooking food to driving vehicles. Most of the energy currently is derived from non renewable or exhaustive resources which is making our present better but definitely ruining our future. The concept of hybrid energy is only solution. The world is facing severe energy crisis and the need of energy is increasing day by day, keeping this in mind the concept of hybrid energy sources came into existence. As we all know hybrid means combination of two or more things, same concept is applied here also, the energy utilized by hybrid systems is generated from two or more sources. conventionally, houses are provided with electricity or any other form of energy from non renewable energy sources such as coal ,petroleum based fuels, nuclear fuel etc these fuel have high calorific value and easily combustible, but the environmental degradation caused by utilization of these type of fuel is also at very large scale thus , makes us to rethink about the massive use of non renewable sources of energy. These types of houses will help us in making efficient utilization of energy which is necessary from environmental point of view to crab down the pollution caused by use of non renewable form of energy which depletes the quality of our environment and making it difficult for the survival of living organisms on the planet earth.***

Key Words: *Hybrid Sources, Renewable Energy*

1. INTRODUCTION

Hybridization of things is nothing new to this world, there are many technologies developed to hybridize different form of energy ,the best example from day to day life is hybrid cars ,many car makers have roll out hybrid cars in market and they are running successfully, with the success of hybrid cars the emission of green house gases had been reduced to great extent.

Here we came up with same concept of hybridization but in context of homes because the power utilization of homes are increasing day by day by each and every houses .Moreover, in developing countries there are still many areas where houses are still running on primitive sources of energy because government is still unable to provide them with electricity, With the development of technologies which makes houses to utilize different kind of energy at the same time to fulfill their needs can make the houses self efficient.

Hybridization is not only the use of two different kind of energies but the use of efficient form of energy, there are so many renewable sources of energy has developed by today's world which makes the energy production eco friendly and also increases the portability of energy creation for instance , from the use of solar panel electricity can be generated anywhere having good intensity of sunlight same with case of exploitation of wind energy we can place wind mills to generate electricity in the area where we can get good amount of wind flow . there are many forms of renewable sources of energy and each have their own pros and cons but exploitation of these sources of energy is now possible to great extent with development of advanced technologies . The reason why they are not used at mass level is the cost of production at large scale but at small scale

such as for single house or apartments they are economical and can be efficiently used for production of energy . So, in our idea of hybrid home we can use renewable sources of energy along with the potential of house to generates its own energy for utilization.

The major concern while developing the idea of hybrid energy is the acute crisis and lack of infrastructure in developing nations to deliver power to each and every homes according to their requirement. Thus, there is a need to explore new possibilities.

There are several form of energy which can be used to make a house self efficient and the use of these energies in the combinational two or more form give the rise to hybrid house .The reason behind making the combination of two or more energy resources so that we can provide uninterrupted power supply to the houses because renewable sources of energy depends on natural conditions and it may be possible that natural condition is not in favor all the time so we need the backup energy resource for hustle free power supply . Moreover, to reduce the dependency on the non renewable power source as if when all the house become self efficient in terms of power the load on power generation using non renewable power generation decreases to large extent which will be very helpful to make eco friendly environment.

2. ENERGY SOURCES

Some kind of energies which can be used solo or in the combination of two or more to form hybrid homes are described below:-

2.1 SOLAR ENERGY

Perhaps the most utilized amongst all of the resources as of now is the solar energy. The ideology of utilizing this resource is simple i.e. to use sun rays to generate energy. Sun rays are comprised of two parts-heat and light. The usage of light energy is limited in homes because nowadays heat can be directly converted into a usable form like in the gas stoves in kitchens and in other devices or technologies involving heat in either direct or indirect form whatever the application may be.

Solar water heaters are also based upon utilizing the suns energy to maximum limit by utilizing the heat of the sun to actually heat water directly. This method has gained importance because of the ease of installation of the system. Silicon chips being the future of technology have started gaining momentum in various spheres in the energy requirement industry with it able to now cater to more and more domains of energy requirement.

Solar energy offers much more advantages that now techniques of transferring solar energy directly to electricity are used even in public places to power street lights and lamp posts. Similar to above application solar energy could also be used to power home lighting and other electrical equipments in case of power failures instead of conventional inverters and power backup systems.

If statistics [1] are to be involved then 8% of the total world energy requirements is now being fulfilled by renewable resources of energy. Out of the 8% less than 1% resources are using solar energy thus clearly stating that the given technology is very much underused. The solar energy has a lot of potential which need not be stated here but its usage needs to be improved drastically to make the world a better and greener place.

The solar energy is such a wide domain that its application can be extended to very many domains of energy requirements, but solar energy still has few drawback which if not corrected upon make the technology much more

expensive than the current conventional technologies. Solar energy must be able to provide a mechanism to provide backup in rainy weather. The maintenance of solar energy components like the solar panel and the associated accessories are still very expensive due to which there usage has still been very limited.

Hence solar energy has arrived and is definitely here to stay. The government has started making policies to subsidies solar equipments like solar lights and solar water heaters to make them accessible to the general people of all domains.

2.2 BIOGAS

Biogas simply refers to breakdown of organic waste in the presence or absence of oxygen to produce gasses which can be further processed to be used commercially cheaper to technologies used currently. Biogas has the biggest advantage that it can be directly made from various sources like agricultural waste, manure, organic waste, green waste, vegetable waste and waste of other such kinds.

Use of biogas in homes has been a technology of constant research for many because of the ease with which the raw materials are available. Biogas in the elemental form primarily comprises of methane, carbon dioxide and in some forms hydrogen sulphide may also be present. Biogas can be compressed similar to CNG and hence can be transported easily thus making it easily accessible to the masses.

The world [2] is currently generating 23% of the required energy from biomass and waste. The stats show a steady usage but still many parts of the world like rural India have a lot of scope in utilizing the technology which is not truly used because of the simple fact that the people still are either unaware of the same or he usage is still quite expensive.

Biogas has perhaps the most vivid application possible. They can be used to power technology of almost all kinds like automobiles busses houses etc. The biogas can be used in homes for the production of electricity, for running water pumps, to power powerful generators and many other such applications. The best usage of biogas is to produce electricity because it is quite cheap to conventional electricity generation method.

Countries like Europe, Greece, Athens, Singapore and Australia have already started the application of biogas in various domains. Superpower like America has started using biogas in their rural areas. Biogas has the biggest advantage that it can be used to power remote places in villages where electricity lines cannot be properly laid out. The rural areas have more bio waste generation and if supported by proper technology the waste can be treated to produce biogas in such high amounts that they could possibly sell the resources to other areas to earn a good amount of money.

Hence the use of biogas has definitely begun in various regions. The places like Indian villages have huge potential for such technology and can definitely become the energy to drive our homes so that our homes become self-reliant i.e. we produce energy for our homes directly from the waste we produce, which would be an amazing achievement.

2.3 WIND ENERGY

Various forms of energy exist in the world with varying applications in the world. The wind energy is similar type where the places which

have high wind speeds can use this energy in their houses. The system comprises of a fan which when comes in contact with high speed wind starts rotating, this rotation mechanism uses a dynamo to convert the rotational energy into electrical energy.

Countries like Australia, Europe, America have already started funding the idea of wind energy in homes. Other places like coastal areas of countries like India and Dubai can easily fund these ideas to energize the places around with some initial support from the government.

In the year[3] 2000 whole of the world together had the technology to generate only 200MW of electricity from wind energy, in the year 2011 the capacity has now increased to 11000MW which clearly indicates that the technology has a lot of potential in it.

The wind energy has various applications in household like it could be used to power lights at very cheap prices, it could also be used to power electrical or induction gas stoves which can easily be used to cook food. The wind energy could be used to replace the conventional energy forms for almost all household chores like heating water, burning fuels, and other such tasks.

Wind energy although has a huge scope but it also has certain limitations like the batteries used to store the generated energy would be massive. The energy produced to run a dynamo to provide a considerable output is very high presently hence designs need to studied which could make the dynamos efficient. The cost of setting up of such a wind turbine is initially very high which would be recovered in a set and finite amount of time which initially makes the system very expensive.

Hence the energy definitely has a lot of potential. With proper intermixing of technologies and the support of local government the ideas of a hybrid home can be succeeded one day and trust us that day is not very far.

Thus, the above described energy sources have the potential to develop the idea of hybrid homes. Now the question is how we will make it possible so that this idea can become common and can be utilized by each and every class, society and types of people living in this world. The energy possessed by these natural things can be converted in the form electricity with the help of dynamo or photovoltaic cell. The need of conversion of energy into electricity is because electricity is the form of energy which can be easily moldable and transferable, hence most of household activities depend on electricity, most importantly it provide light which is the basic need for every human activity.

Now let us mainly concentrate on Biogas energy because it will act as prime energy source in hybrid homes. How will we use Biogas for energy generation? the answer for this question is given as follows. Various technologies are available now a days to generate electricity from biogas ,mainly the chemical energy of the combustible gas is converted into the mechanical energy in a controlled combustion system by a heat engine. Combustion engine are of two types reciprocating engine and Sterling engine for internal combustion and external combustion respectively. The efficiency of the heat engine is reached up to 89% in comparison to the conventional power plant whose efficiency is 55%[4]. Thus the installation of these kind of machineries can make the home self efficient

We agree with the fact that the primary installation cost is high but with the help of government aid this is not impossible because government spends millions on setting up the power plants ,if we have such kind of plant at the distance of every 100 houses then also we have sufficient energy to store after utilization by those hundred houses because according to WRAPAI 2009[5] report these type of power generation sources have the potential to generate between 5KW to 500KW which is more than required energy.

The other form of renewable energy can act as power backup just like in hybrid cars petrol act as the backup to the energy generated by the car itself. The installation of their components is also not so cost effective but with the development of technologies they are coming in reach of common people for instance in India only 161 MW of electricity is generated using solar panels in 2010 but in today's scenario in 2015 3743 MW[6] of electricity is generated using solar panels. The data in itself is dictating the change which is in favor of developing the idea of hybrid homes.

3. CASE STUDY ON BIHAR

we have done the case study of Bihar a state in India ,since India is a developing nation every states in India suffers power crisis .

Situation of power availability and supply is never rosy in Bihar and the situation prevails now also, there is still wide demand-supply gap that needs to bridged, one glaring proof of the same is the fact that Bihar's power system has peak of about 3500 MW under the constrained demand scenario and the availability is about 2759 MW in accordance with the report in year 2014-15[7] . According to the Green peace report [8] 2012 only 52.6% of the villages is electrified leaving the remain with no access to electricity.

The state also incurred huge transmission loss because of era old infrastructure for the transmission of electricity to different places in state. Apart from that in the state major production of electricity is done by thermal power station situated at Muzzaffarpur , Barauni and the newly installed power plants by NTPC at Barh and Kahalgaon which causes pollution at mass level and degrades the environment. In state only 11.3% [9] of urbanization had taken place, the major population depends lives in villages and depends on farming for their livelihood so it is difficult to them to afford electricity also. This is a matter of disgrace that even in 21st century people are living without the basic needs like electricity.

The state government is making their move on the path to came up with the plan which can improve the power situation in states but seems too late because Bihar lagged far behind other states of the country in terms of power generation and utilizations ,only abrupt revival of the power condition can make Bihar to return back to the main stream.

The plan of hybrid energy seems to have some potential here in this state because the state government had made some plot which can help to implement this idea. According to the resolution made by the energy department of government of Bihar on date 24/06/2011 [10] ,the government had made policy for promotion of New and Renewable energy sources. As the state have the potential to generate new and renewable energy sources which is yet to be harassed .The Government had made separate department named as Bihar Renewable Energy Development Agency(BREDA)[11] to overview

such kind of projects and accept applications regarding these kind of projects. The primary gathered information tells us that at least 25MW of energy can be produced in each district [12] with the help of biogas and other kind of renewable resources. the main reason to make emphasis on biogas plants is that because it makes houses self efficient and in the state which majorly depends on farming large amount of bio degradable wastes are produced which can be easily utilized to produce the energy which can bring happiness in form of electricity to each and every people of the state and make state self dependent in terms of energy generation .

According to one of the research each hospital bed of government hospitals generate 750 grams of bio degradable waste which can be easily utilized for energy generation to provide power to hospitals itself.

This was the case study of a small region of the country now let us come back to the main stream that how will we implement such kind of idea so that human life can get benefit with that idea .

CONCLUSION :

The world is facing severe energy crisis and the need of energy is increasing day by day, keeping this in mind the concept of hybrid energy sources came into existence. Hybrid means combination of two or more things, same concept is applied here also, in hybrid the energy utilized by homes is generated from two or more sources. This makes us to rethink about the massive use of non renewable sources of energy. Hence we conclude on this note that with the implementation of these concepts we can achieve the hybrid model in the world.

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