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## ***Clean And Sustainable Energy For Our Clean And Better Future***

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### ***ABSTRACT***

*This research examines the need of energy/electricity is a need or considered as a human right in the present scenario as the need for electricity is increasing due the new launch of electric vehicles which provide for a greener environment and user friendly. The rate of dependency towards the non-renewable sources for the generation of electricity and the rate of exhaustion. The rate of shortage faced by the people and the adverse impact of use of non- renewable sources on the environment. The various international conventions which are promoting the sustainable development through the renewable resources and the measures taken by the member countries specifically India towards the same. The types of renewable sources of energy especially solar energy, wind energy, tidal energy, hydro- electric energy, bio energy. How to make this energy affordable to the people of the society, the role of the concerned government in reaching the public and to make transition from non- renewable to renewable sources for the energy generation at large. This research also tries create awareness among the public and to protect and preserve the same for the future generation. Other eco- friendly initiatives taken up by the private organizations or he NGOs or private entities as apart of CSR initiative towards sustainable development. Ultimately this research tries to provide insights to the Ministry of Power and stakeholders to implement plans or schemes towards the implementation of the SDG. The duty of the concerned government to encourage the entities involved in the production of electricity through the clean energy and to provide incentives for the same. To encourage Private Public Partnership in the production and distribution of solar equipment. To plan towards the generation and transmission within the country. Also suggests for the need for the Energy Storage Systems in solar energy, making it more affordable, available and accessible to the public. The various solar products that are available to the public for the domestic purposes which in order create a cleaner environment by reducing the dependency on the renewable sources in the generation of energy.*

*Keywords: Solar thermal technology, storage system, sustainable development, wind farm, renewable energy.*

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### **UNDERSTANDING CLEAN ENERGY AND ITS NEED IN THE PRESENT SCENARIO:**

Meaning- Clean Energy is the method used in the generation of energy in which there is no emission of any harmful effluents and is eco-friendly in nature.

The United Nations Framework Convention on Climate Change, 1992 which was held at Rio de Janeiro which aimed at protecting the climate for the present and future generation. Its objective was to reduce the dangerous anthropogenic interference. The Article 3 of this convention talks about the responsibility of the state for taking preventive measures to reduce the climate change and also gives the right to sustainable development to the parties of the convention. In the year 1992, an Inter-Agency Committee on Sustainable Development was formed for co-operation between the UN bodies and the environment protection and in the same year the UNFCCC (United Nations Framework Convention on Climate Change) was established. The Climate Change Conference, COP 26 held at Glasgow UK, 2021 also tried to implement the Paris Agreement through promoting Sustainable Development.<sup>2</sup>

Clean energy like solar energy, wind energy and others have key role to play in promoting sustainable development, there is zero emission of greenhouse gases and to overcome the shortage in the supply of electricity. Usually in the generation of the electricity is mainly by burning the coal and fossil fuels which emits high percentage of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>) and carbon monoxide (CO) which has led to global warming. Nearly 80% of the generation of energy is using the fossil fuels which leads to climate change and global warming. This has led to increasing number of deaths at early ages, asthma, respiratory disorders and other diseases. Shortage of electricity hinders the development of the nation, the rapid industrialisation which affects the productivity of the industries which in turn affects the economy of the country and reduces the FDI in a developing country like India.

The rise in the price of electricity and the rate of dependency in the present scenario has an immediate need for switching to the affordable and renewable sources which will in turn reduce the

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<sup>2</sup> <https://www.un.org/en/climatechange/cop26>



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cost of generation and also the transmission to the public making it affordable to all. Not only in India even the developed countries like U.S are facing this challenge relating to shortage of electricity and the increase in the retail price of electricity by the regulatory authorities.<sup>3</sup>

Lack of energy restrict the development as it makes the daily tasks, it makes it impossible as we are totally dependent on this form of energy. We ourselves can imagine the day without electricity the entire day's work will come into stake hence, not wrong if said that 'RIGHT TO ENERGY IS A BASIC HUMAN RIGHT IN THE PRESENT CONTEXT.' And it is the need of the hour to swich towards green energy for our better future before we become extinct.

### **TYPES OF CLEAN ENERGY:**

- SOLAR ENERGY.
- WIND ENERGY.
- BIO ENERGY.
- TIDAL ENERGY.
- HYDRO-ELECTRIC ENERGY.
- GEOTHERMAL ENERGY.

### **SOLAR ENERGY:**

As the result of various conventions and reaching the sustainable development goal, many countries have come forward with an intension to reduce the dependency on the coal or fossil fuel sources for the generation of electricity. Under article 21 of the Indian constitution the right to live in a healthy environment has been guaranteed, which also states about the pollution free environment through the various land mark judgements of the Hon'ble Supreme Court and High Courts. **Solar energy is obtained from the sun directly which is plentiful, cheaper and environment friendly.**

On 31<sup>st</sup> march 2024 in the 5 states of India that is Karnataka, Tamil Nadu, Rajasthan, Maharashtra and Andhra Pradesh contributed for 70.76% of the country's solar power installation. Solar power had a share of 56.95% under the renewable sources of energy.<sup>4</sup>

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<sup>3</sup> [https://fraser.stlouisfed.org/files/docs/historical/frbsf/frbsf\\_let/frbsf\\_let\\_20010420.pdf](https://fraser.stlouisfed.org/files/docs/historical/frbsf/frbsf_let/frbsf_let_20010420.pdf)

<sup>4</sup> <https://mnre.gov.in/renewable-energy-statistics/>

Solar energy will not run out as long as the sun shines, like other non-renewable resources as the fossil fuels are in the verge of getting extinct, it is the one-time investment to the people for domestic purpose at their household by installing the solar panels, which in return reduces the electricity bill. Low maintenance cost and has long life span for more than 20 years. This also creates various job opportunities and contributes to the economy of the nation. The solar energy does not require any form of fuels like kerosene or diesel as it happens in the generators and hence, has low operational costs. This is one of the most evolving sectors in the field of innovation.

### **Solar products:**

There are mainly 2 ways for generating energy from sun that is from Photovoltaic (PV) and Concentrating Solar Thermal (CST) or also known as concentrating solar power (CSP).

PV converts the sunlight directly into electricity and can be seen in many household devices. Apart from these there is solar drip irrigation system where it reduces the dependency over the electric grid system and reduces the operational cost to the farmers, also reduces the use of fertilisers and is water saving. There are soil moisture sensors which will send the intimation for the water requirement and provides the requisite amount of water. With the help of the solar panel the water is drawn from the nearby stream and the same is transmitted to the water storage tank and from where the water is distributed to the entire agricultural fields.

Solar thermal energy- which is used for the largescale production of energy where with the help of the solar panels the solar rays will be collected which will be used to for heating a liquid and there is indirect generation of electricity.

Solar PV- the major drawback is that it is limited to the daytime and to the weather, it fluctuates based in the weather conditions which is considered as a major disadvantage and people refuse to opt solar devices, adding a better storage system will be a great solution to the people's hinderance. At present the solar batteries hold the charge for nearly 5 days, which is not sufficient as during the rainy or cloudy weather which lasts for 6-9 minimum days or more, the rate of tariff imposed by the government on the solar power is 12% of the GST on goods and 5% on the services and no exemption is being provided for the same which discourages not only the people to invest in solar powered products but also to the businessmen to take up this sort of products either for the production or for the distribution related matters.

Solar thermal technologies- It can be used for either residential or commercial purpose. It can be

further classified into low, medium, or high temperature collectors. The low- temperature collectors are used for smaller non-intensive requirements, medium- temperature collectors are used for heating waters for residential or commercial purposes and high temperature collectors for electric power production.

The Integrated Energy Policy Report, 2006 stated the need of India to increase the level of production of electricity by 5- 6 times in order to meet the per capita consumption. The Godavari Green Energy Ltd (GGEL) which was established in the year 2009, it is the nation's first solar thermal power plant, it generates almost 118000 MW hours per year, one of the major challenges is to reduce the auxiliary power reduction, power consumption during the non-generating hours.<sup>5</sup>

Solar Thermal Integration is one of the best methods for adding energy to the existing primary power plants. The MNRE-GEF-UNIDO project which is driven by the solar support initiative under the Jawaharlal Nehru National Solar Mission (JNNSM), which promotes CST and promotes investment in the renewable sources. The primary stake holders is the Ministry of New and Renewable Energy, Government of India, Micro, Small and Medium Enterprises (MSMEs), Indian Renewable Energy Development Agency (IREDA), industrial unit owners (end beneficiaries), CST manufacturers, designers, installers, training institutes, energy professionals, and service providers.

Innovative loan schemes are been provided by the United Nation Industrial Development Organization (UNIDO) with IREDA. Also tried to provide incentives for CST installation which include the Central Financial Assistance at 30% to the benchmark solar project cost and tax benefit from the Government of India up to 80%.

India's electricity sector- the 100 GW solar energy target set up under the Jawaharlal Nehru National Solar Mission comprises of 40 GW as solar rooftop installations and 60 GW as large and medium scale grid connected projects. India is the fifth highest investing country in the renewable energy.<sup>6</sup>

### **WIND ENERGY:**

Wind energy is an indirect form of solar energy. The wind mills can be installed either on shore or

<sup>5</sup> <https://www.undp.org/sites/g/files/zskgke326/files/migration/in/Sun-Focus-oct-dec-2016.pdf>

<sup>6</sup> <https://mnre.gov.in/solar/>

off shore, off shore installation is expensive when compared to on shore, as there is need for more stronger and consistent wind to provide reliable energy.it also depend on how much the wind is blowing. It manufactures about 15000MW per annum, India is currently the fourth largest wind installed capacity in the world.

The government is promoting the wind power projects through the private sector investments. Extensive research on the Wind Resource Assessment is essential for selecting the areas with the high level of wind, the National Institute of Wind Energy has installed over 900 wind monitoring stations. Facilities Offshore Wind Energy in India which was implemented in the year 2013 in consortium with Global Wind Energy Council (GWEC) which is supported by European Union for the Off shore wind power development.

For the standards specified in the manufacturing of the wind mills is provided in the Internationally Accredited Certification Body the certification is mandatory. The utilization of these energy reduces the cost of electricity. The hybrid wind energy not only generates the electricity but also stores the energy rather than wasting the energy. It's also helps in the long-distance transmission from one place to another. It is the most efficient form of energy generation after the solar energy. The major problem is the locating for the installation of the wind mills, the planning for the wind farms to be made after the thorough study of the wind flow. Other associated problems are the shortage of place for the installation in the developing countries like India. China has occupied 1<sup>st</sup> place in the installation of wind energy and this energy reduces the dependency on the fossil fuel, there is zero emission of carbon.

## **WIND FARMS**

Wind energy plays a pivotal role in India in shifting towards a cleaner energy. It acts like a power plant. It is the assemblage of multiple number of wind mills for the purpose of generating the electricity, but shall consist of more than 3 wind mills in a particular farm after conducting the Environment Assessment Impact. This relates to creation of job opportunities in this field and land can be leased out to agencies who are willing to install the wind mills. It can be mostly seen in remote areas. These wind mills have a longer span and incur a huge investment and the maintenance cost is very low, running cost is very little. The Alta Wind Energy Centre is the largest wind farm in the world and is situated Los Vientos in South Texas in the U.S.A and produces nearly 900 MW.

The government of India is trying to promote the wind energy through the private companies intervention also providing several fiscal and financial incentives such as Accelerated Depreciation benefit; concessional custom duty exemption on certain components of wind electric generators.

- The Revised List of Models & Manufacturers is the list of type and quality certified wind turbine models eligible for installation in the country in order to facilitate the investors, developers.<sup>7</sup>
- Concessional Custom Duty Exemption Certificate- in order to facilitate the quality of wind turbines and its safety. Even the imported products need to adhere these standards<sup>8</sup>.
- The Wind Turbine Generator technology has evolved and state-of-the-art technologies are available in the country for the manufacture of wind turbines. Around 70-80% indigenisation has been achieved with strong domestic manufacturing in the wind sector. All the major global players in this field have their presence in the country with more than 12 different companies, through (i) joint ventures under licensed production (ii) subsidiaries of foreign companies, and (iii) Indian companies with their own technology. The unit size of machines has gone up to 5.2 MW. The current annual production capacity of domestic wind turbines is about 15000 MW.

### **NATIONAL INSTITUTE OF WIND ENERGY**

This Institute is only meant for the wind energy technology, established in 1998. It provides all the kinds of assistance relating to the wind turbine technology and works towards its project. It is one of the research organisations in Asia. Also tries to provides solutions to the difficulties and stives towards the improvement. The aim of National Institute of Wind Energy under its WRA division is to locate wind rich sites in the country through data analysis for the development of wind energy utilization.<sup>9</sup>

Major wind mills are found in the state in Karnataka, Gujarat, Maharashtra and Tamil Nadu of INDIA.

**STORAGE SYSTEM-** Due to the fluctuations based on the geographical area and other environmental aspects, wind energy can never be a primary source for energy generation but the

<sup>7</sup> <https://mnre.gov.in/wind-manufacturing/>

<sup>8</sup> <https://ccdcwind.gov.in/>

<sup>9</sup> [https://niwe.res.in/staff\\_profile\\_dg.php](https://niwe.res.in/staff_profile_dg.php)



necessity of research in the storage system is still a debateable issue. When there is overgeneration due to the climatic condition the same can be stored for future purpose and the same can be mitigate the power fluctuations. There are mainly four types of storage systems available, they are;

- 1. The storages are Compressed Air Energy Storage system (CAES),**
- 2. Superconducting Magnetic Energy Storage system (SMES),**
- 3. Flywheel Energy Storage System (FESS) and**
- 4. Hydrogen Energy Storage System (HESS).**

The investment cost in these storage system needs to be reduced in order to promote clean environment.

### **BIO ENERGY:**

**Biomass is an organic renewable energy source that includes materials such as agriculture and forest residues, energy crops, and algae. Scientists and engineers at the Energy Department and National Laboratories are finding new, more efficient ways to convert biomass into biofuels that can take the place of conventional fuels like gasoline, diesel, and jet fuel.<sup>10</sup>**

In Rome on July 20<sup>th</sup> 2024 gave a call for the implementation of the Bio Energy for the sustainable development. Endorsed by the Food and Agriculture Organization of the United Nations (FAO), GBEP, Clean Energy Ministerial Bio future Platform Initiative, International Energy Agency (IEA), IEA Bioenergy Technology Collaboration Programme, International Renewable Energy Agency (IRENA), United Nations Economic Commission for Europe (UNECE), and United Nations Industrial Development Organization (UNIDO), the statement outlines the many benefits of sustainable bioenergy, including fostering inclusive and just energy transitions, enhancing energy security and rural development, and boosting agricultural productivity and job creation.<sup>11</sup>

Nearly 1 billion tons of biomass can produce

- 50 billion gallons of bio fuels,
- yield 50 billion pounds of bio-based chemicals and bio products,
- generate 85 billion kilo watts – hours of electricity to power 7 million households,
- can contribute 1.1 million jobs.

<sup>10</sup> <https://www.energy.gov/eere/bioenergy/bioenergy>

<sup>11</sup> <https://www.unido.org/news/sustainable-bioenergy-key-achieving-climate-and-development-goals-says-un-and-international-organizations>.



Initially the Biogas plants were developed from the cattle dung. Due to the technology development now, Biomass is mainly derived from plant and algae-based materials which usually includes crop wastes, forest residues, purpose grown grasses, woody energy crops, micro algae, urban wood waste, food waste. It can be converted into liquid transportation fuels which are equal to fossil-based fuels. Bio fuels can be used in airplanes and other types of vehicles.

There are three ways to harvest the energy stored in bio mass to produce bio power;

1. Burning.
2. Decay.
3. Conversion to gas.

It can also be used in manufacturing products like plastics, lubricants, industrial chemicals and other things.<sup>12</sup>

With the availability of large number of wastes, generation of energy through these sources is an excellent solution for mitigating the need of energy. In India there are mainly 3 schemes;

- Waste to Energy Programme- from the urban, industrial and agricultural wastes.
- Biomass Programme- To support the manufacturing of briquettes and pellets.
- Biogas Programme.

The biogas plants costs around rupees 9,800/- - 70,400/- per plant based on the size of the plant. (1-25 cubic meter per day). The citizens of India can avail Central Financial Assistance for the same on reimbursement basis after the full construction and commissioning of the plant.

A separate scheme has been having been made with an intention to set up Biomass Briquette/ Pellet and to support the Biomass manufacturing plants and financial assistance is being provided for the same by the Indian government.

Where a Briquette / Pellet Manufacturing plant – 9 lakhs per metric ton/ hour. There is a separate portal BioUrja portal developed for the purpose of availing the Central Financial Assistance to convert the waste to energy projects.

**BIOMASS STORAGE SYSTEM** – it is the most challenging aspect; it offers the opportunity minimise the seasonal variation in the availability of the Biomass. The dry storage system is one the solution for providing for storing it for a longer period of time. The Biomass stored in dry system are susceptible to microbial degradation, there is a necessity to create a physical

<sup>12</sup> <https://www.energy.gov/eere/bioenergy/bioenergy-basics>

barrier.

Wet storage system is an alternative to the dry storage and has been successful method for the storing of the biomass. There is also potential to shift the focus of long-term storage from a cost centre to a value-added operation such that bioconversion, energy balances, and sustainability are positively impacted. Securing the storage operation of the feedstock logistics and supply chain will be a key component to making the bioeconomy a reality.<sup>13</sup>

### **TIDAL ENERGY:**

**Tides are regular and predictable changes in the height of the ocean, driven by gravitational and rotational forces between the Earth, Moon, and Sun, combined with centrifugal and inertial forces.<sup>14</sup>**

It is a renewable energy source that can be used to generate electricity from the natural rise and fall of tides. Tidal Power can be harnessed through a barrage or through submerged tidal turbines. Tidal barrages involve the use of a dam, the sluice gates on the barrage allow the tidal basins to fill on the incoming high tides and empty through the turbine system on the outgoing tide. The global tidal energy resource is estimated to be 3,000 Gwa by the World Offshore Renewable Energy Report. The Tidal energy is being harnessed by using large barrages in the areas experiencing high tidal ranges. The Sihwa Lake Tidal Power Station is the largest tidal power barrage which is situated in the Republic of Korea, which is in operation since 2011 August.

India having coastal line approximately 7,500 kilometres, in which the Gulf of Khambhat also known as the Gulf of Cambay and Gulf of Katch are the two most powerful tidal energy generators in India. Around only 20 areas in the world get the high tides. Indian government has collaborated with France and United Kingdom for the purpose of sharing of knowledge and expertise in this field. These tidal projects need to be set up with great caution as it may affect the marine life. Environment impact plays a very crucial role in setting up the tidal energy.

The sum incurred in the production of ocean energy is equivalent to the source of buying electrical energy from the conventional method, hence many of the countries have very much limited polices towards tidal energy.

### **CHALLENGES**

- Irregular supply of energy due to the weather conditions and lack of storage capacity.
- The cost of capital investment is very high and even the cost of maintenance and

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<sup>13</sup> <https://www.frontiersin.org/journals/bioengineering-and-biotechnology/articles/10.3389/fbioe.2020.00370/full>

<sup>14</sup> [https://www.un.org/depts/los/global\\_reporting/WOA\\_RPROC/Chapter\\_22.pdf](https://www.un.org/depts/los/global_reporting/WOA_RPROC/Chapter_22.pdf)

operation does not support the economy of developing countries.

- The conventional tidal turbines are more harmful to the marine life.
- Limited to very few locations.
- The tidal barrages may affect the tidal level and may cause flood, effecting marine life.
- Barrages effect the fish migration.
- Construction is very expensive.
- Tidal energy depends on the tidal current.
- It is only accessible to few locals.

In India few coastal regions have a great potential in developing electricity through tidal energy system and the present condition requires to switch to these methods of electricity generation.

### **HYDRO ELECTRIC ENERGY:**

Hydropower currently is the largest source of renewable energy in the electricity sector. It relies on generally stable rainfall patterns, and can be negatively impacted by climate-induced droughts or changes to ecosystems which impact rainfall patterns.<sup>15</sup>

Hydropower till accounts for 70% of the world's renewable generation capacity, a proportion that rises to more than 80% in Latin America, according to the International Renewable Energy Agency (IRENA). So the sector has a key role to play in the implementation of the Paris Agreement.

Hydropower holds a double relationship with climate change. On the one hand, it contributes to the avoidance of greenhouse gas emissions from the burning of fossil fuels. On the other, water availability and hydropower generation are likely to be affected by changing rainfall patterns, which can reduce the flow of rivers.<sup>16</sup>

The Hydro Power projects can be classified into small and large hydro projects based on their sizes. In India the Hydro Power plant capacity of 25 MW or below can be classified as Small Hydro Power. The estimated potential is 21133 MW from 7133 sites across India. Small Hydro Power projects are environmentally friendly as they do not require large scale deforestation of forests or displacement of human settlements. This also leads to large employment opportunities to the people for the purpose of operation and maintenance. The Hydel projects

<sup>15</sup> <https://www.un.org/en/climatechange/what-is-renewable-energy>

<sup>16</sup> <https://unfccc.int/news/how-hydropower-can-help-climate-action>

and Watermills can meet the power requirements in the remote areas, also help the small-scale industries by supporting them, these projects play very crucial role in India as it meets the criteria of sustainability, availability and reliability.

The Small Hydro Power projects are governed by the state policies, the decision of setting up these projects are done by the concerned state governments.<sup>17</sup>

There no specific schemes provided by the government of India for the Small Hydro Power projects which is one of the renewable sources of energy by providing any sort of financial assistance.

**Department of Hydro and Renewable Energy-***"An Academic Department of Excellence for education, research, development, training, and providing advisory services to provide key inputs for full realization of renewable energy potential and environmental management"*<sup>18</sup>

The generation of power does not depend on the climatic condition and has positive impact on the climate, it promotes the price stability as it is not subject to market fluctuations. These projects lead to the reduction in the demand for power.

The development of a significant energy storage capacity is the need of the hour for the development of the renewable energy sources.

The European Union is carrying out the Climate and Energy policy, one of the goals is to study in-depth the advantages of the storage system, one of the drawbacks of Pumped Hydro Energy Storage is non-availability of suitable locations for the constructions of power plants.

### **GEO-THERMAL ENERGY:**

**It is the energy that is generated from the heat that is generated from the hot rocks within the earth, which generates the steam and pressure, this steam is used to run the turbines and produce the electricity.**

Geothermal energy is a form of renewable energy that harnesses the Earth's internal heat to generate electricity or provide heating and cooling. It is a clean and sustainable energy source that can be used in various residential, commercial, and industrial applications.<sup>19</sup>

The heat is used to generate electricity, it is a reliable and consistent energy source, as the earth is constantly producing the heat. It is also a clean and environmentally friendly causing no air pollution or greenhouse gas emission.

The Geological Survey of India has carried out exploration of geothermal energy in various geothermal fields. GSI has identified 381 areas across India in its report titled 'Geothermal Atlas of India, 2022'. A 10,600 MW of geothermal power has been estimated in India.

<sup>17</sup> <https://mnre.gov.in/POLICIES/>

<sup>18</sup> <https://iitr.ac.in/Departments/Hydro%20and%20Renewable%20Energy%20Department/About%20Us/About%20Us.html>

<sup>19</sup> <https://unece.org/sustainable-energy/sustainable-resource-management/unfc-and-geothermal-energy>



Singareni Collieries Company Ltd has commissioned a 20 KW pilot geothermal power plant in Manuguru area of Bhadradi Kothagudem district in Telangana.

No specific budget has been allocated towards in geothermal energy by the Ministry of New and Renewable Energy. India has signed MoU with Saudi Arabia in 2019 for identification of Geothermal area. The MNRE provides for 100% financial support to the Government, non-profit research organization and up to 70% to the industries, startups, private institutions, entrepreneurs, and manufacturing units under Renewable Energy Research and Technology Development Programme, including for geothermal energy R&D projects.

India's first Geothermal energy project is located at Ladakh where a Memorandum of Understanding was signed by the ONGC Energy Centre with the Union Territory of Ladakh. Geothermal power plants have the average ability of 90% as compared to 75% for coal plants. There are 7 geothermal provinces in India. These resources have been mapped by the Geological Survey of India.<sup>20</sup>

### **CONCLUSION:**

The major challenge for the people to adopt to the renewable sources is its depends on the climatic condition or the reason it is area specific in nature. Research in the field of storage systems especially in solar panels will encourage the people to shift towards adopting solar energy in their day to day lives, as it is one of the energy sources where the common people can adopt rather than other energy sources which needs huge investments or occupies large area.

The other energy sources like wind energy, tidal energy, geothermal energy, hydro electric energy requires the intervention of the concerned state government along with the help of private companies through public-private partnership for the effective implementation. Again, the need for the research and development in the storage system is the need of the hour, when there is over production of energy, there is need to storing the same for the future purpose rather than wasting the same, which also bring reduction in the price of electricity to the general public.

Lack of incentives on the part of government in support of clean energy discourages the people from adopting to renewable sources of energy. Solar energy is one the form where the people can adopt towards promoting sustainable development –solar water heater, solar panels, solar lights, etc. The concerned government can start promoting solar energy through solar street

<sup>20</sup> <https://indbiz.gov.in/indias-first-geothermal-energy-project-an-ongc-initiative-to-put-india-on-the-world-map/>

lights rather than the regular street lights.

The concerned departments owe the duty of promoting the renewable sources of energy, which involves creating awareness by making public appearances. People forget that environment is the most important aspect, while others come afterwards, in the present scenario least importance is given to the environment. This paper tries to bring all the renewable sources of energy and the efforts made by the Indian government through the Ministry of New and Renewable Energy in bringing sustainable development by promoting clean and renewable sources of energy for the better future of us.

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