RENEWABLE ENERGY: SOURCES AND THE LAWS

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Abstract

In a rapidly developing country like India the need for energy consumption is rising steadily. Total dependence on fossil fuel is not feasible as the demand for fossil fuel like oil and coal will soon exceed the supply. It will also become very expensive which the common man will not be able to afford. India has a vast potential for renewable resources like biogas, biomass, solar energy, wind energy, hydro energy etc. This paper would like to study the efficacy of the law in tapping the renewable energy sources and finding out whether it will be able to meet the needs of the growing populace under the existing norms and during the period of vast urbanization.

Keywords: *Renewable Energy, Energy Laws, Biomass and Biogas, Solar Energy, Wind Energy, Urbanization and Energy Needs*

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INTRODUCTION

India is a developing country with a huge appetite for energy. It is the fourth largest energy consumer in the world (Pawar and Kaur, 2014). Most of the energy needs are satiated by importing fossil fuels like petrol, gas, oil and coal. With the soaring prices of petroleum crude it's become imperative for India to shift to more affordable sources. Indian cities are choking with exhaust fumes and hence for its populace to be able to breathe India has to think of clean energy resources like sun, wind, biogas, biomass etc. Municipal solid waste, biomass and ethanol are important untapped renewable resources. The Minister for State (Independent Charge) for Petroleum and Natural Gas, Dharmendra Pradhan, (2016) said that renewable energy is clean and can supplement fossil fuels like coal and petroleum. It is also derived from resources that are regenerative and do not get exhausted as they are replenished and in doing so reduces carbon emissions and increase economic development (Kumar, Kumar, Kaushik, Sharma, and Mishra, 2010). India so far is dependent on imports for nearly three fourths of its energy requirements but this should be reduced in any case. India has increased its power capacity from 1362 MW to over 112,058MW but it is not sufficient. India has taken major steps in electrifying villages but still 80,000 villages have not been electrified and nearly 44% of homes do not have access to electricity (Kumar and Meena, 2017).

India is committed to tackling climate change and must increase its renewable energy capacity to 175 GB by 2025 (Pradhan, 2016). If agricultural waste and urban waste is added to energy projects it will add one lakh crore to our economy. The waste to energy cycle will prevent pollution from burning biomass and the pollution hazard of dumping energy waste. Projects are being started to use municipal solid waste to energy. There is also a policy in place for ethanol-blending of petrol, biodiesel and to support ethanol production from agricultural waste.

In Delhi, Compressed Natural Gas is much preferred as fuel for mopeds, cars and buses to keep pollution under control. A beginning has been made but a lot needs to be done. With vast amounts of renewable energy resource available in India, it can achieve its target for energy with a significant contribution from renewable energy resources.

Renewable Energy Sources

Renewable energy sources are sources of energy that are constantly replaced by nature. They are not depleting any resources and do not cause harm to the environment as compared to fossil fuels. Fossil fuels don't replenish hence their supply is limited. Unlike the past, nowadays renewable energy collection and storage is competitively priced. The major types of energy sources are described below:

- *Solar Energy:* This is the most popular type of renewable energy which can be obtained from the sun. In a sunny country like India where the sun shines throughout the year except for the monsoon, sunlight can be trapped by using solar panels and convert it into electricity which can be used to power homes and business.

- *Wind Energy:* Wind blows form a place that is relatively cooler to the place that has heated up. Wind power can be captured using big turbines which produce electricity when they rotate. It is pollution free and wind farms are coming up at a faster rate.
- *Hydroelectricity:* Water is found in abundance in India and it can be harnessed to generate electricity. Running water rotates a turbine to produce electricity. This resource does not cause pollution and no emissions are generated. This source has an environmental impact as it can alter the course of a river, cause changes in water levels and habitats of fishes or tribes dependent on rivers.
- *Geo Thermal Energy:* Our planet Earth has heat energy trapped inside when it was formed. Radioactive degeneration is constantly taking place in the rocks deep down the surface of the Earth. Sometimes this energy is released in the form of volcanoes. This energy can be tapped by pumping water below the ground to the source to get it heated which rises in the form of vapour and drives turbines to generate electricity. Hot water can also be directly used to heat homes. In Iceland 90% of home heating is done with the help of geo thermal energy.
- *Bio Mass Energy:* Bio energy refers to energy coming from organic matter like plants and animals. It is a renewable resource as plants can be grown with energy from the sun. Other sources are wood, residue from agriculture and animal matter. Bio energy is said to be carbon neutral because they do not add to the carbon content of the atmosphere (Marsh, 2018). Whatever CO2 is released is utilized by the growing trees. Biomass is also used to produce Ethanol and Biodiesel which fuels cars and trucks.
- *Ocean Thermal Energy:* Ocean thermal energy conversion uses the temperature difference between the warm surface water and the cold water below 600meters to produce electricity. It's a vast renewable resource with a capacity of billions of watts of electric power and a tremendously vast sea as the collector.
- *Hydrogen Fuel Cell:* Electrical energy produced in a fuel cell by converting hydrogen containing fuels through the electrochemical reaction of hydrogen and oxygen gases into water. It is also known as reverse electrolysis. If Hydrogen is used as fuel there are no pollutants and the end result is water.
- *Tidal Energy:* Tides used to produce electrical power are known as tidal power. Tides are formed when moon attracts the seawater. When water changes height from high tide to low tide, power is harnessed. In the same manner fast currents flowing through channels can be harnessed.

EFFICACY OF THE LAW IN TAPPING ENERGY RESOURCES

India is the only country in the world to have a ministry for renewable energy development – MNES, the Ministry of Non-Conventional Energy Sources. It has the largest program in the world for renewable energy systems. India has taken the following administrative actions for the promotion of renewable energy.

- Formation of Electricity Regulatory Commission 1991
- Mandatory Environmental Audits for Power Projects 1992
- Energy Conservation Bill 2000
- Renewable Energy Promotion Bill 2005

Under the Electricity Act, 2003, the Central Government in consultation with the State Government is preparing national electricity policy and tariff policy for optimum utilization of resources including renewable sources of energy. It has the following sections:

- *Section 86 (1) (e):* The State Commission shall promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of distribution license.
- *Section 3 (1):* Government of India shall, from time to time, prepare the National Electricity Policy and Tariff Policy, in consultation with the State Governments for developing the power system based on optimal utilization of resources such as coal, natural gas, nuclear, hydro, and renewable sources of energy.
- *Section 4:* Government of India shall, after consultation with the State Governments prepare a National Policy permitting stand-alone systems (including those based on renewable sources of energy) for rural areas.

SATISFYING THE NEEDS OF THE GROWING POPULACE

The Ministry of New and Renewable Energy (MNRE) intends to increase clean power production to 175 GW by 2022. Many other countries are continually stepping up their efforts for clean energy. From wind turbine Denmark could generate 140 % of its electricity requirements on a windy day. Germany came close to running the country on wind and solar power for a day. Portugal could power the country for four and a half days using renewable energy. Costa Rica could power the country for 250 days using renewable energy. Many countries are aspiring for this goal and India certainly cannot reach it in the near future but rapid strides are being made in that direction. To reach the goal of 175 GW --- 100 GW targets solar energy. Our capacity now is 8 GW and we need to increase annual production by 15GW. India needs huge investments to the tune of US 100 billion dollars. The energy ministry is trying to attract domestic and foreign private investors. It has got commitment for $20 billion from Japans Softbank in partnership with Taiwan's Foxconn and India's Bharati Enterprises.

India is a vast country and 300 million people are without power and millions more with intermittent supply. To satisfy their energy demands public – private partnership funding is necessary. Government offers feed – in – tariffs (amount paid to individuals who generate clean energy) and a 10 year tax holiday for projects registered before April 1, 2017. All states compulsorily have to purchase a part of their energy from green sources. Sometimes the government cuts down on benefits which discourage investment.

The money collected from coal tax funds (NCEF) National Clean Energy Fund which is not utilized to the fullest only 40% was allocated to the fund.

Clean energy projects will be unsuccessful without a robust power grid. The head of Energy systems at Panasonic India said that 15 – 20 % of total renewable energy is wasted due to low

capacity of power grids. The making of a green energy corridor is necessary which could take up five years.

MNRE is solely focusing on solar energy but India has a large potential for wind energy so proportionately its production must be stepped up.

Energy plan for 2030 involves 850 GW of power from renewable but it amounts to only 40% of the total need for energy. The remaining energy is coming from coal as it is cheaper. India should give incentives for investing in renewable energy and also adopt cooperative model of investment for solar panels and set up wind farms. Rooftops could be rented by companies to produce solar power and then sell it to the grid and give the benefits to the house owners.

CONCLUSION

Taking into account that the Energy sector falls in the Concurrent List where cooperation from the states to the centre is necessary for implementation and execution of rules framed regarding renewable energy resources. The centre has taken adequate steps by forming a ministry to look over the affairs of the clean energy sector and with the drafting of the Energy Act 2015 it has laid out mandatory national targets. India has taken large strides and with the cooperation of the state governments it is not impossible to realize the dream of power for all by 2030 with 40% of energy needs being generated by renewable energy sources. India on the whole has huge potential only that it needs to be tapped and sustained. India should systematically plan to increase energy produced by renewable sources to have a clean environment.