



Sustainable Eco homes

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ABSTRACT:

In this rising era of covid19 and other disasters in world it has become quite essential for us to become self-sufficient. In this span of few years human being have suffered a lot with health problems and also with financial problems. So by my idea of sustainable eco homes I believe that most of the people could live a life of great health as well as very less financial cost. By using the natural resources in our surrounding we can generate a lot at reasonably quite less cost. In addition this is not only helpful for us humans but also is utterly beneficial for nature. This homes are crucially innovative environmentally sustainable adapts to changes in climate and overall provides affordable housing.

KEYWORDS: solar energy, biogas, terrace water irrigation, plants diversity.

INTRODUCTION:

Electricity is mostly generated by the use non- renewable source of energy like coal, oils, fuels etc. this source is decreasing and on top of it it creates a lot of pollution while generating electricity through this source. Each one of us have possibility to generate our own electricity at our own homes. By using solar panel we can generate more than the amount of electrical energy we require in day. This is not only cost efficient but also is non- polluting. Same is for biogas where we make our own gas unlike conventional LPG gas. The diversity in plants at our home allows in functioning of proper ecosystem. Terrace water irrigation is a process by which we can keep our homes naturally cool.

SOLAR ENERGY IN ECO HOMES:

SOLAR ENERGY:

Sun is the greatest source of energy on our planet. Sun supplies more energy in one hour than the energy consumed by whole planet in a year. Sun gives us renewable energy, the energy that we can use again and again. Sun provides sustainable energy. This solar energy can be used to make electricity using photovoltaic modules.

SOLAR ENERGY USES:

The solar panel turn the energy absorbed by the sun to electrical energy. The main part of solar energy is it is available all over planet. The areas where sun is not available in its full glory solar energy can be used there too as it can be stored in batteries and used in such location. PV modules have very good life, they are reliable and have a very low maintenance cost. This is because they do not have any moving parts. They have guarantee of more than 25 years. Best part of solar energy is it is eco-friendly unlike other fuels like petrol, diesel, coal etc. It is inexhaustible and pollution free, helpful for our environment.

SOLAR ENERGY THE FUTURE:

Solar energy requires skilled person for its making and installation, so the requirement of skilled labour is increasing. Most of the countries in the world have installed this system on large scales of land. This contributes to reduction in a lot of pollution produced by unconventional sources of energy. Remote energy is a 501 C3 an organisation that train people for future technology.

SOLAR ENERGY SYSTEM IN ECO HOMES:

CALCULATE YOUR HOMES ENERGY REQUIREMENT:

This should be the first step before installation of solar panels. You must calculate the total energy that you consume. You can do audit for your home to understand where you are losing unnecessary electricity. You can do audit of your home to understand where you are losing unnecessary electricity. You can use induction stove for cooking purpose same goes for water heater, so that you can use energy generated by solar for it. You can change your home lights to Led as it consumes very less electricity, also use appliances which have higher efficiency rating.

CALCULATING THE AMOUNT OF ENERGY PRODUCED:

Before installing solar energy generation plant you must calculate the amount of solar energy that is received at your locality. The solar energy uses disperse and direct sunlight energy generation options. By calculating this factors you can alter the solar panels and system accordingly. There are various experts in the market who do this work of calculation. There are also other factors like life span of your terrace.

FEATURES OF SOLAR SYSTEM IN ECO HOMES:

The solar system must be capable to satisfy your energy requirement. Solar system should give ac power supply that is alternating power supply. Conventional home uses ac power supply for all household appliances.

COMPONENTS OF SOLAR SYSTEM IN ECOHOMES:

- The eco homes requires a lot of wiring and cables for solar system to work.
- As the power generated by solar system is dc is needs to be converted to ac. This is done by inverter. Hence a inverter is also required in solar system
- Solar system needs battery where the charged power can be stored. Off grid system are the ones that use battery. Generally during night time when there is no sunlight, battery is required to power up the eco home.
- The solar system requires certain number of PV panels as per the electricity requirement of eco homes.

BASIC OPERATION OF SOLAR SYSTEM IN ECO HOMES:

The semi-conductor in PV modules which is made up of silicon converts the sunlight energy to electrical energy. The energy that we get through this conversion is in the form of dc which charges the battery. If direct ac power is required it can be done by the help of inverter, thus in this way electricity is obtained in eco homes.

IMORTANT ELEMENTS TO CONTEMPLATE:

The face of the PV panels should be towards south to get as much sunlight as possible.

The area covered by the panel depends on the energy requirement. More energy requirement greater is the area of panel.

The panel required can be calculated. For example, if the requirement of eco home is around 30units per day. Which is equal to 30kwh. The solar panel must generate 30,000 watts of power in an hour. So if panel can produce 5kwh per day than 6 such panels would be required.

The power required in eco home is ac. This needs to be calculated. This can be calculated by using most high generated electricity bill of previous year. In bill you could see the number of units used in that month, by dividing that with 30 you can calculate daily units consumed and accordingly get the solar panel.

INITIAL COST OF SOLAR SYSTEM IN ECO-HOMES:

The general cost of the system depends on the amount of panels required to generate enough electricity. They are classified into 2 off grid and grid connected. Off grid system is not grid connected. The energy converted is stored in battery. The grid system does not involve any battery and only has an inverter. Grid system has digital meter. The basic idea is if you generate more electricity than the required during the day time that can be circulated to grid and during night time when there is no sun, the energy from grid can be used. You can also get certain amount of money for supplying this excess energy to the grid. The cost of 1kw off grid system is capable of making 3-5 units which costs around 1.25 lakhs to 1.5 lakh. The grid connected system of this range costs around 80k to 1 lakh. The return of initial investment can be easily obtained after a span of 5 to 6 years.

BIOGAS IN ECO-HOMES:

In a biogas system the gas is produced when the biomass or the substance in the plant is fermented. The waste material used for this plant is generally the household waste of food, vegetables, manure etc. The end product of the plant is slurry waste which can be used as a powerful fertilizer for the plants.

MAKING OF THE GAS:

The gas involves two levels. The production of gas is done in absence of oxygen. In level one acid is formed and in latter methane. In the first level the bacteria present in the dung acts upon the waste. As soon as acid is formed in first level the methanogenic bacteria reacts with this acid and forms the gas methane.

PROS OF BIOGAS IN ECO-HOMES:

Biogas reduces the use of gas through LPG and thus saves environment.

It helps to lessen the waste produce and the most optimum use of waste. Also this reduces the spread of diseases significantly.

You can get gas that is totally free, zero emissions and totally eco-friendly.

The waste after producing gas is a watery substance which is powerful fertilizer. You can either use it or could also sell it as it has high demand.

The products for gas making are always available at home. So you don't need to buy anything from outside.

WORKING OF BIOGAS IN ECO-HOMES:

There are few household waste such as egg shells, coconut shells, bones which are hard to process. A separate drum is required to store slurry waste.

The separation of kitchen waste makes it easier to process it. The waste from kitchen is digested with the help of microbes. It is a fermentation process which takes place in anaerobic condition.

RAINWATER HARVESTING IN ECO-HOMES:

Rainwater harvesting is a technique by which rain water can be used for future. The water stored can be used for various purpose. As there are climatic changes almost every day on our planet, there is a rise of uncertainty and on the top of it the ground water level is decreasing day by day, and in such cases rainwater harvesting has become a lot important. Dependency for water on other water resources gets reduced. This is a bit conventional process but highly effective. Rainwater harvesting can be built not only in eco-homes, but also in school, colleges, offices, buildings etc. There are various advantages to this like you get to store all natural water which is free from filtration chemicals. The method is easy for harvesting rainwater and also convenient. It also contributes to increase in amount of ground water. It reduces the need of external water supply. Also you save money on electricity bills. The installation or built cost is also relatively lesser.

VENTILATION IN ECO-HOMES:

Air ventilation is the most essential part in eco-homes. Air ventilation contributes largely to your health also helps you to reduce your electricity bills by avoiding the use of external devices for ventilation. This is natural ventilation and does not involve any devices. This concept of ventilation is also used in the newer concept of green building. Before construction of the home analysis is done on the flow of wind and natural air on the location. Different kinds of design are made in the architecture of the building accordingly. The weather as well as the climate too of the construction site is determined. Apart from this the speed of wind, humidity and moisture content of air is also calculated. The main aim of air ventilation system is to give purified air, low humidity content and proper air flow. This concept of ventilation also helps in eliminating the heating, ventilation and air-conditioning system. There are many research which suggests that if done properly the comfort given air ventilation system is even better than HVAC. Air ventilation is done with the help of windows which are placed on the top and bottom. Though in summer due to higher temperature external exhaust fans are needed. Also shading is required. Air ventilation highly helps in expelling carbon di oxide and keeps good odour.

BIO-DIVERSITY OF PLANTS IN ECO-HOMES:

Plants are scientifically proven to help human live comfortably. They reduce stress levels. They suck in toxins in the air. Plants helps you in calming down. Research have shown that plants contributes to the increase in productivity, focus and happiness. They help in boosting your mood and also reduction of noise levels. It has also been proven by many researchers that plant can sharpen your attention. Plants also helps in recovering faster from illness. Even NASA study shows that indoor plant increases the quality of air and also purifies the air. Plants like ficus tree, rubber tree, bamboo palms, snake plants, dwarf date, areca, lady etc. are some of the plants that can be kept indoor.

SUSTAINABLE ECO-HOMES:

Nowadays whole world is facing lots of harmful climatic changes. The pollution has increased to great extent. The world now is moving towards sustainable technology. As sustainable technology has very less harmful impact on the environment, it supports natural livings and products. The eco-homes are becoming known and there demand is increasing day by day. Eco-homes require very less to negligible external energy for its working. Thermal insulation is very much important as it reduces the need of external energy supply. It also helps in maintaining the climate of eco-home. Air ventilation, natural flow of air, direction of air towards the home, planting specific tree in the direction of wind towards home so that there is always fresh odour in the home. Ventilation is an important part of it. Sustainable eco-homes must use every bit of the design and available materials that's what makes it sustainable. In case of availability of greater land you could also plant some veggies, fruits, herbs etc. This is also proven scientifically that planting plants help in reducing stress and boosting mood. It also makes you sustainable as you grow what you eat, hence avoiding the need to buy. Also you plant flowers and trees of various types which increases bio-diversity and attracts the natural flora and fauna. You can start using high star rating electrical products, though they cost a bit more, but saves a lot of energy by providing you all the new features. The new intelligent technology features can contribute a lot in eco-homes, example, the sensing lights etc. Main part of eco-homes is the energy generation unlike conventional homes in which you depend primarily on non-renewable sources of energy. Here in eco-homes you could create your own energy which is renewable and of low cost and also emission free. Electricity can be generated through solar. Fire through biogas which also helps in recycling the waste of home. Rain water harvesting not only supplies you with water all year round but it is scientifically proven that it increases ground water level and also helps in increase of moisture content of the surrounding soil. There are various ways by which you can turn the regular home into sustainable one, not fully but to an extent and also make it eco-friendly. You can plant, small plants on your terrace as it would not only increase habitat but also helps in reducing temperature of the house. Also you could install PV panels. The indoor plants in your home could purify the indoor air and suck in toxins in the air. Plants like snake plant has been proven by NASA that it purifies air and also supplies oxygen during night. This plants also require very less maintenance. It wouldn't take much time from your daily routine. It's totally healthy for this plants if you water them once in a week. It is very crucial that natural light enters your home. You could use less coloured curtains. So that not much of the light is blocked by them. You could also change the lightning system of the house by installing smart lights and also install smart and less energy consuming appliances. Also you could change the plumbing and taps of the home and install smart taps, so that less water is wasted. Though the initial investment is a bit high as compared to conventional homes, but you can recover all the investment in a span of just few years. Eco-homes is the future of sustainable homes.

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