

# RENEWABLE ENERGY GENERATION SYSTEMS

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**Abstract:** A discussion and comparison of renewable energy generation systems as well as identifying, analyzing and describing the related ethical and societal issues. Power generation using solar collectors and wind turbines are discussed. A hybrid system combining solar, wind and in some cases a diesel generator is compared to stand alone solar collector systems and wind turbine generation systems.



## 1. INTRODUCTION

All past ethics were created during an era when the earth was observed as rich and permanent. Humanity's capability to utilize innovation to accommodate itself and cut out its territory as urban areas, left nature overall unaltered and its generative powers undiminished (Jonas 1974). The business of energy was just as restricted to the straightforward utilization of flame for cooking and warmth. Since humanity's effective reach was distinguished as little and changeable, nature was not acknowledged an object of human responsibility, insights, not ethics, connected to it. As a result, customary ethics, going from Aristotelian to Kantian, were intended to serve as an aide for intra-human conduct, as it were human-centric, and kept to a prompt setting.

Verifiably, human movement in its different structures has absolute changed, and present day energy use has developed to move an enormous innovative drive that has had intense outcomes for the entire of the biosphere. Two of the most glaring illustrations of this freshly discovered power are environmental change and the expansion of harmful nuclear squander, both of which will have repercussions that reach out far into the future, potentially into the several centuries, and for more than just humanity (Timmerman 2003). On the grounds that the earth has uncovered a basic helplessness to customary energy arrangement, and human activity by and large, an entire new extent of ethical pertinence has been opened as responsibility unparalleled in extension (Jonas 1982). Subsequently notwithstanding the instantaneous and human-identified issues made by the present energy framework, ethics must now address the global condition of human life and the faraway future, incorporating dangers to the proceeded presence of the human race and different species.

Sustainability has risen as an ethic, or code of conduct, pointed at diminishing humanity's environmental footprint and cultivating more excellent intragenerational and intergenerational value. Discriminating issues going out from the utilization of fossil fuel and nuclear energy sources

indicate the need for new energy engineering sending based on sustainable principles. Energy inferred from natural courses of action that are recharged always, or renewable energy, has picked up across the board distinguishment as a method of solving a portion of the present issues connected with traditional energy, incorporating: energy poverty, biased distribution of resources, unjust distribution of dangers and profits, and military clash. For renewables to essentially broaden their instated limit, and be free of the negative aspects connected with ordinary energy, requires attention of the power structure underlying such a move and whether it will help sustainability.

Therefore, respective paper will briefly evaluate and analyze the ethical considerations associated with several energy generation approaches.

Drastic and alarming increase in global pollution, environmental degradation and rapid contraction of energy reserves has attracted the concerns of the authorities and public masses. One of the major reasons of these global issues is rapid and unchecked consumption of available energy resources that are not only depleting at a very rapid rate, but are also becoming a major source of global pollution. Consequently leading to global warming, ozone depletion, emission of Green House Gases, water oxidation, air pollution, etc.

Little effort is being done by the business class to control the adversaries being brought in by the Urban sprawl (Gonzalez, 2005). And whatever is being done is insufficient and ineffective. In order to control the impacts, something needs to be done at the larger scale. Currently, technology, instead of helping in the civilized urban sprawl is not helping in curbing the adversaries caused by it. Moreover, little effort is being done for the green technology and its implementation to save environment since advancement of technology based solution needs more funds that would add more pressure on the government.

In order to overcome these issues and restore ecological suitability of the earth, researchers and scientists

have been working to promote and develop efficient and effective Alternative Energy Sources that can be economical as well as environment friendly. They have been considering and working on the energy sources such as Solar Energy, Wind Energy and Hybrid Energy sources as these energy e=sources are perceived to be present in abundance. They are not feared to be running out and are not dangerous for ecological stability as well. Respective paper will briefly compare and contrast benefits and limitations of these alternative energy sources.

## 2. Solar Generation

One of the most abundant and inexpensive energy sources that are freely available is the Solar Energy. Evidence of using and extensively harnessing the Solar Energy can be traced back to ancient times when large mirrors were used to reflect and refract sunlight for illumination and heating systems. As per the observations, the emission of energy from the sun is almost 10,000 times as compared to the current human consumption of energy sources (Sawin, 2003). Furthermore, the energy emitted from sun in one day is twice the energy that is harnessed by all the energy resources of earth ("GCEP"). These statistics are extremely encouraging in harnessing the power of sunlight, as there is no threat of energy from sunlight extinction or running out.

Solar Power is extracted from Sunlight using Photovoltaic cells. And it is converted in electric energy through generators connected to Photovoltaic cells. The concept of solar cells was started in 19th century when it was discovered that the heat energy can be transformed into electrical energy. A. E. Becquerel was the first one to discover this phenomenon in 1839 and named it as photovoltaic effect. Later, the mechanism was also described by Albert Einstein in 1905 and received Nobel Prize Award. The very first commercial solar cell was made by the Bell Laboratories in 1954. This very first solar cell used a diffusion p-n junction, using the silicon as the semiconductor. 6% efficiency was achieved using silicon which was earlier 0.5% using the selenium.

In order to generate the electricity from solar heat, solar panels are created using extensive assemblies of the photovoltaic cell. These assemblies are further divided into groups and each group has several solar cells.

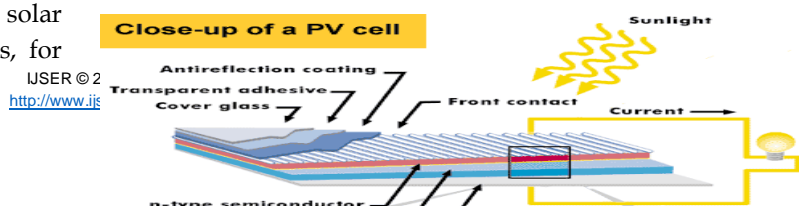
Solar power diminish the environmental effects of ignition utilized as a part of fossil fuel power era, for example affects from greenhouse gases and other air pollution emanations. Unlike fossil fuel power creating offices, solar offices have extremely low air discharges of air toxins, for

example sulfur dioxide, nitrogen oxides, carbon monoxide, unstable natural mixes, and the nursery gas carbon dioxide throughout operations. Notwithstanding these profits of solar improvement, development and operation of solar offices makes both immediate and aberrant work and extra wage in the districts where the advancement happens. On the other hand, there are likewise some unfriendly effects connected with solar power offices that must be recognized in methodology of conceding solar right-of-way authorizations and the procedure of improving environmental direction for solar offices. Potential antagonistic effects to different resources connected with the development, operation, and decommissioning of solar power plants are quickly illustrated underneath. These effects and moderation measures for solar offices are addressed in portion in the Solar Energy Development.

### 2.1. Solar Energy

Solar energy is the energy that comes from the sun. This is good for the environment because it is not using up fossil fuels, and the sun's energy cannot be wasted. Just recently in the 19th and 20th centuries, people began to re-examine solar energy to fit more ways to capture and use it. Solar energy is a renewable source, which means it is good for the environment. Coal, oil, and natural gases are other recourses, which when burned are used for energy. However, these resources are limited, and we will soon run out of the natural gases. The gas and fuel that cars run on are very harmful to the atmosphere and add to the greenhouse effect.

The greenhouse effect causes pollution and unnatural heating of the earth. The only way to prevent this from occurring is to promote the use of solar energy. Researchers are interested in changing the sunlight into electricity. Many methods of sending heat through air are presently being tested in Spain. My prediction is that solar energy will become more common in the future because there is a limit to the fossil fuels (Smil 1991). There is no limit to the sun's energy. Solar Energy is heat and light and electromagnetic radiation, which comes from the sun. Even though there is no cost for the sun to shine, it is very expensive to turn those rays into harnessed energy. Solar panels have to face the sun directly for them to work effectively. Solar cells use materials, like silicon which are semiconductors to change sunlight into electricity. The solar panel contain three different layers; black contact, p-type semiconductor and n-type semiconductor. The following figure will describe the process for the solar panel and how it supposed to function:



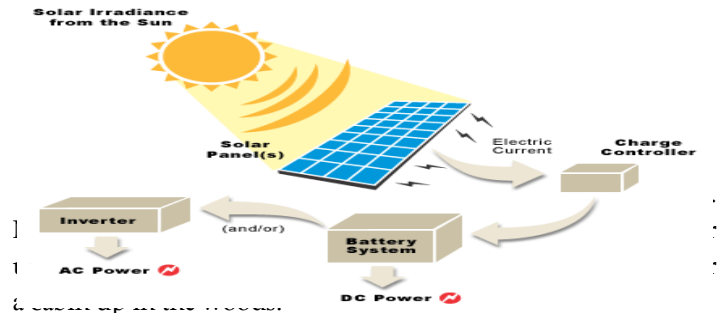
The inverter is necessary to convert the DC power stored in the battery into AC power. Determining the appropriate strength of an inverter for a solar power system is a fairly simple task to accomplish. First, add up the wattages of all of the appliances the solar generator is intended to power. Then, purchase an inverter that is slightly more powerful. Of course, if the generator is only going to be used to run DC appliances, there is no need for an inverter. A DC meter and DC input will suffice. It is also possible to buy a ready-made solar generator, one complete with all the necessary components.

Solar Energy can also work on days when the sun isn't out. Scientists at the Weizman Institute in Israel found a new way of storing solar power. They circulate water through collector plates with an electric pump. Water moves through a tank in the basement to all the other rooms of the house.

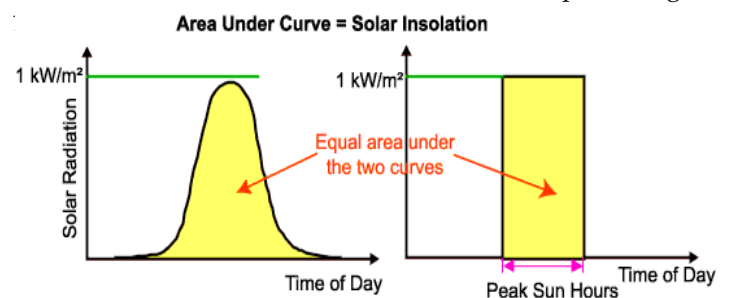
In a solar energy system, the sun hits mirrors which create heat. The heat creates steam and the steam pushes a turbine which makes the generator work. This produces electricity. The absorber panel, which absorbs the sun's rays, should be black because black doesn't reflect the sun it absorbs it. When the sun is lower in the sky, the panels absorb the heat more effectively. A lot of people in warm climates heat water with inexpensive batch heaters. These heaters have several layers of glass covering, the inside of their tanks face south and are coated in black. This is one of the many ways people in different places use solar energy. Location has a lot to do with the usage of the energy because so far it has been easiest to produce solar heat in warmer, sunnier places like Florida and Egypt, than London or San Francisco. Solar energy is very useful, and good for the environment. It can be used to heat homes, water, and produce electricity. It is not harmful to the environment; therefore there is no excuse for not using solar energy.

## 2.2. Solar Generator

A solar generator can benefit the home in a variety of ways. Depending on the size, it can allow a homeowner and family to remain unaffected in the event of a power failure. It can also be used to simply cut the costs of daily energy use. In very simplified terms, a solar generator works by converting solar energy into electrical energy. This energy can then be used to do such things as power lighting, heat water, and run the TV. The generator consists of solar panels (which must be placed where they will receive the most possible sunlight,) a deep cycle battery for continuous use, and an inverter (Scheer 2002).



The average daily solar insolation in units of kWh/m<sup>2</sup> per day is sometimes referred to as "peak sun hours". The term "peak sun hours" refers to the solar insolation which a particular location would receive if the sun were shining at its maximum value for a certain number of hours. Since the peak solar radiation is 1 kW/m<sup>2</sup>, the number of peak sun hours is numerically identical to the average daily solar insolation. For example, a location that receives 8 kWh/m<sup>2</sup> per day can be said to have received 8 hours of sun per day at 1 kW/m<sup>2</sup>. Being able to calculate the peak sun hours is useful because PV modules are often rated at an input rating of



## 2.3. Ethical and Environmental Considerations

Several observers and researchers are concerned about illustrating ethics and how we can associate it to solar energy improvement. They illustrated that ethical issues include clash of interests or values of diverse people or associations. Concerning ethical contemplations of energy, the illustration of global warming. Global warming is a concern of

numerous researchers however still remains an issue of clashed open interest. Furthermore, it descends to what we know and what we should do. We realize that introducing atomic force plants can have deplorable effects on both a natural scale and a human health identified scale. In spite of the fact that atomic debacles like Fukushima and Chernobyl can possibly happen once more, it is a danger that numerous nations take to manage an energy economy.

There are two philosophical perspectives with respect to ethical contemplations. The predominant is Utilitarianism Ethics, which states the most stupendous useful for the most amazing number. Individuals who improve ethics on the Utilitarianism guidelines might concentrate on the outcome and see which choices profit the most individuals. Utilitarian Ethics in energy approach might make an energy arrangement that might profit the most fantastic measure of individuals and the earth." To counter that focus, example of Duty-Based Ethics can be considered which is based on duties or commitments paying little heed to the outcomes. The Duty-Based Ethics is based on not treating individuals as only and intends to a finish. With respect to energy ethics, this might be seen as everybody having the right to energy administrations, not only a chosen few. These two focuses can frequently clash with the other: How would we be able to balance the best potential conclusion (Utilitarianism) with the right of everybody having the same energy administrations (Duty-Based)?

Assuming that we imagine a practical planet, "energy efficiency on its own is not set to do it, we require conduct changes". With a code of energy ethics, we have the capacity to have guidelines on how we need to see a renewable energy.

### 3. Wind Generation

Another alternative source of energy that is easily available in abundance and is not running out similar to solar energy is the wind energy. Harnessing of the win energy is relatively common in regions like Denmark and Spain where intensity of wind is naturally greater. This energy is harnessed through wind mills and is used to produce electricity and power for grinding and other industrial purposes. Similar to Solar energy, it is inexpensive in production and can be used without the threat of running out.

The mechanism of harnessing wind energy is through the wind mills that have turbine blades attached to it that rotate and produce electrical current with the attached generator. Construction and installation of windmills is easier than installation and construction of photovoltaic cells for solar energy. Furthermore, they can be used for production

purposes throughout the day all over the year unlike Solar Energy that can only be produced in daytimes when the intensity of sun is higher.

However, the intensity or voltage of electricity produced through wind is relative low as compared to solar energy still it is being successfully used in grain industry for crushing seeds, etc. It is also being largely used for water pumping.

There are numerous profits to utilizing wind energy. It is abundant, renewable, broadly conveyed, and utilizes almost no land. Besides, it is an alternative to the global dependence on fossil fuels, and produces no greenhouse gas discharges throughout operation. On the other hand, there are numerous quarrels encompassing the point. One of the fundamental subjects of concern when examining wind power is its natural discontinuity. It's absolutely impossible to certification the measure of wind on a given day, which could turn into an issue if wind is the main source of power. Individuals additionally contend that exchanging to wind power does not have a critical effect on carbon outflows in light of the fact that it can never contend with routine fossil fuel creation, yet in spots where wind ranches have recently been assembled, there has as of recently been confirmation of huge decrease in carbon dioxide emanations, and based on these models, researchers foresee that the lessening in these discharges will just press on to heighten as the utilization of wind energy increments.

#### 3.1. Wind Energy

Wind power has been harvested for centuries, to propel boats, pump water and crush grain. Now that fossil fuel resources are depleting it would be only natural that the wind power be harvested to generate electricity. Wind turbines used for electricity generation come in two styles, vertical-axis and horizontal-axis. Vertical-axis turbines have a vertical rotor shaft and does not need to face in the direction of the wind. The gearbox and generator tends to be mounted lower to the ground so the turbine experiences lower wind speeds and more turbulent airflow. Horizontal-axis turbines have a horizontal rotor shaft and are mounted on towers [1]. Horizontal-axis turbines are most effective when faced toward the wind, but some are designed to work downwind. Because these turbines are mounted on towers they have access to less turbulent, high-speed wind. For this paper our focus will be on horizontal-axis turbines.

#### 3.2. Wind Generation

Horizontal-axis turbines are constructed of two to three blades, a gearbox which connects the low- and high-speed shafts, a generator, a controller, an anemometer, a brake, a yaw drive, a wind vane, a yaw motor and a tower. Blades are angled (pitched) on the rotor so that they will not spin outside of a wind speed range not productive to electricity generation. Start speeds can be 8 mph and stops speeds 55mph[2]. The blade rotor is connected to the low-speed shaft which is connected to the gear box where it's low rpm is converted to a higher rpm to achieve a speed necessary for the generation of electricity. The high-speed shaft is connected to an induction generator, the standard is a 60Hz AC generator [1].

Poles	Ns (RPM)
2	3600
4	1800
6	1200
8	900

Table 1: Synchronous speeds for various poles of a 60Hz generator

The gearbox needs to translate the wind speeds to speeds that will achieve  $s \neq 0$ . The controller, anemometer, brake, yaw drive, yaw motor and wind vane all work together to position the turbine up-wind and to keep the blades from spinning in too low or too high winds.

A general rule of thumb is that doubling the wind speed increases the power by a factor of 23, this is known as the V3 law [3]. The reality is that there will be loss during the conversion to electricity and that loss will vary depending on the efficiency of the turbine. If we have a turbine that produces 22.42W at a 13.4mph wind the V3 law dictates that at 26.8mph the power generated will be 179.36W.

Wind Speed (mph)	Power (Watts)
13.4	22.42
26.8	179.36
53.6	1434.88

Table 2: Power determined by wind V3 law

If we look at average monthly wind speed information for Tampa, FL and use a power regression to model the power curve we can estimate power generation of our example turbine.

Month	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wind Speed (mph)	8.6	9.1	9.4	9.2	8.6	7.9	7.1	6.9	7.6	8.3	8.2	8.3
Power (Watt)	6.36	7.54	8.31	7.79	6.36	4.93	3.58	3.29	4.39	5.72	5.51	5.72

Table 3: Average wind speed data collected by the Southeast Regional Climate Center [4]

As we can see at lower wind speeds the turbine does not provide a great amount of power, about 4.6kWh/month at an average wind speed of 8.6mph/month. However because of the wind speed-power relationship areas that can achieve average winds of 13.4mph/month can generate about 16kWh/month.

For Example, the wind speed estimations for the city of Tampa, FL there are 4 months where the wind speed averages under 8mph. If our turbine has a start speed of 8mph there will be no production from June-September.

### 3.3. Ethical Considerations

Another dubious issue with wind energy is its influence on the individuals who live in the zone where turbines or wind homesteads are, no doubt fabricated. While numerous individuals discover the sight of turbines to be average and ideal in light of the fact that it symbolizes energy autonomy and nearby flourishing, others contend that the tall, huge turbines ruin the landscape and transmit clamor that interferes with their ordinary life. Numerous individuals close turbines claim to have "Wind Turbine Syndrome," which characteristics side effects like rest disturbance, cerebral pain, ringing/buzzing, dazedness, and issues with memory to be an effect of the wind turbines in the territory.

There are additionally budgetary concerns in regards to the execution of wind energy. Aside from the genuine cost of building the turbines, studies have indicated that homes and structures close turbines have lost monetary esteem since the turbines were manufactured. Moreover, one worry that is particularly pervasive in the mountains of North Carolina is the effect of turbines on tourism. So that turbines will work effectively, they must be set in windy puts, which, in the mountains, are on unmistakable ridges and mountaintops, where they could be effectively seen. Since some individuals accept that the turbines "ruin the landscape," economists are worried that building the wind ranches will diminish tourism and the longing to invest time traveling in the wilderness or other recreational outside zones.

Lastly, numerous environmentalists are concerned with the effect of wind turbines on creature environments,

particularly those of birds and bats. Studies have even indicated that the turbines can cause expiration to these creatures, which fly into the quick moving turning razor sharp edges. One case of this contention happened in Eastern North Carolina, where Iberdola Renewables, an alternative energy organization, improved plans for a 49-turbine wind ranch. The ranch would supply power to 15,000 North Carolina homes, would essentially decrease fossil fuel era, and might furnish both occupations and income for the zone, yet it might sit close to a wildlife refuge, where it could influence the transient pathways and scavenging regions of birds. Although the N.c. Utilities Commission endorsed the arrangement, environmentalists from the Pocosin Lakes National Wildlife Refuge are asking the organization to finish a study following bird flight and sustaining examples to verify the conceivable effects of the wind farms.

#### 4. Hybrid Generation

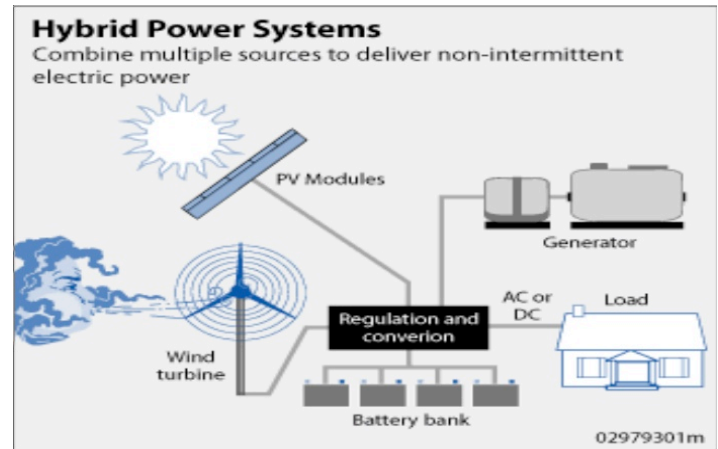
Other than Solar and Wind Energy, another form of energy that is becoming immensely popular amongst the researchers is the use of Hybrid energy. Hybrid energy is being produced and harnessed to replace the consumption of fossil and natural fuels such as petroleum and diesel for the vehicles. Since vehicles are believed to produce a major proportion of pollution and environmental degradation, extensive use of hybrid energy and hybrid car engines can lower the environmental risk immensely.

Hybrid energy sources are the combination of two of more naturally abundant occurring sources that can be harnessed for greater advantage. Common combinations that are currently being worked on and developed include Biomass-wind-fuel, Photovoltaic-wind, etc.

Unlike Wind and Solar energy, use of hybrid energy is relatively new but is being researched on larger scale. And it is believed that Hybrid technologies and energy sources will not only reduce the environmental impact and pollution but will also help in lifting up the global economy.

The demand for alternative energy sources is increasing each year due to need for clean and renewable sources of energy. A hybrid system uses a combination of energy producing components that provide a constant flow of uninterrupted power. Hybrid energy systems are ideal for outdoor and/or remote area applications. Hybridization ensures that should any part of your system not be performing for any reason, you will have a back up means of producing your own electricity. Many hybrid systems are stand-alone systems, which operate "off-grid"—not connected to an electricity distribution system. The most popular hybrid

choice is that of solar and wind. It's generally windy to some degree during overcast days, which makes wind towers and turbines effective when the sun isn't shining. The wind collectors will also work at night, providing there's wind. Alone, the solar and wind systems both have flaws; solar can't work without sun, and wind can't work without wind. When the two systems are combined, they fairly well cover each other's weaknesses.



In much of the United States, wind speeds are low in the summer when the sun shines brightest and longest. The wind is strong in the winter when less sunlight is available. Because the peak operating times for wind and solar systems occur at different times of the day and year, hybrid systems are more likely to produce power when you need it. For the times when neither the wind nor the solar system are producing, most hybrid systems provide power through batteries and/or an engine generator powered by conventional fuels, such as diesel. If the batteries run low, the engine generator can provide power and recharge the batteries.

When looking at our area there is little wind energy potential in the Southeast region for existing Wind turbine applications because 41% is flat and smooth plains.

#### 5. Discussion and Conclusion

In order to reduce these adversities, and make this planet a better place to live in, it is essential to take immediate measures that could lead to the ecological sustainability. For instance, the steps to reduce the green house effects, equilateral political distribution and allocation of the natural resources, recycling, efficient consumption of the energy, development of the eco-friendly technology, conservation of the natural habitats, and development of an ecological accounting framework. Only then the adversities already

being laid over the planet can be reversed, making it safe for the future of the human as well as the non-human races.

For this purpose, extensive research and industrial interest is needed in alternative and renewable energy resources that are available in abundance, are inexpensive and are efficient to harness. With this renewed interest, ecological and economical sustainability can be achieved at global level.

The hybrid system provides a means for constant power generation throughout the year. Months where wind speeds are low tend to be sunnier making the hybrid system the best candidate for renewable generation versus stand alone solar systems or wind farms. Possible improvements in wind generation would be to construct a turbine that does not require a gear box to get the induction generator up to the necessary speed for power generation. Eliminating the gear box would increase the efficiency of the system. Solar generators would benefit from the advance of negative index refractive materials. In a similar way that it increases the viewing area of a telescope it could increase the capture area of the solar panels without actually increasing the physical number of panels.

Inferred from the Greek word *ethos*, importance custom of propensity, ethics is the extension of reasoning concerned with the assessment of human conduct. Ethics can take the type of issuing steer enjoiners of what to do and not to, characterizing principles for such enjoiners, and creating the ground of commitment for obeying such principles (Jonas 1974). Timmerman (2003) composes that there is nobody ethical skeleton to which every living soul subscribes. This is accurate in that most ethics are nearly attached to social qualities.

From multiple points of view, the thought of sustainability encapsulates this bridge and idea of responsibility towards present and future generations and in addition the natural planet. In principle, sustainability has been generally embraced by endless governments, associations, and organizations as a method of balancing social, budgetary, and environmental values after some time. Gibson (2006), in any case, stresses that sustainability is not about balancing yet rather, reproducing strengthening additions. Working towards more excellent sustainability, accordingly, does not just involve the minimization of negative social, financial and environmental effects, however the inversion of two negative patterns: the developing hole between rich and poor and the debasement of biological frameworks (Gibson 2006).

The potential for renewables to help sustainability is presently being shaken by developing attentiveness to a percentage of the earnest results of quick, badly acknowledged arrangement. The generation of biofuels, for instance, is currently irrefutably connected with the present spike in global nourishment costs, which is starting boundless fear over starvations also ailing health in impoverished nations. Modern labour unrest has additionally started to surface as the generation of renewable energy engineering globalizes also moves to parts of the planet with low labour costs. Besides, renewable energy is no more extended absolved from land-identified clashes, with three Chinese villagers shot to expiration in 2006 whilst dissenting over an absence of remuneration for land lost to a wind power plant (Abramsky 2006).

These developing issues will just strengthen without a sound ethical position by which all renewable energy stakeholders stand. This position might incorporate characterizing a set of principles that address intergenerational value, intragenerational value, and the characteristic esteem of the biosphere and all that occupy it. For renewable energy advancement to energize intergenerational value requires that present alternatives and activities well on the way to preserve or improve chances and proficiencies of future generations to live sustainably be favoured (Gibson 2006). This requires an ability to give up present preferences for future picks up, and to genuinely recognize the potential outcomes of contemporary choices. In the connection of renewable energy, it might mean pushing unobtrusive energy utilization levels and building social capital and democratic frameworks portrayed by differences, responsibility, and wide engagement (Gibson 2006).

Renewable energy sending that encourages intragenerational value requires that sufficiency and effective decisions for all are sought after in ways that lessen risky holes in chance, health, security, social distinguishment, political impact between the rich and poor (Gibson 2006). It might additionally imply that socio-natural profits and dangers of renewable energy are not packed in rich and poor nations respectively. For this to happen, there needs to be a stress on less material and energy-serious methodologies to individual fulfillments around the advantaged (Gibson 2006). Moreover, for renewables to profit present and future generations there must be pervasive acknowledgement that the additions be incremental and favour nearby self-governance. This requires quietness and valuation for little picks up and readiness to take an interest in accord building. Finally, renewable energy advancement must be focused on

an ethic of respect for life that transcends limits between humans, and between humans and nature. This means supporting for social equity regarding reasonable wages, working conditions and human rights, and also campaigning for policy changes that sway and eliminate barriers to singular and co-operatively-possessed frameworks. It means uncovering and testing the power structure that has upheld the expected energy framework at outlandish expenses to innumerable human lives and the well being of the whole earth.

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