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Green Energy and Sustainable Development: An Analysis

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Abstract: ***The concept of green energy has come to the force as a strategic sustainable energy formation process for the whole world since last three decades, but it has gained enormous interest during recent years. In terms of reducing negative environmental impact, highlighting the importance of Green Energy on environment, sustainability researchers have increasingly utilized this lens to explain the multi- dimensions of many sustainable development issues. The world is facing a strong evolution due to the advancement of information and communication technologies that set the knowledge technologies at the base of productivity, competition and power.***

Now-a-days, two issues regarding energy are drawing attention to the sustainability researchers. One is how to assure energy supplies in a sustainable manner which has low environmental impacts and low emissions capacity, and the other one is barriers to sustainable energy development and identifying the most efficient way of addressing such barriers.

Although some of the developed countries have been successful on implementing green energy system, while for developing countries technical and financial aspects are considered the key barriers to implement the system. However, there is lack of technical and institutional knowledge regarding how the country will move from traditional energy technologies to modern environmental friendly green technologies. It is urgently needed to adopt the appropriate policies for developing green energy strategies for sustainable future. This calls for immediate action by all nations.

Key Words: RESOP, GHGs, GEA, IPCC, WCED, HDI, UNFCCC.

Introduction- Energy is required for every society with a view to meeting the basic needs, so the insecurity of its supply can approach the work of a nation's economy. In this regard, transition towards green energy has come to be known as a premeditated product. The world is facing a strong evolution due to the advancement of information and communication technologies that set the knowledge technologies at the base of productivity, competition and power. The world is more and more inter-connected than ever before, i.e. people, ideas, images, goods and money are being distributed more frequent and faster than ever before.

The idea of green energy is introduced in November 2006 as renewable energy standard offer program (RESOP). It introduced a 20 year feed in tariffs for hydro, wind, solar (PV) and biomass projects. The Ontario Green Energy Act (GEA), officially the Green Energy and Green Economy Act 2009 was introduced in the Ontario Legislature on February 23, 2009, to expand renewable energy production and encourage energy conservation. The word 'Green' make our mind to think about a world without pollution and eco friendly. So the green energy reflects the idea about generation of energy from natural resources like sunlight, wind, rain, tides, plant, algae, geothermal heat, etc. having no or less impact on the environment and can be renewed. These energy resources are renewable, meaning they're naturally replenished. The different types of renewable energy technologies include: Solar energy, Marine energy, Wind energy, Hydropower, Bio-energy, Geothermal energy etc. There are various renewable energy technologies, which include hybrid and related technologies. These are effectively used for: Storing energy generated through renewable energy; for predicting renewable energy supply; Assisting in efficient delivery of energy generated by means of renewable energy technologies to energy consumers.

The concept of green energy has come to the force as a strategic sustainable energy formation process for the whole world since last three decades, but it has gained enormous interest during recent years. In terms of reducing negative environmental impact, highlighting the importance of Green Energy on environment, sustainability researchers have increasingly utilized this lens to explain the multi- dimensions of many sustainable development issues.

Our Traditional energy sources, such as fossil fuels have a big role in creating the effect of global warming and climate change to the earth and this makes us to create a subway to overcome these problems by introducing the concept of Green Energy. The primary goal of developing Green sources of energy is to generate power and also to minimize both waste and pollution, so that we can reduce the impact of energy production on environment. The concept of Green Energy most oftenly considered when it comes to the issues such as cogeneration, heating and electricity. These sources can be purchased by the

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consumers or businesses as a means to support to support living which is environmental friendly, by reducing bad impacts of energy production. Today energy certificate or renewable energy certificate can be purchased to support the use of green practices.

Green energy can meet the energy demand of local rural communities at economical and sustainable ways. Since access to green energy means access to energy that is clean, affordable, and reliable. Now-a-days, substantial initiative has taken especially by the emerging countries in order to increase access to Green energy.

Literature Review-

* As a larger contributor, energy sector stands for roughly two-thirds of all GHG emissions (IEA 2015).
* According to Wen-Cheng Lu (2017), "About 52 percent of annual energy-related CO2 hails from developing nations and it has been anticipated that, in future, a large volume of energy-related CO2 will be released from there even though now two- thirds of total CO2 come from developed countries that consume energy five times more than the developing countries".
* The International Panel on Climate Change (IPCC) specified that, if there is no proper commitment and urgent action is not taken to control the use of fossil fuel and coal energy, the CO2 emission will be released in the atmosphere at an unprecedented rate (IEA, 2015).
* According to Sen and Ganguly (2017), "One of the key objectives of sustainable development is to secure the supply of energy resources for all generations, and that must be least costly and release minimal emission".
* According to Sathaye et al. (2011), "Both Gross Domestic Product (GDP) and Human Development Index (HDI) are the most widely used variables for measuring the economic development of a country whereas employment variable is used to quantify the social development."
* According to UNDP (2007), "Green energy is more reliable types of energy to improve the quality of human well-being i.e. education and health quality, gender equality, socio-economic status of the poor people, etc."
* According to Sen and Ganguly (2017) has been argued that there exists strong positive association between per capita income and per capita energy consumption.
* According to Mundaca et al. (2016), "Green energy strategy can help to meet the global climate goals without any effects on economic growth and welfare".
* As such, wind energy, which is one of the fastest growing source of cleaner and greener energy has been recognized as the most acceptable source of energy (Ucar and Balo 2009; Akdag and Guler 2010).
* Due to the competency of lowering the level of emissions as well as of minimizing the undesirable effects on environment, green energy has been acknowledged as the nuts and bolts of attaining the goals of sustainable development (Bekhet & Harun 2017; Dogan & Seker 2016).
* According to Bhowmik et al. (2017), "Green Energy, which is generally originated from natural sources, like sunlight, wind, rain, tides, plants, algae, geothermal heat those are naturally renewable as well as environmentally friendly and more sustainable."

The Present Paper describes Green Energy and Sustainable Development: An Analysis. The paper is divided into Seven Sections. Section I deals with Transition toward Sustainable Green Energy; Section II discusses Green Energy and Sustainable Development; Section III explains The Contribution of Green Energy to Sustainable Development; Section IV discusses Barriers to Green Energy Deployment in Sustainable Development Context; Section V discusses Current Status of Green Energy in World Scenario; Section VI discusses Policy Strategies for a Green Sustainable Energy Future. In the last, Section VII provides Conclusion along with Suggestions.

Section (I)- Transition toward Sustainable Green Energy: Maintaining higher and sustainable development is the core area for the Government strategies throughout the world. This activity requires large amount of substantial and energy inputs which are essential for achieving sustainability. In spite of that, the abundant use of such natural resources has create serious environmental problems and imposed negative consequences on the human health as well as on productivity by increasing the concentration of Greenhouse Gasses (GHGs) in the air. They generate huge amount of waste or by-products in the process of attaining greater economic activities.

Accordingly, these activities also contribute to increase the sea level, air temperature, global ocean, and melting of snow and ice sheets as well as exhaustion of the different species throughout the world. These are collectively called as the effect of the global warming and climate change caused by raising the concentration ratio of GHGs in the environment. Global Climate Change which is an alarming problem for attaining sustainable development in these days. Although, the impact of global climate change is certain on human health and environment, therefore, it is difficult to predict the change.

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Many people start realizing that unpredictable change of global climate is a key barrier for attaining sustainable development, while more than half of the global climate change is caused by the increasing concentrations of GHG emissions and contributed mainly by the energy sector (Climate Group, 2009).

In addition, over the decades, Carbon Dioxide emissions (CO2) which is known as the leading creator of GHGs from the energy sector have risen at a higher levels that account for about 55 percent of total GHG emissions (IEA, 2015). As a result, energy-related carbon Dioxide (CO2) has received more consideration everywhere in the world as the most substantial pollutant. Because of higher economic progression and development of the international market, energy consumption will be heightened by developing nations and it increases by about 90 percent of the total expected increase in consumption of global energy.

To be accurate, activities related to power generation, deforestation, and transportation, industrial, residential and commercial are the indication of human activities that are strictly correlated to the CO2 emission. In general, CO2 is discharged into the atmosphere from combustion of non- renewable fuels, such as oil, coal and natural gas as sources of energy. Hence, the degree of global climate change will be overstated leading to strong long-term effects around the world, which is already increasing rapidly at the present time.

Moreover, it is an uncountable fact that, the number of nations for sustaining their economic progress still now significantly dependent on fossil fuels energy sources. For this dependency on fossils fuels energy which is not green generates extensive CO2 emission, global warming and uncontrolled environmental problems, like storms, floods, and droughts etc. as regular phenomena throughout the world. It has been estimated that for the period of 20th century, roughly thirty billion tons of CO2 from the burning of fossil fuels move into the atmosphere each year. For the past few years, fossil fuels burning of CO2 emission also have showed an increasing trend.

Currently, the high growth of energy demand which has been coexist with the long term economic growth and development of global market leads to increase the dependency on non- renewable fossils fuels energy, and it has resulted in CO2 emission. There is a strong correlation between economic growth and energy demand is reflected as an emissions driver in the environment (Stern, 2011). As such, global energy demand increases to 2.1% along with global economic growth at a rate of 3.7% in 2017. While, the share of fossil fuels to global energy demand increased by 81%, as a whole. Consequently, global CO2 emissions from energy increase by about 1.4% which was equivalent to an increase of 460 million tonnes (Mt) (IEA, 2018).

However, such growth of energy-related CO2 emission is an advance and terrible warning toward global efforts of combating climate change and shows that the current effort is not sufficient to meet the Paris Agreement goals (global average temperature is no more than 20C). According to Roberts, (2017) there exists gap between the goals of Paris climate change (below 2%) and actuality (above 4%). Research proves that, without taking exact course of actions all hope of attaining two degrees will almost certainly be out of reach as well, and the world environment will face the challenges of sustainability. In addition, we will reach a level that will not be sustainable for the time being.

Consequently, recent years have received considerable attention by scientists and policy makers due to their growing concern for green energy strategies on the way to sustainable development. In the process of transition towards green energy set of opportunities can produce enormous benefits for the world by the way of sustaining economic and social development, insuring access to energy for all, enhancing security of energy, improving the quality of environment by reducing the reliance on fossil fuels and mitigating climate change with cutbacks of greenhouse gasses and overall emissions from the industrial and non-industrial sectors.

It can be seen that green energy have met the objectives of sustainability i.e., which are least costly, efficient means for improving the sustainability of a country's productive sector, people's standard of living and environment. On the other hand, fossil fuels as energy resources are limited and have lack of attributes which are required for meeting the objectives of sustainability. Midilli et al. (2004a, b) explains, by considering the benefits of green energy over fossil fuels energy, that long-standing and dynamic policies should be applied at a greater extent to boost the practice of green energy around the world, which is considered as a key element of the interaction between nature and society.

Section (II)- Green Energy and Sustainable Development: As a new slogan, sustainable development became the desired model of economic progress at world level. Many academicians/study groups defined sustainable development but there was no uniformity and common rules/ principles in them. To rectify such problem, the first ever world conference on human environment was held in the Swedish Capital Stockholm in June 1972 where representatives including the Head of the States from more than 70 countries participated and pledged to save the environment. This may be regarded as the '1st

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Earth Summit'. India was represented by the then Prime Minister Mrs. Indira Gandhi. The Conference was chaired by Mrs. Gro Harlem Brundtland , The Prime Minister of Norway, who was later entrusted with the task of forming the World Commission on Environment and Development (WCED) in 1987 where she conceived the term sustainable development. Brundtland Commission Report on Sustainable Development (1987): The report of the World Commission on Environment and Development (WCED) was published as 'Our Common Future a (1987) '. It redefined the concept of development which should encompass three components:

1. A system of socio-economic development to meet the 'needs' (but not the greed) of the present generation without compromising with the abilities of the future generations to meet their own needs.
2. A system of stable socio-economic and ecological development that should improve the total quality of all life (human beings, plants and animals) on Earth now and in the future too, while maintaining the social and ecological integrity (natural and man-made ecosystems) of the earth upon which all life depends.
3. A system of socio-economic development which can provide good quality of life to all the people (rich and poor, men and women, adults, children born on earth, while protecting their basic life-support systems (air, water, soil, flora and fauna) and also safely disposing all the wastes (domestic, commercial and industrial) generated by them.

First, the definition clearly establishes sustainable development as an equity issue. As such, it entails that the economics of SD has a principally normative goal. Second, the definition of SD offers a rather specific ethical criterion i.e. the needs of the present are not to be satisfied at the expense of future needs (well-being). It, therefore, deals with equity across generation-inter-generational equity. Third, the Brundtland Report, by emphasizing equity, raises questions about the validity of standard economic analysis based exclusively on efficiency.

Though the term Sustainable Development is difficult to define. As a concept, it is very popular throughout the world. There exist number of agreements of defining the term sustainable development i.e. what is it, how it is different from the term sustainability and how it can be achieved.

In general, it is a key approach of achieving social, economic and environmental issues simultaneously (Dincer and Rosen 2005). To come out of the concept of sustainable development in front of the world, Agenda-21, as a basic framework, was suggested by the United Nations World Commission on Environment and Development in 1992 in Rio de Janeiro, and United Nations World Commission was a pivotal driver for the United Nations Conference on Environment and Development (UNCED). A number of new and emerging issues were outlined there, and the importance of energy as an essential factor of sustainable development was also discussed here. However, energy for sustainable development achieved priority in the year 2000 when economic growth faced the challenges of sustainability and was recognized as aspects of sustainability in 2002 at the World Summit for Sustainable Development (WSSD). Therefore, The Academicians and Researchers stated that sustainable development is the union of energy and resources sustainability as well as economic, environmental, and social sustainability. Amongst different categories of energy, the green energy has received greater importance and attentions in the context of sustainability. Instantly, the impacts of global financial crisis and climate change have raised worldwide concerns to reorganize the economy's structure by shifting towards a path that will secure environmental sustainability by lowering the negative impacts on environment and society.

Globally, it has been agreed that the practice of Green Energy should be increased at a larger scale for maintaining the energy sectors sustainability which is true not only for developed countries but also for developing and emerging countries. Dincer and Rosen (2005) highlighted three main reasons for practicing green energy as a key tool of sustainable development, and those are following:

(i) Compared to conventional energy sources, Green energy sources produce lower consequences on environment.
(ii) By nature, Green Energy is not exhausted. It can supply cleaner and greener energy indefinitely at a sustainable manner compared to other sources of energy.
(iii) Small scale equipment and less time are required for the production of green energy. Thus, the production of green energy boosts the flexibility and economic benefits for the local people by delivering compliance in case of unpredictable economic growth and unstable energy demand.

Section (III)- The Contributions of Green Energy to Sustainable Development: Green Energy is a key tool for achieving sustainable development. Desired outcome would not be possible if efficient policy is not designed to protect the environment and consider the economic and social matters immediately. Similarly, Green Energy is crucial for sustainable development, because it has the capability of reducing social, political, economic and environmental conflict at global level. Therefore, planning for the betterment of a country sustainable green energy strategies is very crucial. However, the major

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contributions of the deployment of green energy strategies to Sustainable development are provided in the following:

(i): Sustainable Socio-Economic Development: Socio-economic sustainability means supporting peoples cultural and social lives through formal and informal processes. Social and economic opportunities have been provided people to promote their health and well-being. Energy sector specify the significant contribution to economic development because there is a strong correlation between economic growth and energy consumption. Hence, to justify the role of energy for sustainable social and economic development can be described in the following manner:

* Energy and Economic Growth: Since the last few years, economic growth has been considered as one of the most governing factors behind the expansion of energy consumption. Hence, economic growth which is associated with greater economic activities leads to higher demand for electricity which is called the driver of automation and modernization of production. It is a main contributor to maintaining the continuity of productivity. Nevertheless, consumption level of energy may vary which is based on the economic structure of a country (Sen and Ganguly 2017). Such as, countries which are at the initial level of development have to consume large amount of energy derived from conventional sources. In addition, the consumption of energy followed by residential sector and manufacturing sector for the emerging countries, while transportation and service sectors for the fully industrialized countries is increasing.

* Energy and Human Development Index (HDI): The HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living. HDI plays an important role in measuring the welfare of society (Sathaye et al. 2011). There exists a significant positive relationship between energy consumption and HDI which implies that countries with higher level of HDI consume relatively higher level of energy (UNDP 2010; World Bank 2010). Therefore, conservation of quality standard of living needs green, clean, and reliable energy.

* Energy and Employment: In the process of transition towards green energy, job creation is one of the greatest positive outcomes for both the developed and developing countries (Sen & Ganguly 2017). It has negative effects on employment because some people lose their jobs during transitional period. In the process of positive consequence of green energy on employment exceed the negative consequences.

Currently, countries, like Japan, China, Korea, European Union and United States, put more emphasize on the implementation of Green Energy because it provides opportunities of new employment creation. In addition, the study conducted by Barbier (2009) shows that a Global Green New Deal might open up over 34 million jobs in the long run in some sectors, like low-emission intensive transportation and related sectors.

(II): Increase Energy Access: The majority of the world populations have lack of access to green energy. From the viewpoint of sustainable development, extension of sustainable green energy is necessary for those people who have lack of opportunities to access cleaner and greener energy and who are living in the rural areas and have no connections with the grid. In 2009, it has been estimated that more than 1.4 billion people of the total population in the world have no way to access to electricity, and eighty- five percent of them are from countryside (IEA, 2010). Such as installation of solar (PV) which is the attractive form of fulfilling very basic energy needs on one hand and on the other hand, hydropower and bio-energy account for meeting greater local energy demand.

(III): Enhance Energy Security: According to Kruyt et al. (2009), "There is no acceptable meaning of defining the term energy security because it can be defined based on context". However, the word Energy Security can be defined as to ensure the provision of energy over the period of time without the influence of any distraction. Here, there are two meaning of explaining the term energy security: one is the efficient allocation and readily available of energy resources, and another is reliability and variability of energy supply.

Now-a-days, countries around the world face the challenges of ensuring sustainable supply of energy because it has the strong correlation between energy consumption and economic growth. Higher energy demand associated with worldwide higher economic growth increasingly which create pressure on the existing energy resources and also expands the gap between energy supply and demand in each sector and this gap creates the tension.

The other critical issue regarding higher energy demand is that the dependency on fossil fuels energy increases at an unexpected level. If current energy demand is continuously fulfill by only fossil fuels, the existing fossil fuels reserves will be exhausted more rapidly, and that situation will be harmful for our present and future generation. This growing concern about the potential for the scarcity and limited availability of future energy resources of fossil fuels permits nations for a transition to a more sustainable green energy system. Green energy which is extracted from nature, therefore, is more reliable and available. It provides energy security by way of expanding the options of energy supply and reducing the usage of fossil fuels energy.

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(IV): Better Environmental Quality and Mitigating Climate Change: Mitigating the impact of climate change and improve the quality of environment is the crucial factor for the emergence of increasing demand for green energy system. Recently, policymakers have come to the conclusion that if no action is taken to combat global climate change, the impact of climate change on environment will be life -changing and uncontrollable. On the other hand, conserving environment from the harmful effects of climate change is the major issues of sustainable development.

COP 21 which was held in December 2015 in the United Nations Framework Convention on Climate Change (UNFCCC) was considered as a milestone for the increasing worldwide effort to mitigate the impact of climate change and to reduce the adverse effects of global temperature by limiting on an average 2°C at the end of the period 2030 (UNFCC 2010). In the Conference, governments from around the world were requested to submit their set of targets and policy strategies in order to limit global temperature which is continuously increasing.

After assessment of each countries target and policy strategy, it seems that the deployment of green energy is a key pillar for mitigating the impact of climate change. In addition, green energy has significant impact of reducing air pollution and health hazards. For example, traditional energy seriously affects health and environment by the discharge of carbon dioxide (CO_2) emission and other pollutions. Long term experiences of such pollution can contribute to severe health related diseases. In this case, non- explosive based green energy is able to produce very less amount of pollution compared to the fossil fuels as well as conserve the factors that affect sustainable development.

Section (IV)- Barriers to Green Energy Deployment in a Sustainable Development Context: Explaining green energy strategies in the perspective of sustainable development include all the issues of sustainability, such as environmental, social and economic. This interdependence among the variables implies that the task to form green energy strategy is not easy because there are some barriers to green energy deployment, and those barriers are rooted in the specific social, economic, and environmental perspectives that have been described below:

* Economic Barriers: The assessment of the economic barriers to green energy requires explicit social costs benefits analysis. Social benefits conclude that the lower supply of goods is associated with lower price whereas social costs are damage costs. Since the consumers do not bear the full costs so the demand for the harmful activities will increase with the increase of economic activities. Therefore, economic barriers towards the deployment of green energy can come as: (i) Shortage of investment for the adaptation of green energy technologies (ii) Minimize environmental shocks (iii) High investment cost, especially for developing countries (iv) Uncertainty of future energy prices and (v) Financial risks.

* Informational and Awareness Barrier: These barriers arise due to lack of in depth data on green energy sources, lack of skilled human resources, and lack of technical how-to-know, etc. For instance, how much energy would be generated by the Wind turbine, depends on wind speed and also on other related factors. Although national scale data on wind may be available but at the local scale area specific data on wind is unavailable in most of the cases.

Similarly, in case of Solar, there is no availability of reliable data on solar radiation. As a result, it is difficult to estimate the produced output from the solar power as well as from the return on investment. For Geothermal, the problem lies in the case of proper making out of the basin. Such unavailability of data visualize as the key obstacles for the development of Green energy. Moreover, successful implementation of green energy system depends on skilled human resources with specific training (Martinot 1998). Moreover, there is a lack of opportunities for training workforce that is a major barrier for the developing countries.

* Socio-Cultural Barriers: Currently, green energy as environmental-friendly energy has gained support from the general public. Socio-cultural barriers are strongly linked with general and individual values and norms. Such standards (values & norms) play crucial role in determining the society's acceptance and perception regarding the deployment of green energy technologies that have impacts on distribution of resources (GNESD 2007b; Sovacool 2009; West et al. 2010). Lastly, social acceptance plays an important role for the successful implementation of green energy system in the context of sustainable development.

* Market Barriers: Successful implementation of green energy system also depends on market structure. If the market structure has the features of monopoly market, there exist institutional barriers (Besant-Jones 2006). Energy industry in a number of countries has encountered a small number of competitors. As a result, highly centralized system is developed associated with fewer participating organizations. Such system which dominates the production, distribution, and transmission process implies that it is difficult to adapt green energy system at a larger scale. So, we can say that a modification of market structure is required at a priority basis for the successful transition towards green energy system.

Section (V)- Current Status of Green Energy in World Scenario: In the future, it is aimed that the main energy

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sources will become new and renewable energies. While the fossil fuels are inevitably running out, renewable sources will be more important. They are effective in many areas such as continuous cost reductions, generating jobs, developing future industries and meeting energy and environmental targets. In the longer term, if the investments in the renewable technologies continue, renewable will have the potential to make significant contributions to energy needs. The largest market share and the most of advanced renewable energy technologies belong to the leading developed countries such as the USA, Japan and The Europe.

The development and use of renewable energy will improve the energy security, environment, economy, mechanical manufacturing, construction, transportation, and industry and also help to create new jobs. Energies of solar, wind and biomass can meet local energy demands and assist to improve the environmental protection. Current situation related to the energy demand encourages a broad market for renewable energy. As predicted, the share of renewable in meeting global energy demand will grow to reach 12.4% in 2023.

Fossil fuels are still maintaining the largest portion of energy consumption and keep on their increasing trend all over the world. In this situation, environmental pollution is somehow inevitable, whereas the renewable energy plants do not contribute directly. The share of fossil fuels in total primary energy supply is expected to include around 81% of total in 2023. By 2050, renewable energy will approximately account for 30% of energy structure in the world. It is estimated that more than 35 million European homes and 1 million American homes are currently using Green Certificates that symbolizes their use of Green Energy. Ultimately, green energy is clean energy.

Section (VI)- Policy Strategies for a Green Sustainable Energy Future: In future, for dealing with sustainable energy, the mandatory fact is to develop sustainable green energy strategies. Notably, to increase the adequate supply of green energy, the following strategies should be undertaken by both the developed and developing countries: (i) Making stronger obligation to green Energy; (ii) Organizational support to green Energy; (iii) Institutional and technical support to green energy; (iv) Publicizing of the importance of green energy for achieving sustainable development goals; (v) Increasing National and International Collaboration.

Expansion of green energy market can be accelerated by providing price signals (Sen and Ganguly 2017). Such price signals that take in externalities which consist of environmental and human health related problems. Therefore, the initial task is to set the targets of green energy, and the next task is to choose the devoted policies to implement the target. This setup will provide strong market signal and illustrates government responsibility to the green energy development.

Complementary measures can also be taken to reduce subsidies on fossil fuels and pricing externalities based on country's local condition (UNEP et al. 2015). As such devoted policy framework is able to generate sustainable investment environment that can stimulate the deployment of green energy and reduce barriers to green energy expansion in the perspective of sustainability.

According to Dincer (1999), "For achieving the sustainable development goals, energy is considered as foundation". This indicates that development is not possible without energy whereas sustainable development will not be possible without the deployment of environmentally sustainable modern energy services. It is obvious that, cost-effective and stable energy can help not only to meet the sustainable development goals, namely affordable and clean energy but also meet other goals of SDGs i.e. bringing welfare for the people, reducing inequalities, creating new employment opportunities, reducing poverty, sustainable cities and communities and mitigating climate change.

Furthermore, initiatives, such as Common initiatives can lower the cost of deployment of green energy worldwide. It can increases financial and technical assistance, increase economics of scale, and stimulate trade domestically and internationally (Sen and Ganguly 2017). Numerous benefits can be obtained by the countries who are participating in the common initiative. They are given below:

* Deployment of Green Energy requires large amount of investment that is difficult to finance for a single country. By collaborating with others, country can reduce the problems of financial deficiency.
* Acting as a joint market can make negotiations with other partner countries, reducing further the costs of deployment green energy.
* Enjoyment of the opportunities of sharing human and technological resources, which are essential factors for producing green energy from the renewable sources.

In this context, it can says that global collaboration could serve as an effective platform for sharing technological knowledge and the best practice for expanding green energy markets. By taking into account the benefits of global collaboration, governments of each country should be engaged in closed collaboration with each other.

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Section (VII)- Conclusion and Suggestions: It is obvious that the role of Green Energy for a sustainable energy in future is unavoidable. The leading component that determines the importance of green energy is energy demand. With the purpose of meeting energy demand, countries around the world have taken initiatives to produce green energy from the natural sources like hydraulic, solar power, wind, tidal wave, geothermal, biogas and biomass, etc. Countries will be able to obtain the sustainable development when green energy is abundantly produced.

The huge supply of green energy can help the country by providing a more sustainable energy in future, increasing the energy security for its entire people, reducing the negative impacts on human and environment and minimise conflicts among nation's regarding energy reserves. Therefore, for conserving global sustainability, it is compulsory to decrease the use of energy that is generated from the fossil fuels and substitute it by green energy. The role of green energy for reducing global crisis and obtaining sustainability, transition towards green energy should be encouraged.

Sustainable Energy Development Strategies typically involve three major technological changes: energy savings on the demand side, efficiency improvements in the energy production, and replacement of fossil fuels by various sources of renewable energy. Consequently, large-scale renewable energy implementation plans must include strategies of how to integrate the renewable sources in coherent energy systems influenced by energy savings and efficiency measures.

Although some of the developed countries have been successful on implementing green energy system, while for developing countries technical and financial aspects are considered the key barriers to implement the system. However, there is lack of technical and institutional knowledge regarding how the country will move from traditional energy technologies to modern environmental friendly green technologies. It is urgently needed to adopt the appropriate policies for developing green energy strategies for sustainable future. This calls for immediate action by all nations.

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