Green & Sustain Energy Technology and Applications

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Abstract: Green energy technology (GET) is the fundamental source to most of the daily activities we face throughout our life periods. So, we need to produce the GET and protect our life and environment, which are affected by the global warming (GW). We all have to blame ourselves for these GW affects, but it is the correct time to think of new solutions. Reducing the GW and increasing GET are better for the future health and wealth. Here, manpower method of generating GET is introduced with less cost and maximum benefits. This method will increase GET, maintain the healthy body, develop more employments etc. with less cost and reduce the GW because the implementation of this method does not depend on any artificial or nuclear energy. It purely depends on the human energy, which can be obtained from fitness centre, amusement parks and dedicated place where people can work to convert the mechanical energy to GET.
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1. Introduction

Solar energy is a natural resource, which prevents the most of the damages related to global warming (GW). Sun's radiation and unwanted chemical particles created from sun rays and other planets of the solar system, are also few of the reasons for GW. Most of the countries in 2012 are facing unmanageable economic threats due to modern technology, which creates the GW using unclean energy. Now we are thinking of precautions for reducing GW, but it is already started to affect people's life. When energy organizations including nuclear energy industries increase to use more artificial, nuclear and unclean energies, GW increases and damages balance life environments such as employment, health etc.

We are the healthy and strong people, because we have enough power to produce maximum clean energy but it is not used to create the clean energy technology (GET) properly. Instead of creating GET, we are wasting our energy with modern technology operated from the artificial source of energy which creates the GW. For instance, most of us use the fitness centre because we are wasting our valuable energy which can be applicable to produce the GET without affecting the GW. Of course, our body is important but still we should be encouraged to create the GET with minimum cost. We are using a lot of gadgets, which need reasonable energy source within the limited range of power. Natural GET can be created from pure human energy, which may be useful for future electric cars. It is not a new technique or invention but implementations are really worth for the current economic situation around the world.

Few years ago renewable energy accounted for just few (4%) of total energy consumption. In 2020 this percentage is expected to be double figures (10% - 20%). This increase must however take place economically because populations and energy consumptions will be increased. Innovation is necessary to enable to compete with sustain energy technology and applications in the long term (2050 onwards). The geothermal energy systems are also used for renewable energy [13, 14].

According to our opinion, implementation will be simple, and it will solve GW as well as current economic problems which create more employments. Compulsory military service was introduced many decades ago, but now it is influenced with modern technology, which increases the GW and unnecessary cost. Like this service, we can use manpower to create GET.

Fitness centre uses some spinning wheels, which is very small to produce electricity. When we use large spinning wheels (LSW) like wind power stations, we can easily produce necessary GET. Here, manpower is very important to build a LSW in every neighbourhood area where we can generate GET without affecting GW. It should be maintained all 24 hours because generation of GET is more important than the storage. In addition to this, it will help to charge the electric car batteries. People have to rotate the LSW using mechanical power with wheels, which is like a bicycle wheels or clock wheels. If we need continuous GET, people have to work in turns or shifts throughout the day and night. We are sure that this technique will minimize the GW and improve the current economic situation around the world with a bright future.

We begin by presenting in Section 2 a brief literature review of GET against GW to which people use gadgets with new technologies. Section 3 introduces the theoretical model of generating GET with manpower which is a human energy. It is freely available source with low cost. Section 4 explains about the sustain energy applications which are useful for human life and nature. In Section 5, advantages of GET against GW effects and comparison results of current and future of existing GET developments. In addition to this, power ranges are given with general discussions and recommendations. Overall conclusions will be in Section 6.

2. Energy and GW

Here, few energy sources used in the current climate are outlined with advantages and disadvantages. They are wind power, which produces the GET without affecting the GW, nuclear power, which produces reasonable and guaranteed amount of energy and manpower, which produces the GET using mechanical power.

2.1 Wind Power and Technology

There are a number of different types of wind power technology used to generate electricity. They produce the different energy ranges according to the size of the blades, height, speed etc. At least one wind power can be built in every community area, where we can produce a reasonable amount of energy. This wind power can be rotated indirectly by the children, when they use riders which are basically rotating wheels. In the wind farm, lot of birds are killed and created the unbalanced situation against nature. This situation is also considered, otherwise wind power cannot be used as GET because it increases the GW [1, 2, 3].

2.2 Solar Energy and technology

Energy created from solar power will be one of main solutions because sun light will be available throughout the year. We may not be able to use this light directly in the earth but we can modify the orbiting earth satellite which is originally developed for energy creations.

As shown in figure 1, AC and DC current can be generated from solar energy through the solar panels, which use photovoltaic (PV) elements. In equation (1), the energy efficiency of solar energy is controlled or increased using correct material of solar panel.

$$E_{sol} = Ak_{sol}E \quad (1)$$

Where, E_{sol} is energy generated per day, A is area of solar panels, k_{sol} is the energy constant of the solar panel and E is the watts/m^2 x (hours of sunlight)

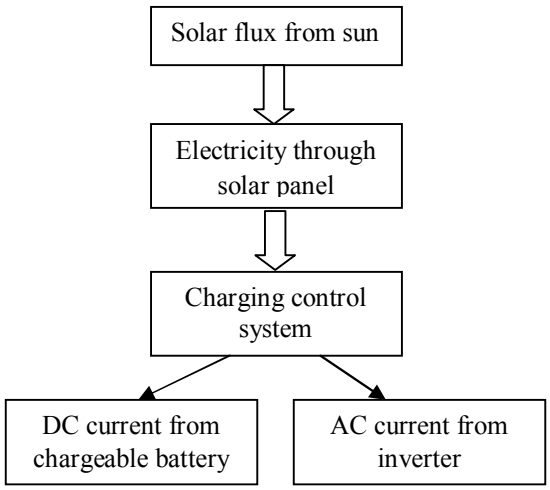

Figure 1. Solar technology

Following solar technologies also provide green and sustain energy technology. Using prism, seven colours are separated from source of sun's light, which carry different photon energy. Blue colour photons carry more energy than other coulars. Following equation can be used to analyze the sustainable energy.

$$E_2 - E_1 = hf \quad (2)$$

In equation 2, h is the Planck constant, $E_2 - E_1$ is the energy of a photon and f is the frequency of it's associated with solar wave.

Large mirror may be used, which can increase the heat of the water or some fluid that provides the steam quickly to rotate the turbine. Hybrid system which provides heat and electricity storage from the solar energy is another sustainable energy technology and application.

2.3 Nuclear Energy

Generally speaking, we are encouraged to use nuclear power for high voltage applications, which may minimize the energy cost but it would not support to GET. In the modern world, nuclear power is used mostly for military purposes and still many countries are increasing the atomic weapons according to the latest defence budgets around the world. UN must declare the international law for unnecessary war situations such as fighting for civil rights, invading [4, 5].

2.4 Human Energy and technology

Manpower must be balanced with the nature otherwise; GW effects will be increasing because currently most of us are using all the latest technology throughout the day and night. More people around the world are out of work for more than half of their life time because most of the functions in the daily work are replaced by the technology. Unemployment situation creates unbalanced life, which makes GW. The proposed model given in the next section is

implementable easily in every community area to create the GET, which increases the manpower including employment opportunity and reduces GW effects.

2.5 Bio Energy

Bio fuel for vehicles and other applications are generated from raw and organic materials. These materials can also be used for renewable bio fuels, electricity etc. Further, this sustainable energy not only reduces the CO_2 emissions in GW but also increases the energy efficiency.

3. Theoretical Model

In this model, we will use similar mechanical configurations as used in wind power station, where speed of the wind is used to rotate the blades. The proposed model (figure 2) will use manpower applied to rotate the small wheels which are directly connected to other big wheels or LSW. These big wheels or LSW are constructed according to the GET, which generates the electricity through the manpower.

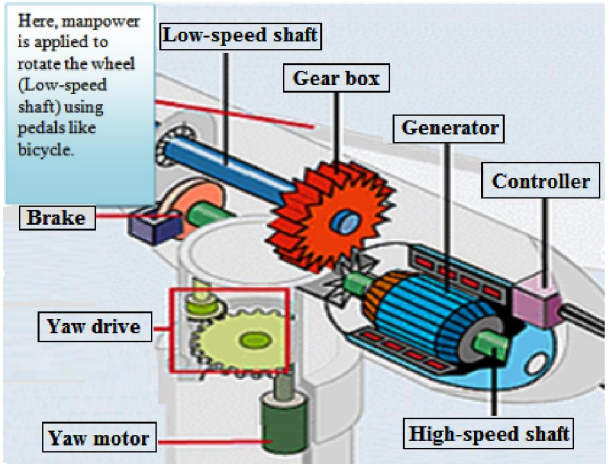

Figure 2. Proposed model with existing technology [7]

3.1 Design Model

GET can be implemented from existing mechanical set up, which use rotating wheels like wind power generator. Following block diagram (figure 3) shows the basic idea of the proposed design, which has three major functions which are input force created by manpower, increasing the speed limits and energy (electricity) generation.

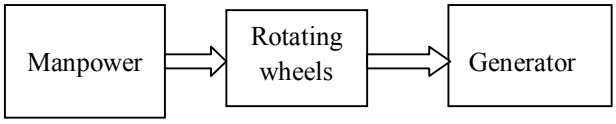

Figure 3. Basic design of the theoretical model

3.2 Operational Model

In this operation, low-speed shaft is rotated by manpower, which can be average people's energy. This shaft rotates the wheels in the gear box, which increase the speed of the generator. From this operation shown in figure3, the GET and sustain energy applications can be implemented for future generation.

4. Sustain Energy Application

There are many applications that we can apply sustainable energy. Electricity storage, electric cars and GET are useful examples for sustain energy applications.

New approaches and policies for Sustainable Energy Systems offer reviews of the main assessment and simulation methods used for effective energy assessment. In many developed and developing countries, new projects have been started to maintain the sustainable energy.

Smart grid application is another way of managing distributed storage system and sustainable energy. Further it distributes the electricity to users in smart way that not only reduces the cost but it also increases the storage capacity [9-12].

4.1 Sustainable electricity storage

Researchers are looking for efficient ways which provide better energy storage systems without much cost. In the middle-east countries, every vehicle should have solar panel roof because PV solar cells are wasted, which should be used to store electricity. Each driver can earn extra money as well.

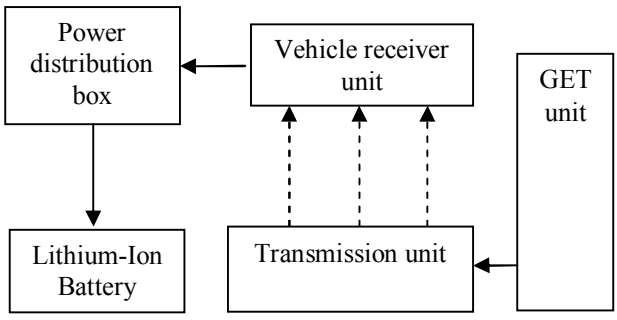

Figure 4. Example of vehicle battery charger

Electrical vehicles are the potential solutions for pollution free environments. So, batteries used for the electrical vehicles are the few of the main sustainable energy applications which store the electricity. Figure 4 shows the process of charging battery through GET. Here, new ways or research directions are important to increase the charging capacities of sustainable energy. Charging capacities are maximum storage capacity for long-hours applications and less time for charging reasonable capacity with limited-hours applications.

According to recent announcement [8], rechargeable batteries are considered with nanotechnology which provides better storage or recharging time. Most of the rechargeable batteries are for few hours but using solar and nanotechnology, batteries for long hours can be developed with reasonable cost.

4.2 Sustainable energy sources and applications

Hydro electric was the first source for natural power plant used for creating sustainable electricity energy. In order to increase the capacity of electrical energy, density of the water, height and flow rate should be considered as given in equation (3). Necessary details of this equation are given below.

$$E_{hyd} = \rho hqgk_{hyd} \quad (3)$$

- E_{hyd} is the energy measured in kilo watts hours,
- ρ is the density of water fallen from mountains (~1000 kg/m^3),
- h is the height between the top of the mountain and turbine (meters),
- q is flow rate of the falling water (m^3/s),
- g is the falling acceleration due to earth gravity (approximately 10 m/s^2),
- k_{hyd} is a coefficient of efficiency considered from latest turbines. Efficiency is often higher that is closer to 1.

There are number of projects considered with best sustainable sources. Table 1 shows the some examples of current GET and average capacities for future applications.

Table 1: Sustainable energy source and capacity

Sustainable energy sources	Technology	Plant capacities for applications
Hydroelectricity	Speed of water- falls or flowing water	100MW to 10GW
Solar	Mirrors, solar panels, lenses and chemical elements	10 kW
Wind	Rotor speed and direction from air	100W to 1MW
Wave	Height, Wavelength of the wave	1700kW per wave front
Geothermal	Heat from earth or deep wells [14]	3000MW
Tidal power	power water turbines	15kW to 200kW

Renewable energy controls the climate change and minimizes the GW. Renewable energy generation with which we have mentioned in the section 2 will be competitive.

In equation (4), wind power capacity is proportional to speed of the wind, which mainly depends on air density. Other parameters are also important to increase the capacity and these are changeable through the design of fans and other parts used in the wind power plant. Necessary wind energy can be obtained as mentioned in equation (4).

$$E_{win} = \frac{\rho A V^3}{2} \quad (4)$$

- where, E_{win} is wind energy measured in kilo watts hours. (kwh)
- ρ is the air density in kilograms per cubic metre
- A is the swept rotor area in square metres
- V is the speed of the wind

5. Results and Discussion

Results are varied according to the maximum benefit of GET and minimum level of GW effect. Figure 5 shows the GW effects such as carbon emission, green house gas (GHG) etc. for the different energy technology [6]. From the predicted graph, GET from chemical and molecular reaction using some chemical elements will be better than other energy developments because they reduce the GW effects.

The major advantage of solar energy is that green energy is generated during the conversion which is the transformation of heat energy into electrical energy. It minimizes the GW effect because it does not require any extra fuel. Solar energy is very clean, renewable, sustainable and storable

In order to reduce the green house emissions, solar energy and its applications are very attractive. It does not pollute our natural environments which help us to reduce the medical cost. Some specific diseases such as asthma and other breathing problems are increased by the air pollutions, which not only damage the human energy but also it increase the government's expenditures.

We are wasting solar radiations which are free in most of the Middle East countries. So, these countries can generate the electricity without on-going expense. There must be some initial cost to establish the processing of electricity from the solar radiations. Solar panels used in energy technology are flexible for all sustain energy applications. They can be used for low voltage to high voltage applications.

Solar panels even though they don't have enough sun light throughout the year; they are developing new storage system for electricity as sustain energy technology and applications. There are many storage mediums available for long time, which save the electricity from the solar energy.

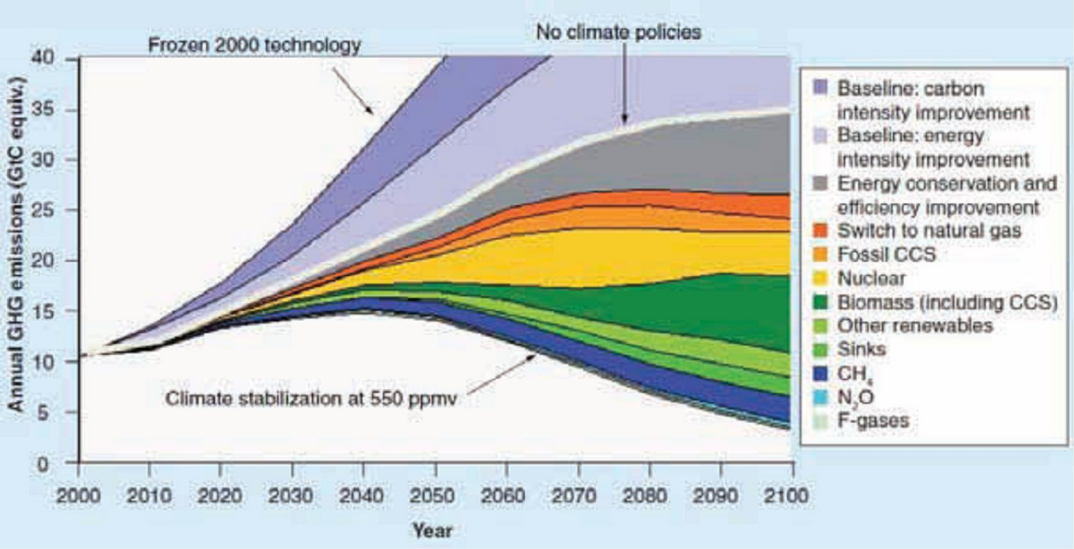

Figure 5. Energy technology with GW [6]

6. Conclusion

From the theoretical analysis, GET can be easily generated using manpower which is the main resource. In the modern world, people try to reduce the work load and expect to have everything in their own place. It is a trade off because GW will increase when we use maximum technology for all functions. This situation develops the unbalanced life and GW effects even people use GET. Implementing this proposed model offers more employment opportunities, which create the balanced life between maximum benefit of GET and minimum level of GW effects.

Energy through the human power will be very flexible for their low voltage domestic applications. They can generate this energy from their home. We have studied the solar energy technologies and their applications; this approach may not be possible for all 24 hours because day time of some countries is less than 12 hours.

Tidal wave is also another approach which depends on wave. Even though, less cost for generating electricity, capacity is not enough but we can increase it.

Sustainable energy production, transformation and use are very much needed to maintain the readily and cheap access to energy to the growing and increasingly demanding world population while minimizing the impact on the environment.

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