

Development of Sustainable Energy in India: Steps to be Taken

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Abstract

Sustainable energy is the energy that meets the needs of the present generations without compromising the ability of future generations to meet their own needs, source that renew themselves, rather than sources that can be depleted such as Wind, Solar, Water, Bio-energy and geo- thermal energy etc. Usage of sustainable energy will not only decrease the energy crisis but also help to better the climatic and environmental conditions. The dedication to promote sustainable energy requires supportive policy and legislative framework. The Indian government is taking certain initiatives relating to energy sector particularly in order to develop renewable energy resources. This approach towards the development of verticals of sustainable energy is very encouraging. The steady and systematic development of non- conventional energy resources will give fruitful results for securing the better future. One of the main reasons for exploring the non- conventional energy resources or sustainable energy resources, because these resources are environmentally as well as economically sustainable by comparison with the conventional energy resources. The research paper will trace the development of sustainable energy in India, explores the provisions of renewable energy sources and concentrates on developing the idea of sustainable energy in comparison to other existed resources. In conclusion, it highlights what kind of paradigm shift would be required to be strengthened legal as well as policy making for securing better future in the field of sustainable energy.

Keywords: Sustainable Energy, Conventional and Non-Conventional Energy Resources, Legal Framework

I. Introduction

According to some estimates, the current global power consumption suggests that power consumption of about twelve terawatts² will reach thirty terawatts by

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² One terawatt equals 1000 gig watts or one million megawatts.

2040³globally. Other forecasts view that total global energy consumption will expand by fifty-four percent between 2001 and 2025⁴. The overall significant and drastic projected increase in the energy demand will occur in developing countries that depend primarily upon the combustion of hydrocarbons, such as coal, to produce the electricity necessary to meet their energy requirements.

As a result of the increasing reliance of developing countries on fossil fuels - particularly coal, which is the most carbon- intensive of fossil fuels - CO₂emissions from developing countries will be greater than those of developed countries by 2020 despite the lower projected energy consumption levels by developing countries. In fact, in 2001, developing nations consumed sixty four percent as much oil as industrialized nations, and by 2025 they are expected to consume ninety four percent as much as developed countries⁵.

There are two important corollaries to this premise which point towards the pressing need for more and more better quality energy specifically in the developing world. Firstly, 1.7 billion people, or one fourth of the world's population, which located in developing countries, who do not have access to electricity.⁶ The right of these countries to sustainable development is inconceivable without electricity. On seeing Second, 2.3 billion people rely on wood agricultural products and animal waste for their cooking and heating needs⁷. While wood and agricultural products may formally be classified as renewable biomass, the manner in which wood and agricultural products are

³See NEBOJSA NAKICENOVIC ET AL., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT ON EMISSION SCENARIOS 95-96, 221 (2000);

⁴ ENERGY INFO ADMIN. (EIA), INTERNATIONAL ENERGY OUTLOOK 2004, at 7 (2004), available at [www.eia.doe.gov/pub/pdf/international/0484\(2004\).pdf](http://www.eia.doe.gov/pub/pdf/international/0484(2004).pdf). The EIA's "reference case" projects total world energy consumption will increase from 404 quadrillion British thermal units (Btu) in 2001 to 623 quadrillion Btu in 2025. "Last accessed on 30/08/2017"

⁵ IEO 2004 (2004), available at <http://www.eia.doe.gov/oiaflieo/index.html> : "Last accessed on 31/08/2017"

⁶ INTERNATIONAL ENERGY AGENCY, WORLD ENERGY OUTLOOK 2002 365 (2d ed.2002), available <http://www.iea.org/textbase/nppdf/free/2000/weo2002.pdf>: "Last accessed on 31/08/2017.

⁷ Ibid.

collected, harvested and used has led to an acute loss of biodiversity and environmental degradation⁸. Further, if we are to secure our energy needs, and more effectively, those of the developing world, we need to search for new renewable energy sources of sustainable primary energy.

Primary energy which refers to the kind of high energy required by humans that is found in the resources such as coal, gas, crude oil, sunlight, and uranium and is subjected to anthropogenic conversion or transformation. Sustainable primary energy means to energy that can be developed or produced without causing significant and destructive environmental impact. Moreover, the findings for new sources of sustainable energy must be paired with an unyielding and persistent thrust toward energy efficiency and for conservation. Oil and gas are finite and non-renewable natural resources. While their finite nature is not in doubt, controversy abounds as to the extent, and the anticipated life span, of petroleum reserves⁹. There is a volatile disagreement among environmental intellectuals about whether the world faces an surged oil peak, then followed by an drastically decline and exhaustion of resources.

The case for new energy accords that address the challenge of sustainable energy is premised upon six widely recognized phenomena¹⁰.

These six phenomena are:

- (i) The increasing energy demand, especially from the developing world;
- (ii) The harmful and liability environmental consequences of using fossil fuels or hydrocarbons as sources of energy;
- (iii) The limited nature of oil and gas reserves;
- (iv) The energy insecurity caused by affect on Crude oil;

⁸See LAKSHMAN D. GURUSWAMY, INTERNATIONAL ENVIRONMENTAL LAW IN ANUTSHELL 129-32 (2ded. 2003)

⁹ One thing is clear: While geologists may discover possible oil resources, they will remain in the ground until petroleum engineers can convert those resources into actual producible oil reserves.

¹⁰LakshmanGuruswamy, Sustainable Energy: A Preliminary Framework, 38 Ind. L. Rev. 671, 688 (2005)

(v) The uninterested and biased nature of the international legal response to the looming shortage of sustainable energy; and

(vi) The lack of satisfactory and unworthy technological, legal, economic, and social mechanisms that address this sustainable energy demands.

For achieving the goal of Sustainable energy we need to maintain energy security. There are three major pillars need to be followed in the energy security. The first seeks to limit energy vulnerability by reducing dependence on oil use from unstable parts of the world¹¹. The second attempts to offer access to adequate supplies at reasonable prices¹². The third endeavors to prevent international sabotage of oil pipelines and cables, tankers, offshore and onshore installations¹³.

II. Tracing History of Renewable energy in India

The world's leading economies have been pledging support for developing alternative and cleaner forms of energy, especially in this new century. According to the International Energy Agency ('IEA'), fossil fuels (oil, coal, and natural gas) will remain the dominant source of energy for the immediate future, but their share in the energy mix is bound to progressively decline in the future. IEA estimates that renewable energy demand may increase in 2035 by an amount ranging from fourteen percent to twenty seven percent. India needed solar power developers, or their successors in contract, to purchase and use solar cells and solar modules of domestic origin in order to develop growth rate in Indian energy sector. Perhaps the Indian government is amongst a few one who established and converted a department on renewable energy to a full fledged ministry after realizing the valuable utility of these sources in years to come as domestic as well as international level¹⁴.

¹¹ BARRY BARTON, ENERGY SECURITY: MANAGING RISK IN ADYNAMIC LEGAL AND REGULATORY ENVIRONMENT 17-28 (Barry Barton et al. eds., 2004).

¹² Ibid.

¹³ Ibid.

¹⁴ Available on <http://www.cii.in/web/cms/upload/renewableenergythenextwave/pdf> :
" Last accessed on 01/09/2017"

Renewable energy technologies such as solar, wind, geothermal and biomass power generation are gaining traction and popularity, but are not yet viable at a utility scale level to play a significant role in a country's energy demand. The inability to internalize the cost of greenhouse gas (GHG) emissions has caused significant under-pricing of non-renewable forms of energy. This market failure has also resulted in significant sub-optimal production of renewable energy. Economic theory posits that public intervention may be required when market fails to provide desirable public goods or prevent negative externalities. A number of firms in the renewable energy sector face complex risks involving future changes in demand, pricing, grid connection to wider markets, cost return on capital and other key performance and regulatory risks. The renewable energy industry is still developing and the economic viability of most such projects is uncertain. In addition, the discovery of shale gas has the potential to slow the development of renewable sources of energy. A recent study by KPMG, a consulting firm, indicates that the energy industry's focus on developing shale gas and other unconventional sources of energy could disrupt the economic ability to work successfully on renewable energy and could potentially take the focus away from this sector¹⁵.

In the year of 2006 the ministry renamed as ministry of New and Renewable energy (MNRE) and then considered as the nodal ministry for developing renewable energy in India. This is the great step towards the development of renewable energy in India. Before this in the year 1987, another important national institution namely Indian Renewable Energy Development Agency (IREDA) was also established with the responsibility to finance the renewable project throughout the entire country¹⁶. In the general sense we need to understand various types of renewable and non-renewable energy resources.

A. Non- Renewable Energy Resources

The Energy resources like Coal, Oil, Natural Gas, Some forms of Electricity, Non Sustainable Hydro Energy were the resources which cannot be renewed.

¹⁵KPMG, *Shale Gas: Global Perspectives*, 19, (2011) available at <http://www.gses.com/images/documents/shale-gas-global-perspective.pdf> : "Last accessed on 01/09/2017"

¹⁶ Available on IREDA website.

Once the end of these abovementioned resources we have to go for new dimensions in order achieve our requirements of Sustainable energy goals.

B. Renewable Energy resources

Being the paper is related to development of sustainable energy in India we need discuss somewhat elaborately relating to the energy sources which are renewable in nature. The following mentioned resources are helping towards the achieving the sustainable energy goals. Those renewable energy sources includes

- 1) Wind energy:
- 2) Small wind energy and hybrid systems
- 3) Small hydro power
- 4) Biomass and cogeneration
 - The various applications of biomass energy include:
 - 1) Thermal or heat.
 - 2) Mechanical water pumping for irrigation etc.
- 5) Biomass Gasifies
- 6) Solar Energy
- 7) Biogas

The above mentioned renewable energy sources which creating growth in the field of sustainable energy. Further the government which taking certain policy decisions and enacting some legislative framework trying to develop energy by using these resources. In the present era the usage of energy has increased drastically. In order to encounter the drastic demand the only option is to get sustainable energy through renewable energy resources in India.

III. Legislative framework on Sustainable Energy

The following Laws and policy are dealing with the Sustainable energy in India.

A. The Energy Conservation Act, 2001

“With the background of high energy saving potential and its benefits, bridging the gap between demand and supply, reducing environmental emissions through energy saving, and to effectively overcome the barrier, the Government of India

has enacted the Energy Conservation Act- 2001. The Act provides the much-needed legal framework and institutional arrangement for embarking on an energy efficiency drive”.¹⁷

Under the provisions of the said Act, Bureau of Energy Efficiency has been established with effect from 1st March 2002 by merging erstwhile Energy Management Centre of Ministry of Power. The Bureau would be responsible for implementation of policy programmes and coordination of implementation of energy conservation activities¹⁸.

B. Electricity Act, 2003

The Indian Parliament also passed the Electricity Act in 2003¹⁹ in order to consolidate laws relating to generation, transmission, distribution, trade and use of electricity. Among other things, it called for rationalization of electricity tariffs, creation of a competitive environment, and open access in transmission and distribution of electricity. The Act also mandated the creation of regulatory commissions at the central, regional and state levels.

The Electricity Act, 2003 have given much Potential for saving energy. Further the importance of energy efficiency and demand side management has clearly emerged from the various supply scenarios and is further underlined by rising energy prices. It is said in the act that Efficiency can be increased in energy extraction, conversion, transportation, as well as in consumption. Further, the same level of service can be provided by alternate means that require less energy²⁰.

C. “Integrated Energy Policy-2006” prepared by the Planning Commission, Government of India

In order to promote energy efficiency and conservation there is a need to create an appropriate set of incentives through pricing and other measures. Public

¹⁷Renewable Energy and Energy Efficiency Status in India: Report compiled by ICLEI South Asia May 2007.

¹⁸ Ibid.

¹⁹http://powermin.nic.in/acts_notification/electricity_act2003/preliminary.htm “ Last accessed on 02/09/2017”

²⁰Renewable Energy and Energy Efficiency Status in India: Report compiled by ICLEI South Asia May 2007.

policy can set the pace for such development by offering attractive rewards and imposing biting penalties²¹. An enabling institutional framework is essential to achieve the objectives of the mentioned Policy. The government somewhat trying to marginalize energy consumption and energy efficiency by using this policy.

D. New and Renewable Energy Policy, 2005

A comprehensive Renewable Energy Policy for all round development of the Renewable sector, encompassing all the key aspects, has been formulated by Ministry of New and Renewable Energy. “Through this Energy policy Statement, it is proposed to send appropriate signals to industry, scientific and technical community, business and investors to indigenously develop new and renewable energy technologies, products & services, at par with international standards, specifications, and performance parameters for deployment in a manner so as to arrive at an optimal fuel-mix that most effectively meets the overall concerns of the country”²².

E. National Renewable Energy Act 2015

The proposed enactment on separate Legislation for Renewable Energy resources which may lead for energy efficiency and sustainable development in India. Accordingly the government is paying attention towards the development of renewable energy resources in order to achieve sustainability in energy production.

The objectives of the National Renewable Energy Act includes

- a) To promote the production of energy through the use of renewable energy sources in accordance with climate, environment and macroeconomic considerations.
- b) Reduce dependence on fossil fuels, ensure security of supply and reduce emissions of CO₂ and other greenhouse gases.

²¹ Integrated Energy Policy: Report of the Expert Committee, Government of India, Planning Commission, New Delhi, August 2006

²² Supra.

c) Contribute to ensuring fulfilment of national and international objectives on increasing the proportion of energy produced through the use of renewable energy sources.

Further understanding The National Renewable Energy Bill is designed majorly for the development of conducive ecosystem, which promotes the utilization of Renewable Energy sources and permits investments. This includes, Renewable Energy Policy and Plan, Resource assessment, policies on testing, monitoring and verification, and indigenous manufacturing of components. However, By seeing the preamble of the Act, this is an Act to “promote the production of energy from renewable energy sources, in order to reduce dependence on fossil fuels, ensure energy security and reduce local and global pollutants, keeping in view economic, financial, social and environmental considerations, and for matters connected therewith or incidental thereto”²³.

According to the mentioned Act —Renewable Energy Sources means energy derived from non-depleting resources and includes the following sources.

1) Wind 2) Solar radiation; 3) Mini hydro; 4) Biomass; 5) Bio-fuels; 6) Landfill & Sewage gas; 7) Municipal solid waste; 8) Industrial waste; 9) Geothermal energy; 10) Ocean energy; 11) Any other energy source, as may be notified by the Ministry; and 12) Hybrids of above sources.

The major important provisions under this Act constituting the National renewable energy committee for developing resources under renewable energy.

The Functions of the NREC includes:

- i. Review the implementation of the National Renewable Energy and advising the development on renewable energy.
- ii. Facilitate the development and deployment of renewable energy sources in the country by developing of fiscal, financial, regulatory, policy, and institutional mechanisms;
- iii. The Central Government in discharging its functions under this Act and in accordance with the Energy Policy;
- iv. Identify and set research and development priorities for the sector;
- v. Coordinate on matters relating to grid integration of renewable energy.

²³ Preamble to the national renewable energy Act, 2015.

- vi. Monitor the development and progress of Renewable Energy Investment Zones
- vii. Identify measures for development of indigenous technology, manufacturing base, capacity development, skill development, export of technologies, and establish / coordinate related technology missions created under this Act;

The above mentioned policies and Legislative framework is somewhat lagging in the development of the real objective of the development of sustainable energy in India. In order to meet the consumption of energy demands we need to come up with the attracting legislations and policies in the renewable energy resources is concern.

IV. Conclusion

By considering the all the above laws and policies, India is more dependant on the non renewable energy resources such as like coal, crude oil and natural gas etc. for getting better future the India need to convert into using of non-renewable energy resources to renewable energy resources. By adopting this method the future generations would get survive relating to the energy? Moreover day by day the using of energy is increasing but on the other side non-renewable energy resources are decreasing. This will affect the future generations largely. For avoiding this situation we need to develop and encourage the renewable energy resources like solar, Wind, Bio-gas etc.

Suggestions:

- 1) Need to come up with the better policy towards the development of Sustainable energy resources.
- 2) Need to enact suitable legislations relating to improvement of renewable energy resources like Bio-gas, solar, wind energy etc.
- 3) Need to give incentives to the industries which related to the renewable energy.
- 4) Try to reduce non-renewable energy producers gradually up to not affecting the present energy demands.

5) Impose restrictions on non-renewable energy resources which causing environmental pollution.