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Renewable energy sources & Impact on economy - Future energy Trends in India

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Abstract : *The consumption of electricity is growing on in India along with the rise in population.. Energy is a necessity for everyone for every routine work. The reliance on limited natural resources of earth has to be contained with sustainable energy sources. In this case, there is a great demand for finding alternate energy sources .The sustainable renewable energy is a vital link in economic development. The industrialization and economic development of India can promote sustainable renewable energy applications for furthering GDP . A great transition from conventional energy systems to those based on renewable resources is the necessity of the time. The global trends have changed towards application of sustainable renewable energy in meeting the escalating demand for energy and to address environmental concerns. This paper examines the new perspectives in promotion of sustainable renewable energy strategies.*

Keywords: *sustainable renewable energy, environmental concerns , new perspectives , energy strategies*

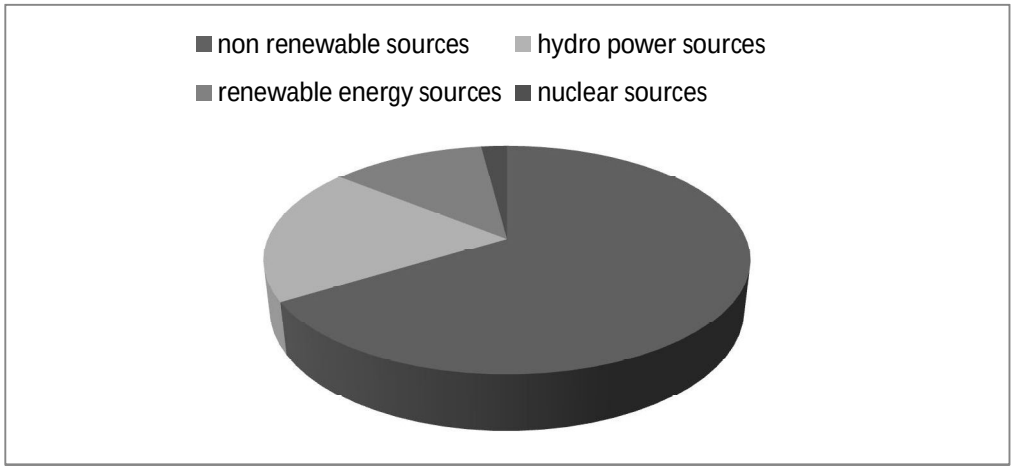
Introduction: India is the world's fourth largest energy consumer. Its energy needs continue to increase, but national energy shortages and an inadequate energy infrastructure could perpetuate national energy poverty. (Report of Non Conventional Energy Sources 2014). To meet the growing energy demand over the next few years, India will have to enhance its energy security by procuring energy supplies at affordable prices. While the country has surplus refining capacity and is an exporter of petroleum products, major investments will have to be made in the domestic upstream industry and to acquire hydrocarbon reserves abroad. India's fragile energy security is under severe pressure from its rising dependence on imported oil, regulatory uncertainty and opaque natural gas pricing policies, small pool of skilled manpower and poorly developed upstream infrastructure and dependence on fossil fuels as the dominant source of energy in the near future. (Report of Non Conventional Energy Sources 2014).

India meets its electricity demands with 65 percent use of non-renewable, 19 percent of that demand is met with hydropower, 12 percent from renewable, and 2 percent from nuclear power as shown in chart -1

According to 2011 census, 77 million households in India still use kerosene for lighting . The problem is even more acute in rural India where up to 44 percent of households lack access to electricity. While India has undertaken various programs and initiatives to address energy poverty, they have been faced with logistical problems and inadequate implementation locally. In the case of rural villages, access issues and geographical hindrances make addressing the issue extremely costly

and difficult. India faces ever expanding demand and insufficient supply. As the country's population and needs continue to grow rapidly, it will also need major reforms in infrastructure and efficiency. Demand is far outpacing supply in meeting the rapidly growing electricity needs of the country. (Report of Non Conventional Energy Sources 2014).

Indian energy meets



Indian energy sources: Chart -1

Source of energy	ratio %
non renewable sources	65%
hydro power sources	19%
renewable energy sources	12%
nuclear sources	2%

Source : Report of Non Conventional Energy Sources 2014

Impact on economy :

Electricity shortages have resulted in loss of profits for many companies, loss in productivity as plants and businesses have been forced to shut down for a few days a month or slow down manufacturing, and added operational costs as some businesses have been forced to pay for power back up units. While growing demand is part of the problem, poor infrastructure equally contributes to electricity shortfalls that have hindered recovery in India's industrial sector and hurt its overall economic growth. (Report of Non Conventional Energy Sources 2014).

The average per capita consumption of energy in India is around 500 W, which is much lower than that of developed countries like USA, Europe, Australia, Japan etc. However, this figure is expected to rise sharply due to high

economic growth and rapid industrialization. The consumption of electricity is growing on the worldwide basis. Energy is a necessity and sustainable renewable energy is a vital link in industrialization and development of India. A transition from conventional energy systems to those based on renewable resources is necessary to meet the ever-increasing demand for energy and to address environmental concerns. (Report of the energy institute -An Overview Of Renewable Energy Sources In India 2006). As it is shown in table-1 the total usage was

All-India energy usage as on 2014	coal	gas	diesel	total thermal energy	nuclear	hydro	res	total
	145273	21782	1200	168255	4780	40532	29462	243029

Source : Reliance Energy online portal 2014

Classifications -Indian energy sector has following classifications

1. Solar energy- Solar energy is easily available & unlimited source of energy. Solar energy resources are untapped & only 42 % of the sources is being utilized. There is a vast avenues towards tapping solar energy bases to industrial & residential purposes. (Report of the energy institute -An Overview Of Renewable Energy Sources In India 2006). The growth of townships has accelerated the use of energy . The Solar energy can be supported to residential purposes such as for home lighting cooking, , TV and radio etc . There is a rising demand for portable lighting systems for home, agricultural fields, educational institutions, health centres, water pumping for irrigation and drinking water , refrigeration , Rural & urban telecommunication etc.
2. Wind energy – India ranks wind super power having a net potential of about 45,000 MW . Development of high efficiency wind turbines to generate electricity are made.
3. Hydro electric energy –only 20%of the hydro electric sources are used for energy.
4. Waste to energy – This area has still to grow among Indians.
5. Bio-mass energy -This reduces the reliance on fossil fuels with the support of thermo chemical reaction. .

Strategies for growth

1. Government policy making: Renewable energy strategies have to be seriously promoted through Government policy making. The strengthening of renewable energy strategies at grass roots level through government policymaking would help renewable energy strategies. Renewable energy strategies application can be rewarded with incentives & this can be applied without any hassles & the clearance should be given immediately. Indian government can pass legislation towards avoiding large battery energy storage systems from commercial & residential purposes.

2. **Private public partnerships**- Private public partnerships can be more meaningful. Academic institutions can play a key & imperative role in creating an awareness on renewable energy strategies through curriculum. Indian with the great youth population can draw the youth towards renewable energy strategies by redesigning curriculum.

3. **Role of corporate sector :** corporate sector can play an important role. Public & private offices / corporate centers / hostels / hospitals / hotels etc should stand as an example for renewable energy application. Use of solar energy for home & office lighting should be made compulsory . Industrial complexes huge residential apartments can go for mandatory renewable energy strategies provision. (Report of the energy institute -An Overview Of Renewable Energy Sources In India 2006).

4. **National level awareness movem**ent - A well planned National level awareness movement would help for effective campaigning the cause of renewable energy strategies

5. **financial allocation** - financial allocation & support through micro loans for renewable energy strategies. Renewable energy strategies can strengthened through micro loans , supportive financial subsidies , & easy bank loan facilities.

6. **Funding for research** in renewable energy strategies -funding for research in renewable energy strategies is needed

7. **Support form stake holders-** target setting for renewable energy strategies for local governments such as biomass power generation needs a review

8. **Legislative support**- Legislation towards new house construction strategies has to be renewed with mandatory installment of renewable energy strategies. compulsory installation of solar water heaters for residential & commercial usage

9. **Relaxation in Duties** -renewable energy strategies can be more effective if government removes duties on renewable energy appliances

10. **Need an integrated policy** - Renewable energy strategies need an integrated policy making

11. **Promotion of rural energy needs** -Renewable energy strategies can best support in rural areas where it can be used for telecommunication, irrigation purposes, water lifting , water pumping , etc.

12. **Promotion of career prospects**- encouragement to .youth in solar energy technology ,scientific waste management ,organic farming, environmental planning these are called as green careers

13. **Promotion of youth entrepreneurship**- promotion of youth entrepreneurship-

Recommendations

There is a need to create awareness about renewable energy sources among all stake holders. An awareness through media, social media, academic curriculum, public knowledge etc will be very helpful. An integrated approach towards renewable energy sources legislation is also needed.(Report of the energy institute -An Overview Of Renewable Energy Sources In India 2006).

National Electricity Policy

In pursuance of the provisions of the Electricity Act 2003, the Central Government came out with National Electricity Policy on 6th February 2005. Over the past few years, the Government of India has undertaken several legislative measures and carried out extensive policy reforms with a view to accelerating the growth of the power sector and encouraging greater private participation. Some of these measures include National Tariff Policy, National Electricity Plan, Competitive Bidding Guidelines, and Ultra Mega Power Projects. Now 100 percent Foreign Direct Investment (FDI) is allowed in generation, transmission and distribution segments. Incentives are given to the sector through waiver of duties on capital equipments under the Mega Power Policy. These policy initiatives have resulted in building up investor confidence in the power sector and have created an ideal environment for increased participation by the private sector.

Conclusion: Thus there is an immediate need to petroleum based energy to renewable resources energy. A serious effect on climate change can India projects a massive renewable energy potential this can attract FDI prospects. To meet the growing energy demand over the next few years, India will have to enhance its energy security by procuring energy supplies at affordable prices. While the country has surplus refining capacity and is an exporter of petroleum products, major investments will have to be made in the domestic upstream industry and to acquire hydrocarbon reserves abroad. India's fragile energy security is under severe pressure from its rising dependence on imported oil, regulatory uncertainty and opaque natural gas pricing policies, small pool of skilled manpower and poorly developed upstream infrastructure and dependence on fossil fuels as the dominant source of energy in the near future.

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