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Can Renewable Energy save the global energy crisis and Environmental Pollution

A) Introduction

B) Renewable energy serves multi-pronged purposes

1) Renewable energy is fully capable of addressing the global energy crisis

1) Provides ^{long-lasting} unlimited and sustainable means of energy production

2) Reduces the logistical and infrastructural cost as remote areas access tailored and local means of production

3) Prevents transmission and distribution losses by decentralizing the grids and ensuring a reliable flow of energy

4) One installed per unit cost of renewable energy is low consequently provides cheap energy

5) Provides immunity from external energy shocks emerging due to geopolitical complexities

6) Reduces excessive reliance on fossil fuels by providing diversified means of production of energy

D) Renewable energy is the ultimate source to eradicate environmental pollution

1) Renewable energy sources produce negligible amount of greenhouse gases thus mitigate global warming

2) Produces less solid waste as compare to fossil fuels

3) Reduces air pollution by limiting release of toxic

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gases

4) Help reduce the no of oil spills and contamination

5) Fossil fuels are the ~~biggest source of water~~ ^{biggest source of water} ~~pollution~~ ^{pollution} this renewable energy source helps mitigate water pollution

6) Renewable energy minimizes noise pollution

E) Conclusion

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As global energy demands surge and environmental degradation escalates, the consequences of our dependence on fossil fuels are becoming more pronounced. Pollution is suffocating ecosystems while energy crisis looms larger with every passing day. In such a critical time, renewable energy emerges as a beacon of hope offering a dual solution to address both the world's energy crisis and the pressing environmental challenges that threaten our future. Renewable energy is fully equipped to address the global energy crisis because it provides unlimited and sustainable sources of energy production such as solar, wind, geothermal and tidal. These means are capable to produce limitless energy without having depletion therefore, renewable energy is one of the greatest source of sustainable energy. Moreover, renewable energy is able to provide tailored access to local means of energy sources, therefore, plays a significant role in reducing logistical and infrastructural cost of energy production. Adding further, renewable energy provides cheap energy as there is a huge gap between per unit cost of renewable and non-renewable energy sources. In addition to mitigating energy crisis, renewable energy is also capable of reducing environmental pollution. The biggest success of these sources lies in the fact that, renewable energy sources produce negligible amount of green house gases (GHG) ultimately minimizing global warming.

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Adding to this, renewable energy is also capable of reducing water pollution by reducing the wastewater discharged from traditional fossil fuel plants. Moreover, it is also capable of eradicating oil spill and water contamination which ^{are} results of mining, extraction and transport of fossil fuels. Therefore, it is not an overstatement when it is said that renewable energy is the ultimate solution to global energy crisis and environmental pollution.

Renewable energy serves multi-pronged purposes such as it is significant in dealing with global energy crisis besides serving as an alternate for a clean and sustainable energy. Thus, renewable energy addresses several interconnected global challenges simultaneously. Renewable energy's role in addressing the persistent crisis of energy is pivotal, with the rise of industrial development and increase in population the global need of energy has also widened. However, traditional means of energy production are unable to cater for this rising demand in energy sector paving the way for renewable sources to come for rescue. Moreover, it not only ~~ensures~~ ^{helps} in meeting the needs of global energy but also in ensuring environmental cleanliness. The scourge of environmental pollution is detrimental to human health, leading to respiratory diseases, waterborne illnesses and long term health complications.

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Thus, solution to eradicate these problems lies in adopting renewable means of energy production. Renewable energy sources are ~~environmentally~~ friendly given the fact that these produce less ~~traces~~ during formation and utilization processes. According to UNEP, renewable energy not only helps in mitigating environmental pollution but also ~~also~~ supports energy security throughout the world. Therefore, renewable energy serves both the purposes; addressing global energy crisis and eradicating environmental pollution.

To begin with, renewable energy is fully equipped to provide ^{long-lasting} ~~million~~ and sustainable energy. Sustainable energy refers to the fact that renewable energy sources are naturally replenished and ^{and} do not deplete over time. The sun is an abundant source of renewable energy this energy can be harnessed as long as the sun shines, likewise, water is another source of renewable energy sources as long as ^{water} ~~the~~ cycle continues water flow can be harnessed for power generation. Thus, renewable energy sources are ~~are~~ inexhaustible resources which make them perfect for their role in mitigating energy crisis ~~given~~ the fact that fossil fuels are finite and depleting rapidly the future energy crisis can be resolved by harnessing the potentials of renewable sources such as solar, wind, geothermal, tidal and Hydel. These

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sources can be used indefinitely as long as these are managed properly. According to ~~INREN~~ International Renewable Energy Agency (IRENA) amount of solar energy that hits Earth in just one day is 200,000 times greater than the total amount of electricity generated globally in a day. Thus, renewable energy is the ultimate source that provides long lasting and sustainable means of energy which in turn eradicate energy crisis by providing inexhaustible means of energy production.

Adding on, renewable energy is able to provide access to tailored means of energy production. This tailored access to remote areas reduce the traditional logistical and infrastructural cost of energy production, making energy cheap. A coastal city can be equipped with wind power or a vast area can be harnessed for solar energy therefore, only renewable energy sources are capable of reducing logistical and infrastructural cost by providing customized means of energy generation. Fossil fuel plants based on industrial hubs require strong logistics and infrastructure to transmit energy from generation plants. This not only makes the energy expensive but cause disruptions due to infrastructural failures further enhancing energy crisis.

Thus a case study of Kenya further strengthens the idea. ~~Custom~~ solar panels were installed on rooftops and open lands to harness the areas average sunlight exposure. These panels fulfilled the demand and eradicated the traditional need of logistical and infrastructure support required to provide energy from a far-flung power plant. Therefore, renewable energy is fully capable to provide tailored and local means of energy production.

Adding further, renewable energy is able to prevent transmission and distribution losses which are some of the leading factors for energy crisis. The decentralization of energy grids is the tool employed for eradicating transmission and distribution losses. 20 to 30% of energy losses are witnessed while transferring energy from generation and distribution plants. Renewable energy sources provide opportunity to reduce the centralization for instance rooftop solar panels shift energy generation to individual building or homes. Another way renewable energy sources encourage decentralization by installing microgrids. These grids are localized based on the resources of the area thus remove transmission and distribution losses and give local communities greater control instead of traditional centralization where locals have little say. Therefore, it is not an overstatement to say that renewable energy reduces

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energy crisis by mitigating transmission and distribution losses.

Leading on, per unit cost of renewable energy is more economical than that of non-renewable thus, further strengthens the energy security by providing cheap energy. Although the installation cost for renewable sources is high, once installed provide energy at affordable rates. Multiple reasons contribute to this factor for instance, the cost for operating the renewable energy sources is lower compared to fossil fuel power plants. Besides, the renewable energy sources such as wind, solar, hydro do not require the purchasing or extraction of fuel. Thus, fuel cost for renewable energy is essentially zero due to the presence of natural, inexhaustible resources. According to International Renewable Energy Agency (IRENA) LCOE (Levelized cost of electricity) for fossil fuel ranges from \$50 to \$100 per MWh, in contrast, the LCOE for solar energy is generally around \$40 per MWh, making it a competitive and cost-effective option for electricity generation. Therefore, it is not overstatement to state that renewable sources provide cheaper energy compared to fossil fuels paving the road for ending energy crisis.

Adding further, Renewable energy

provides resilience against external energy shocks which emerge due to geopolitical complexities. External shocks have huge potential to create energy crisis because they can severely disrupt the supply chain, production and distribution. Thus, the savior in such situations is renewable energy sources. As renewable energy provides localised means of energy production which lowers dependence on the external sources such as fossil fuels. It is also true that renewable energy provides inexhaustible means of energy production thus, disruption in global production will have minimal impact on a country ~~that relies~~ ^{that relies} primarily on renewable sources.

A case study in this regard is of Pakistan, ^{due} ~~during~~ to the disruptions in global energy market caused by Ukraine war Pakistan witnessed significant spike in energy prices as the country relies heavily on imported fossil fuels. Hence, it is proved that renewable energy sources provide immunity from external energy shocks paving the way toward resolving energy crisis.

In addition to this, renewable energy reduces excessive reliance on fossil fuels by providing multiple avenues to produce energy. Diversified means of production expand the options for production of energy thus, pivotal for ending energy crisis. Renewable energy does not rely on single source.

rather gives diverse sources such as solar power, wind power, hydropower and tidal energy. Solar energy harnesses the power of sunlight; wind energy captures the kinetic energy of wind; hydropower generates electricity harnessing the flow of water and tidal energy is produced through the movement of water caused by gravitational forces. All these various sources of energy diversify the domain of energy production limiting reliance on fossil fuels.

Danish Energy Agency stated that by diversifying our energy mix we have not only reduced dependence on fossil fuels but also increased the reliability and stability of our energy system. Hence, it is proved that by diversifying energy mix not only reliance on fossil fuels reduce, but it also help mitigate the risk of energy crisis.

Furthermore, renewable energy is not only capable of addressing the global energy crisis, but also provides ultimate source to eradicate environmental pollution. For instance, renewable energy sources ~~are~~ ^{produce} negligible amount of greenhouse gases thus paving the road for eradication of environmental pollution. Fossil fuel produce large amount of (GHG) which in turn causes global warming. Global warming deteriorates the environmental

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stability by increasing levels of pollutants in the environment. Besides, global warming exacerbates smog. Thus, (GTH) ^{contribute} ~~contribute~~ and magnify environmental pollution. Renewable energy is ^{recognized} ~~considered~~ for its lower greenhouse gas emissions.

According to UNEP fossil fuels produce 75-80% of global greenhouse gases, on the other hand, ~~renewable~~ renewable energy produce less than 5% of global greenhouse gases.

Therefore, it is a reasonable conclusion that renewable energy produces negligible amount of global greenhouse gases (GTH) thus.

instrumental in reducing environmental pollution.

In addition, renewable energy sources produce significantly less solid waste compared to traditional fossil fuel-based energy production. This further strengthens a path towards cleaner environment. Solid waste has been one of the detrimental ^{contributor} ~~factor~~ for environmental pollution. But, renewable energy generates minimal solid waste, as unlike fossil fuels renewable energy sources are not involved in combustion. This means there is no ash, slag or other waste products typically associated with burning fossil fuels. Renewable energy sources also ~~generate~~ less solid waste during manufacturing process as materials used to build renewable energy often have less waste associated with their production and generation. Compared to fossil fuels, A case study of Sweden in this regard

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will illustrate the concept vividly, Sweden developed a robust mechanism for solid waste management however, policy makers have claimed that solid waste generated from fossil fuel consumes a lot of resources due to its large volume and greater content. Thus, ~~this~~^{this} is a valid estimate as renewable energy plays a crucial role in reducing pollution by contributing to lower levels of solid waste.

Additionally, Renewable energy sources also contribute to eradicate environmental pollution by reducing the generation of our pollutants. Air pollution is one of the lethal threat for life on earth due to its multi-pronged implications. But, Renewable sources provide avenues for the reduction of this pollution as they ~~produce~~^{limit} production of toxins. Unlike fossil fuels, renewable energy sources do not produce NH_3 , nitrogen oxides, sulphur dioxide, carbon monoxide and volatile organic compounds. The manufacturing, operational and disposal of renewable energy sources emit far less toxins when compared to fossil fuels. According to IPCC wind and solar energy systems produce 99% fewer emissions than coal-fired power plants over their lifetimes. Hence, a key fact about renewable energy sources such as wind, solar-

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hydroelectric and ~~hydro~~ power, produce significantly fewer toxins thus limiting the air pollution. A cleaner air is ~~testimony~~ reflection of clean environment.

Adding on, renewable energy sources reduce environmental pollution by reducing the risks of oil spills and contamination. Oil spills and contaminations have harmed our environment by enhancing acidity or by changing pH level or by changing oxygen levels. As renewable energy do not involve the extraction or transportation of fossil fuels especially petroleum, this significantly reduce the risk of spills and contamination. Most of the oil spills occur while transporting oil by ship, pipeline or rail; however, usage of renewable sources reduce this risk. According ~~to~~ ^{WINE} ~~unlike~~ renewable energy sources do not rely on fuel such as oil, coal or natural gas which makes them best for keeping the environment clean as oil spills and contaminations have devastating impacts on ecosystems. Therefore, renewable energy contributes to reduce environmental pollution by eliminating the risks of oil spills and contamination.

Furthermore, ~~fossil~~ ^{renewable} ~~fuels~~ energy minimizes noise pollution thus contributing towards an environment free of noise pollution. ~~noise pollution is one of the biggest~~ ~~problems~~ ~~in~~ ~~the~~ ~~world~~ ~~today~~

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~~Outcomes of environmental pollution~~
Outcomes of environmental pollution present hurdles towards a peaceful and healthier environment; however, renewable energy is equipped to address this issue. Sources such as solar energy generate no noise at all, once installed. Besides, unlike fossil fuels there is no requirement of ~~fuel~~ extraction and transportation in renewable energy production. These processes are associated with a lot of noise pollution. Renewable energy reduce this need for extraction and transportation making it perfect to reduce ^{noise} ~~air~~ pollution.

Wind turbines generate noise levels of 40-50 decibels, far less than the noise produced by a gas-powered plant. Thus, renewable energy is the best alternate to reduce noise pollution and ultimately eliminating environmental pollution.

To sum up, renewable energy is the ultimate ~~solution~~ solution to global energy crisis and environmental pollution. Renewable energy's role in addressing the global energy crisis is very significant, as these energy sources provide inexhaustible means to generate energy. The sources which produce renewable energy replenished naturally thus, reduce the risk of energy shortages due to depletion. Besides, these sources are generating power which is cheaper than the energy generated.

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from fossil fuels. Therefore, renewable energy sources are capable of addressing energy crisis by providing energy at reasonable cost. Moreover, renewable energy sources provide an opportunity to diversify energy mix this in turn eliminates traditional dependence on fossil fuels. In addition to curing energy crisis, renewable energy sources also pave the way for eradicating environmental pollution. The significance of renewable energy sources lies in the fact that they are involved in producing negligible amount of greenhouse gases, toxins and pollutants. Unlike fossil fuels, renewable energy also produce lesser amount of solid waste which is one of the main causes of environmental pollution. Moreover, renewable energy sources produce minimal noise pollution, making it a quieter and more peaceful alternative to traditional energy sources. Therefore, it is not overstatement to state that renewable energy is capable of addressing not only energy crisis but also competent to eradicate environmental pollution.