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ANALYZING THE GROWTH OF RENEWABLE ENERGY SOURCES SUCH AS SOLAR AND WIND POWER, AND THEIR POTENTIAL TO MITIGATE CLIMATE CHANGE

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Abstract: Climate change has been identified as one of the greatest challenge by all the nations, government, business and citizens of the globe. The threats of climate change on our green planet 'Earth' demands that renewable energy share in the total energy generation and consumption should be substantially increased as a matter of urgency.
Keywords: Renewable energy, GHGs, Climate change, Carbon dioxide, mitigation

INTRODUCTION: Climate change has implications for both human and natural systems and could lead to significant changes in resource use production and economic activity. In response to the impact and possible affects of climate change international, regional, national and local initiatives are being developed and implemented to limit and mitigate GHGs concentration in the Earth's atmosphere. The global concern for sustainable development and climate change has brought concentration of energy policy makers towards the renewable energy sources since these provide energy, without emissions of greenhouse gases (GHGs) and are also abundant resource available for future. Climate change affects populations by changing basic life conditions, for example, food availability, and by causing habitat loss and fragmentation [2].

MATERIALS AND METHODS: Renewable energy refers to energy resources that occur naturally and repeatedly in environment and can be harnessed for human benefit. Examples of renewable energy systems include solar, wind, hydro and geothermal energy (getting energy from the heat in Earth). Biomass, rivers, and even garbage (waste generated) are also source to renewable energy.

A wide range of climatic change impacts are observed, for instances, greater frequency and intensity of tsunamis, droughts, wildfires, floods, storms; also snowstorms, tornados, spread of infectious pests, pathogens and heat waves which, could cause greater human illness and premature mortality. Also, it is intimately connected to the alarming rate of extinction of species and biodiversity loss that could become the sixth largest extinction spasm in planetary history. Clean air policy, including the promotion of renewable energy and energy efficiency, can substantially reduce these negative impacts.

Renewable energy technologies meet the two basic conditions, to be eligible for assistance under UNFCCC mechanism; firstly, they contribute to global sustainability through GHGs mitigation; and secondly, they confirm to national priorities by leading to the development of local capacities and infrastructure. In addition, the steadily growing awareness of the importance of environmental protection is an important aspect of renewable energy.

RESULTS AND DISCUSSION:A marked disparity between the energy consumption pattern in urban and rural segments also forces a shift of energy scenario towards renewable energy systems. Villages and areas situated in remote and far flung areas can be depended on only self generating source like renewables.

Renewable technologies are now matured and well understood technologies, thus it is now possible to connect them to grid and also they offer possibilities of distributed generation at or near actual load centre, thereby saving on costly establishment and maintenance of transmission and distribution networks.

Although considerable experience and capabilities exist on renewable electricity technologies including the development of indigenous biomass gasifier technology and manufacturing base for wind power and solar photovoltaic, a number of barriers still remain to be overcome. The push policies adopted since the nineties have been successful in creating a fairly large and diversified manufacturing

base and an infrastructure (technology-support groups and facilities, as well as the nodal agencies) to support RET design, development, testing, and deployment. But commercialization of the technologies have been limited due to low reliability of the devices, lack of remunerative tariffs for RET-generated electricity, and a lack of consumer-desired features (in terms of the services and the financial commitments) in the design and sales-package. Further Distortions in the energy and electricity prices and non- internalisation of the socio–environmental externalities have impeded the progress of RETs by adversely affecting their competitiveness compared to conventional energy sources.

Table 1. Renewable energy potential & achievement (as on March 2024) [1]

Source/Sector	**Potential**	**Achievement**
A. Power From Renewables		
1. Wind	45,000 MW	2,002 MW
2. Solar Photovoltaic Power	20MW/sq km	47 MW
3. Small hydro (upto 25 MW)	15,000 MW	1,520.35 MW
4. Biomass Cogeneration power	19,500MW*	570.9MW
5. Energy Recovery from waste	1700 MW	30.8 MW
Total power from Renewables	**81, 200 MW**	**4127. 37 MW**
B. Decentralised Systems		
1. Solar water heating (Collector area)	140Million m^2	0.70 Million m^2
2. Solar PV	20 MW/sq.km	47MW
a. Street lighting systems	-	47969Nos
b. Home lighting systems	-	256673 Nos.
c. Solar lanterns	-	509894Nos
d. SPV power Plants	-	1637 kW
3. Solar PV Pumps	-	6368 Nos.
4. Wind pumps	-	945 Nos.
5. Hybrid Systems	-	199.35 kW
6. Biogas Plants	12 Millions	3.44 Millions
7. Improved Chullas (wood stoves)	120 Millions	35.89 Millions
8. CBP/IBP/NBP plants	-	3,902 Nos.

MW= Mega Watt; sq m =Square meter; kW=kilo watt;* Gasifiers are included

CONCLUSION: Tightening of carbon emission constraints leads to alterations in the energy mix on the supply side, and this thereby increases investments in renewable energy. This growth can be attributed to the participation of the private sector, as a consequence of favourable policy frameworks and investment options and opportunities available for such technologies. However, much more remains to be done in harnessing the true potential of renewables in the country. MNES, IREDA and other networking agencies are to achieve the targets by 2022 to reduce dependence on fossil fuels, which would result in a clean and green 'Earth'.

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