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Scope of renewable energy with reference to sustainable development

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Abstract
As of today people are much more aware about the happenings in our surrounding and are becoming much more eco-friendly to protect our environment from any further deterioration and thus it becomes a responsibility to all of us to follow the path of treating our mother nature with same affection and care to what we derive from her as to adopt the sustainable development of life to leave some resources to be further utilised by our future generations as well and as the population is rapidly expanding and people's living has become so sophisticated that some people barely care for the resources thus negligence towards utilisation of natural resources leads to depletion in the quality and quantity of the resources and the theory of conservation flunks to be realised.
So, this paper seeks to explore the energy challenges of India, the cause and effect relationship between energy and economic development, and the sustainability of its environment for its millions of poor populace. Energy security and sustainable development are critical issues to ensure India's economic growth and its human development objectives. In real sense of the Indian context, the issue of sustainability is larger compared to OECD countries as India has to address the basic needs of teeming millions today, before it can start thinking about tomorrow. India should focus on holistic energy policies, diversification of fuel mix, clean technologies, R & D, energy efficiency, creating awareness and strengthening governance for Sustainable Development at the local and national levels.

Keywords: eco-friendly, energy

1. Introduction
This earth provides enough to satisfy every man's need not every man's greed" said Mahatma Gandhi. Development of India to a large extent depends on the development of its villages. India's GDP growth over the last decade has been unprecedented but at the same time India's ranking in terms of Human Development Index (HDI) as well as Environmental Sustainability Index (ESI) has been dismal. India is an agrarian based economy and 70% of its population still resides in the rural villages. Energy is the prime mover for the growth of Indian economy and in order to ensure adequate energy generation to meet the demand India has to depend on the natural resources indigenously or through imports.
In order to meet its energy needs the country has tried to harness energy from various natural resources including wood, coal, natural gas, hydro, wind, solar etc. Technological innovation and industrialization has led to the overexploitation of natural resources beyond limits to satisfy the insatiable lust of greed by humans worldwide. Everyone has become individualistic and materialistic. Quality of life is not just fine; but everyone is interested in a high standard of living.
Starting from basic lighting appliances everything in homes has got sophisticated. People love to be in an air-conditioned atmosphere rather than enjoying the fresh natural air. The per capita energy consumption in India is one of the lowest compared to world average but nonetheless it's highly energy intensive and ranks poorly in terms of energy efficiency. Most of the energy generation is based on coal which is again a big contributor towards the green house gas emissions.

2. Renewable Energy in India
The renewable energy sector in India has made remarkable progress growing from 3.3% (2002) of the total generation capacity to 13.4% (2015). Production rose from 0.4% to 5.6% in this period. Of this, about two-third is from wind, and the balance is from small hydro, solar, biomass and waste to energy, and other sources [1].

Technological Developments
The wind power sector has undergone a major shift in India, from tax-credit driven investment to mainstream IPPs (Independent Power Producer). This has led to the setting up of large wind farms that deploy the latest technology and practices-larger MW class wind turbines, inclusive O & M practices for plant life, use of logistics tools for construction and maintenance, and seamless grid integration. Further, the industry has gained from improvements in drive train technology, tower structure and use of advance power electronics, which add to overall cost effectiveness.
In India, in the last two decades, the hub height and rotor diameter of wind projects have increased fourfold and the average WTG (Wind Turbine Generator) rating has increased almost tenfold. This enhances the energy generated per turbine, thus reducing the overall level lised cost of electricity. Still, the top-end rotor and hub height installed for WTGs in India are 20-30% lower than the global standards, and have scope for improvement [2].
In solar, the vast majority of Indian projects have adopted crystalline silicon technology, with an average efficiency of 16-17%. The thin-film technologies of cadmium-telluride and copper-indium-gallium-selenide, with 14-15% efficiency, have been used selectively. The expectation is that ongoing scientific research will continue to increase the efficiency in the coming years. Most solar projects have been competitively tendered since 2012 [3].
A recent bid for 300 MW was closed at 8 EUR cents per kWh with a median tariff of 7.5 EUR cents per kWh. Wind

[1] https://en.wikipedia.org/wiki/Renewable_energy_in_India
[2] http://mnre.gov.in/file-manager/UserFiles/faq_wind.pdf
[3]http://www.renewableenergyindiaexpo.com/Portals/18/PDF_Files/EYEON-UBM%20Newsletter%20Febuary.pdf

projects are currently compensated through FIT set by state electricity regulators and are now increasingly differentiated by wind zones (Maharashtra has five zones helping it tap sites in low wind regions) [4].

To manage sales risk, several renewable energy companies use a mix of sales models- sale on FIT and contestable supply to third party consumers using network open access. India is one of the country's most involved in developing the use of renewable energies and is trying to make the opportunity for investors more attractive than costly [5].

Renewable energy will need to play a greater role to maximally develop domestic supply options as well as the need to diversify energy resources. Solar power, wind energy, bio fuels etc. will have to play a big role to ensure energy security as well as being environment friendly. If India exploits entire renewable sources, it will be able to meet only 5% of its total requirement with the existing technologies. As such renewable energy can be used as a supplement but not as a supplant. These can be stand alone systems and as such can do well for the rural poor people by providing them with energy for their economic growth as well provide them with means of earning their livelihood [6].

With regard to the energy basket, liquid fuel dominates the basket followed by coal and natural gas. Transportation sector plays a crucial role in creating a huge amount of demand for the liquid fuels as in the present scenario most of the vehicles are designed to run on liquid fuel. With the rising income the urge to own and use one's own vehicle has further added to the problem. Further the energy security in terms of availing the energy resources from energy rich countries is another big challenge due to the risk of volatility either in terms of price or supply. The need is to strengthen regional cooperation and better infrastructure development for safe transportation of the fuel [7].

3. Sustainable Development

The term Sustainable Development has various meanings when interpreted from various dimensions of environment, ecology, economics, technology and sociology, cultural and political aspects. The term sustainability would encompass a number of aspects - for business it would mean sustainability of profits and for environment it would mean sustainability of natural resources which can be used by the future generations or has regenerative value. The most pertinent definition and well accepted across the globe is that given by Brunt land Report "Sustainable Development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The following lines of former Prime Minister Indira Gandhi, aptly explain the dilemma of all the developing countries. While addressing the United Nations Conference on the Human Environment, at Stockholm in 1972, she said:

"…there are grave misgivings that the discussion on ecology may be designed to distract attention from the problems of war and poverty. We have to prove to the disinherited majority of the world that ecology and conservation will not work against their interest but will bring an improvement in their lives [8].

Now in the Indian perspective, where majority of Indians lie at the bottom of the table living on less than one dollar per day subsistence and are not able to meet their basic needs, the challenge is much larger. These people are deprived of food, education, safe drinking water, lack basic health and sanitation, are obtruded with the disease known as poverty, they suffer from malnutrition and maternal and child death. Poverty and a degraded environment are closely interrelated, especially where people depend for their livelihoods basically on the natural resource base of their immediate environment.

The notion of Sustainable Development has been there in India since centuries. Great philosophers and leaders like Mahavir, Buddha, Tagore and Gandhi all believed in the concept of maintaining a healthy and close relationship with Mother Nature. India strongly believes in the Oriental philosophy of being friendly with nature. India worships nature and firmly believes natural resources are the most valuable wealth of humanity.

Majority of Indians still use traditional fuels such as cow dung, agricultural wastes, and firewood as cooking fuel. India's Integrated Energy Policy Report 2008 lays stress on the energy security aspects as well diversification of its fuel mix coupled with indigenous use of resources to meet its energy challenges and its efforts to raise its level of human development [9].

"India faces formidable challenges in meeting its energy needs and in providing adequate energy of desired quality in various forms in a sustainable manner at competitive prices. India needs to sustain an 8% to 10% economic growth rate, over next 25 years, if it is to eradicate poverty and meet its human development goals".

Energy Conservation (EC) Act 2001 provides for institutionalizing and strengthening delivery mechanism for energy efficiency services in the country and provides the much-needed coordination between the various entities. Energy saving is a national cause and all the citizens will have to join hands and make all efforts in making India an energy efficient economy and society.

This will help make India remain competitive within its own market and also would empower it to compete in the international market. Further, the high level of energy intensity in some of the sectors is a matter of concern. In such a scenario efficient use of energy resources and their conservation assume great amount of significance and is essential for reduction of wasteful consumption and sustainable development.

The energy intensity in India is high compared to the world average and this provides good opportunity for energy conservation measures and energy efficiency initiatives. The Government of India set up Bureau of Energy Efficiency (BEE) in 2002 under the provisions of the Energy Conservation Act, 2001 who assist in developing policies and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act, 2001 with the primary objective of reducing energy intensity of the Indian economy. This can be achieved with active participation of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors [10].

4. Legalities Involved

Renewable Energy Act, 2015

The Renewable energy act was being brought into existence

[4] http://mnre.gov.in/file-manager/UserFiles/faq_wind.pdf
[5] http://www.irade.org/egy_2468.pdf
[6] IBID
[7] IBID
[8] http://envfor.nic.in/divisions/ic/wssd/doc4/consul_book_persp.pdf
[9] http://planningcommission.nic.in/reports/genrep/intengpol.pdf
[10] IBID

with the purview of utilising renewable energy from renewable sources rather than using fossil fuels in order to reduce the use of fossil fuel and preserving it and therefore paving way towards sustainable development.

Scope of the act

The scope of the act is to promote the production of energy through the use of renewable energy sources in accordance with climate, environment and macroeconomic considerations in order to reduce dependence on fossil fuels, ensure security of supply and reduce emissions of CO2 and other greenhouse gases. This Act shall in particular contribute to ensuring fulfilment of national and international objectives on increasing the proportion of energy produced through the use of renewable energy sources [11].

Need for the act

Increasing the share of RE in the energy mix will require enabling policies to stimulate changes not only in policies related to RE deployment but also in policies related to the planning of the complete energy system. The mandatory provisions after the enactment of Renewable energy Law will provide the requisite backbone framework to facilitate increase in the use of renewable energy for all relevant applications including electricity, heat and transport in an effective and coordinated manner.

Which is well integrated with the energy and electricity system, and to do so by developing a supportive ecosystem, laying down a institutional structure, and by creating framework for transparent and effective incentive structure.

Hence, these kinds of act are required to harness sustainable development within the society. The provisions of this Act shall be in addition to and not in derogation of, any other law for the time being in force.

The provisions of this Act shall not apply to the Ministry or Department of the Ministry dealing with Defence, Atomic Energy or such other similar Ministries or Departments or undertakings or Boards or institutions under the control of such Ministries or Departments as may be notified by the Ministry [12].

5. Conclusion

To conclude it can be stated that the absence of holistic energy policies as well as the lack of effective leadership and political will has not resulted in the desired outcomes for India as far as energy and sustainable development is concerned. Primary concern is to supply to the poor people in the form of clean fuel. More focus should be on supply of subsistence level of energy. The five separate ministries should be integrated into one Energy Ministry so as to frame holistic policies for the best interests of the nation. To ensure sustained GDP growth India has to grow its primary energy and electricity supply manifold. India in the last few years has come out Energy Conservation Act 2001, consolidated Electricity Act 2003, National Action Plan for Climate Change and the Integrated Energy Policy 2008 which are the right steps as far as government policies are concerned. But, the ineffective enforcement of law is the main lacunae and needs to be strengthened to ensure effectiveness of the policies.

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[11] http://mnre.gov.in/file-manager/UserFiles/draft-rea-2015.pdf
[12]http://mnre.gov.in/file-manager/UserFiles/draft-rea-2015.pdf