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Renewable Energy in India: A Critical Appraisal of Policies and Legal Frameworks

[*1]Dr. Chandreshwari Minhas

[*1]Associate Professor of Law and Director, Centre for Environmental Studies, HPNLU, Shimla, Himachal Pradesh, India.

Abstract

India, as one of the fastest-growing economies and a major energy consumer, stands at a critical juncture in its journey toward sustainable development. The growing reliance on fossil fuels has not only led to severe environmental degradation but has also raised concerns about energy security and climate change commitments. In this context, the development of renewable energy has emerged as a key strategic priority for the nation. While India has made significant strides in scaling up renewable energy capacity-particularly in solar, wind, and bio-energy sectors-the absence of a cohesive and robust legal framework remains a critical impediment. This paper explores the pressing need for a comprehensive legal and policy framework that can effectively regulate, incentivise, and promote the renewable energy sector in India. It examines existing legislative and regulatory instruments, identifies key gaps and implementation challenges. The paper underscores that a strong legal framework is indispensable for fostering innovation, ensuring accountability, and aligning national energy goals with international environmental obligations.

Keywords: Renewable energy, sustainable development, legislative instruments, environmental justice, legal framework.

1. Introduction

The significance of energy obtained from renewable resources has gained momentum due to the rapid exhaustion of natural resources in today's global scenario and need to build a sustainable mechanism of generating energy by effectively utilising these resources [1]. Energy which constitutes the natural renewable resources can be replenished, is available abundantly over wide geographical areas as compared to non-renewable energy resources which originate only in specific areas and are easily exhaustible [2]. In the present scenario, the global consumption of fossil fuels to create energy have immensely escalated, both the demand and supply of fossil fuels are rising at the cost of ecological degradation. The question of environmental sustainability and sustainable development, whose goals are to conserve natural resources and to promote alternative resources for the safer environment are at stake. Therefore, the world cannot continue to rely on fossil fuels subjecting the global environment at risk [3]. Renewable energy has emerged as one of the enablers of sustainable development of the environment as it is a source of clean and inexhaustible energy and neither produces harmful greenhouse gases nor is responsible for carbon emissions [4].

India, like many other nations, faces a critical challenge as a growing dependence on fossil fuels has led to escalating ecological degradation, including air pollution, greenhouse gas emissions, and climate change. Despite having immense potential for renewable energy generation, the country continues to struggle with over-reliance on coal, oil, and other non-renewable resources. This approach is neither sustainable nor environmentally sound and directly undermines India's commitments to sustainable development and climate resilience. The current legal and policy framework governing renewable energy in India remains fragmented, inconsistent, and often lacks enforceability. While various initiatives and policies exist at both central and state levels, they are frequently undermined by weak implementation, overlapping jurisdiction, insufficient incentives, and absence of clear regulatory mechanisms. The lack of a cohesive and robust legal framework hinders the efficient development, integration, and mainstreaming of renewable energy technologies in India's energy mix.

Accordingly, this paper is intended to conduct a comprehensive investigation into India's renewable energy potential, existing policy initiatives, and the prevailing legal and institutional framework governing the renewable energy sector. The study seeks to examine the effectiveness, coherence, and enforceability of the current regulatory mechanisms and identify the gaps that hinder the optimal utilisation of renewable energy resources. By analysing both central and state-level efforts, international commitments, and comparative legal models, the paper aims to highlight the pressing need for a robust, integrated, and future-oriented legal framework that can catalyse the transition to clean

***Corresponding Author:** Dr. Chandreshwari Minhas

energy and support India's sustainable development goals. For this, the author adopts a doctrinal research methodology, based on the analysis of primary and secondary sources. Primary sources include statutes, renewable energy policies, interpreting renewable energy regulations etc. while secondary sources include articles, commentaries, and government reports.

2. Development of Renewable Energy Sector in India

India is increasing the use of renewable energy and has taken several mega renewable energy projects so that the commitment relating to renewable energy can be achieved. To encourage this, India published transparent bidding guidelines for the generation of renewable energy and impose lowest tariff and it resulted in decrease of per unit cost of renewable energy [5]. India has made remarkable progress in recent years…impressively scaling up the use of renewable energy, particularly solar energy [6]. As of June, 2022, our countries installed renewable energy capacity stood at 159 GW, representing 39.70 per cent of the overall installed power capacity and is blending ten per cent of ethanol in its petrol and targets to take it to twenty per cent by 2026 [7]. India has good potential of some other untapped forms of renewable energy such as geothermal, tidal and wave energy. Geothermal energy potential [8] estimated to be 10,600 MW while tidal and wave energy potential ranges from 48 GW to 69 GW [9]. Renewable energy sector in India is one of the most attractive renewable energy-market in the world and India has undertaken several mega renewable energy projects so that commitments relating to renewable energy can be achieved [10]. The grid based renewable energy industry in India has seen four main technologies in action-wind, small hydro, biomass and biogases based co-generation. Out of all three, Wind has been the dominant source [11].

3. India's Policies for the Promotion and Development of Renewable Energy

India has a vast supply of renewable energy resources, and it has one of the largest programes in the world for deploying renewable energy products and systems. Indeed, it is the only country in the world to have an exclusive ministry for renewable energy development, the Ministry of Non-Conventional Energy Sources (MNES), was renamed the Ministry of New and Renewable Energy [12]. The nation's efforts to explore renewable options aimed at achieving sustainable development and ensuring energy security began in the early 1970s. As a result, the adoption of diverse renewable energy sources and the promotion of energy efficiency emerged as key focus areas for advancing sustainable development. The few important steps taken by the policy makers for development of renewable energy are recapitulated below:

i). The government of India established a Commission for Additional Sources of Energy (CASE) in the Renewable Energy Sources in 1981. The mandate of CASE is to promote research and development activities in the field of renewable energy [13]. CASE was formally incorporated in 1982, in the newly created Department of Nonconventional Energy Sources (DNES). In 1992 DNES became the Ministry for Nonconventional Energy Sources, commonly known as MNES [14].

ii). India has pioneered in the world in many administrative actions of renewable energy promotion such as Electricity regulatory commission within liberalised market 1991, Mandatory environmental audits for power projects in1992, Renewable Energy promotion bill 2005 [15].

iii). The government of India has undertaken several initiatives to promote renewable energy in the country viz., National Solar Mission (NSM) [16], Wind Energy promotion, Bio-energy Promotion, Hydropower Development, Geothermal and Ocean Energy [17].

iv). Under the Electricity Act, 2003, state electricity regulatory commissions enforce Renewable Purchase Obligations (RPO) on distribution companies and open access consumers. They are mandated to procure a specific percentage of their power from renewable sources [18].

v). For fulfilling the mandate of section 4 of the Electricity Act 2003, the National Electricity Policy 2005 was formulated but the promotion of renewable energy is not one of the main objectives of this Policy though one of the issues in the policy is dealing with renewable energy to promote generation, distribution and consumption of renewable energy [19].

vi). The National Electricity Policy of 2021 builds upon the framework established by the Electricity Policy of 2005, serving as its practical extension. It reflects the shift in focus necessitated by the changing dynamics of the energy sector. The 2021 policy places a strong emphasis on sustainability and acknowledges the urgent need for transitioning to cleaner and renewable energy sources to meet the evolving demands of the power sector [20].

vii). A National Action Plan on Climate Change is introduced by the government that hinges on the development and use of new technologies. The implementation of plan is focused on promoting understanding of climate change, adaptation and mitigation, energy efficiency and natural resources conservation. There are eight national missions that form the core of National Action Plan: National Solar Mission, National Mission on Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Eco-System, National Mission for the Green India, National Mission on Sustainable Agriculture, National Mission on Strategic Knowledge on Climate Change [21].

viii). Government has also launched Ujwal DISCOM Assurance Yojana (UDAY), Atal Jyoti Yojana and Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY).

ix). In February, 2022 Green Hydrogen Policy was notified by the government. The main features of the policy include waiver of interstate transmissions charges for a period of twenty five years, banking shall be permitted for thirty days for renewable energy used for making green hydrogen or green ammonia, and connectivity will be provided on a priority basis [22].

4. Legal and Regulatory Framework for Renewable Energy in India

Constitutional Provisions: Prior to 1947, the Government of India Act of 1935 did not include any provisions regarding renewable energy. Similarly, the framers of the Constitution did not deliberate on the issue during the Constituent Assembly debates, as renewable energy was not a matter of concern or priority during that period. Article 246 of the Constitution divides the legislative powers between the Union and the States with respect to the subjects of legislation. Though, renewable energy is not mentioned as a specific

subject in the Seventh Schedule of the Constitution, but it can be considered part of electricity sector. So it may fall under the ambit of electricity entry 38 in the Concurrent list of the Seventh Schedule of the Constitution where both the Union and the State governments have power to make laws [23]. The Union government and state governments are competent to enact laws on all aspects of electricity, including renewable energy, under Article 48A and 51-A (g) for the protection and improvement of the environment [24]. Under Article 21 where it mentions no person shall be deprived of his life and personal liberty which also includes access to clean environment or energy [25]. The Union government has also power to pass a law on renewable energy under entry 97, List I read with article 248 (1) of the Constitution which provides residuary powers to the Union government. The Constitution, VII Schedule Entry 97 & Part XI, art. 248 (1) reads:

Subject to article 246A, Parliament has exclusive power to make any law with respect to any matter not enumerated in the Concurrent List or State List [26].

The union government can make law on a subject which does not fall in any of the lists using its power under entry 97 which provides for making law on any other matter not enumerated in any List of the Seventh Schedule [27]. The Constitutional 73rd and 74th (Amendment) Act, 1992 also provide that the State governments may endow powers and authorities to local bodies to make provisions regarding renewable energy [28]. Entry 14 and 15 in Eleventh Schedule read with article 243G provide for rural electrification and the development of non-conventional energy sources by *panchayats* but for this purpose adequate financial resources and powers are to be entrusted to them by the States. Article 243G stipulates that state government should endow the rural local bodies with such powers and authorities to perform functions required from them [29]. Twelfth Schedule (Entry 8) of the Constitution provides for the protection of the environment. Thus, urban local bodies can take recourse to renewable energy, which will promote sustainability not only in protecting the environment but also in providing energy security for future generations [30].

Electricity Act, 2003: In India, there is no specific legal framework to promote generation, distribution and transmission of renewable energy, the existing law on electricity addresses the issue in a sporadic manner. The Electricity Act has however, few provisions with respect to renewable energy and they too are enabling provisions, with a view to promote accelerated development of non-conventional energy based power generation [31]. The act consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalisation of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies [32] Under the act, the central government, from time to time, is responsible for preparing the national electricity policy and tariff policy, in consultation, among others, with the state governments for the optimal utilization of all resources, including renewable sources of energy [33]. Further, the act provides that the central government shall, after consultation with the state government, prepare and notify a national policy, permitting standalone systems (including those based on renewable sources of energy and other non-conventional sources of energy) for rural areas [34]. Part VII of the act deals with tariff. Sec 61 provides that the appropriate commission shall, subject to the provisions of this act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the promotion of co-generation and generation of electricity from renewable sources of energy [35]; and the National Electricity Policy and tariff policy [36]. Likewise, Part X of the act deals with regulatory commissions; their Constitution, powers and functions. Section 86 provides that 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 a distribution license [37].

Energy Conservation Act 2001: The Energy Conservation Act is a statutory measure to regulate the energy efficiency and conservation due to an increase in the demand for electricity and fossil fuel and an increasing dependence on commercial energy. The act tries to promote energy efficiency in the commercial sector, which is the largest user of energy. This would reduce the pressure on already existing resources and would be beneficial to the environment, as there will be drastic reduction in greenhouse gas emissions. This act is very similar to the Environment Protection Act, 1986 with regard to delegated legislation [38].

Energy Conservation Act 2001 defines "energy" which means any form of energy derived from fossil fuels or non-fossil sources or renewable sources [39].

The legislation aims to promote the efficient use and conservation of energy by establishment and incorporation of Bureau of Energy Efficiency [40]. This Bureau is tasked with coordinating with designated consumers and agencies to carry out functions and exercise powers essential for achieving energy efficiency and conservation goals [41]. The act authorises both the central and state government to facilitate and enforce efficient use of energy and its conservation [42], including the establishment of fund for the purpose of promotion of efficient use of energy and its conservation within the State to be called the State Energy Conservation Fund [43]. It also empowers authorities to impose penalties for violations of the act [44] and outlines the procedures for adjudicating such penalties [45], including the right to appeal to the Supreme Court [46].

The Energy Conservation (Amendment) Act, 2022: The amendment to the Energy Conservation Act, 2001 aims to regulate energy consumption across various sectors such as equipment, appliances, vehicles, vessels, industries, buildings, and other establishments involved in the consumption, generation, transmission, or supply of energy. The act emphasises the promotion of new and renewable energy sources along with the National Green Hydrogen Mission. The amended act aims to promote renewable energy and develop the domestic carbon market to combat climate change and introduce new concepts such as carbon trading and mandate the use of non-fossil sources to ensure faster decarbonisation and help achieve sustainable development goals in line with the Paris Agreement and various other actions related to climate change [47].

Key Highlights of the Amendment Act, 2022

Carbon-credit Trading: The amendment act empowers the central government to specify a carbon credit trading scheme. The central government or any authorised agency may issue carbon credit certificates to registered entities compliant with

the carbon credit trading scheme [48]. A 'registered entity' is a defined term under the amendment act and means any entity, including designated consumers, registered under the carbon credit trading scheme [49]. The amendment act empowers any other person, other than the designated consumer, to purchase a carbon credit certificate on a voluntary basis [50].

i). **Obligation to Use Non-fossil Sources of Energy:** The Amendment Act empowers the central government, in consultation with the Bureau, to specify minimum share of consumption of non-fossil sources by designated consumers as energy or feedstock, provided different share of consumption may be specified for different types of non-fossil sources for different designated consumers [51].

ii). **Energy Conservation Code for Buildings:** The amendment act substitutes the definition of 'energy conservation building codes' with 'energy conservation and sustainable building code' to mean the code which provides norms and standards for energy efficiency and conservation, use of renewable energy and other green building requirements for a building [52].

iii). **Penalty:** The amended act substitutes Section 26 of the Act. It brings in new penalties and aggravates existing penalties for violations of certain provisions of the Act [53].

Draft Renewable Energy Act 2015

The Draft National Renewable Energy Act, 2015, introduced by the Ministry of New and Renewable Energy (MNRE), was designed to establish a unified and comprehensive legal framework for the advancement of renewable energy in India. Its objective was to streamline and integrate the diverse policies and regulations related to renewable energy, thereby offering a structured roadmap for its development and implementation. The draft proposed the creation of dedicated institutional bodies, introduced concepts such as "behind the meter" generation, and promoted the use of market-based mechanisms to accelerate the adoption of renewable energy solutions [54].

5. Gaps and Challenges in the Existing Legal Framework on Renewable Energy

i). The statement of objects and reasons of Electricity Act, 2003 elucidates thirteen main features of the act and not one focuses on development of renewable energy, except allowing for setting up of standalone systems for generation and distribution in rural and remote areas. The focus on development and promotion of renewable energy is missing in the Electricity Act, 2003 [55].

ii). The provision under section 4 of the Electricity Act does not impose any legal mandate but is just player to bring renewable energy into the centre stage of policy formulation. To give boost to renewable energy sector it is important to have a real substantive legal mandate to bring investors in this sector [56].

iii). Hydro energy and all other forms of renewable energy can be included in the definition of energy as given under section 2(h) of Energy Conservation Act, 2001 but this section includes only grid connected renewable energy projects and it excludes stand-alone renewable energy projects not connected to the grid system under its ambit [57].

iv). Resource mapping is an important aspect in renewable energy development which is not addressed by legal framework and it cannot be left to administrative enabling orders [58].

v). While carbon credit has not been defined under the Principal Act (Energy conservation Act, 2001) or the Amendment Act (2022), it generally refers to a tradable permit, allowing the holder to emit a specified amount of carbon dioxide or other greenhouse gases [59].

vi). The other existing loopholes in the existing frame work are weak enforcement and monitoring mechanisms, regulatory inconsistencies among states, insufficient incentives and clarity for private sector investment, delays in project approvals and land acquisition issues, lack of grid infrastructure and storage capacity.

6. Conclusion and Suggestions

India, currently the fourth largest economy in the world with a GDP of $3.1 trillion, is projected to grow to $8.4 trillion by 2030, overtaking Japan [60]. The nation's development goals are centered on achieving inclusive socio-economic progress and enhancing human well-being. Energy plays a critical role in driving this growth, and therefore, the country's energy strategy must emphasise efficiency, accessibility, security, and environmental sustainability to support long-term, sustainable development.

Several policies are introduced and framed by the government to promote renewable energy, additionally, the country drafted the National Renewable Energy Act in 2015 however, it is yet to be finalised.

With a commitment to achieving carbon neutrality by 2070, India must take proactive measures to strengthen its renewable energy sector for sustainable development. However, this sector faces a range of significant challenges, including policy and regulatory issues, financial and fiscal constraints, market limitations, technological barriers, as well as challenges related to awareness, education, training, and environmental concerns. Considering India's current development stage, economic growth, industrialisation, and focus on human development, renewable energy emerges as the most viable and sustainable option to meet the country's increasing energy demands [61].

To ensure renewable energy development, a legal instrument seems to be a more prevalent and successful option being preferred by the countries world over. It is not dispute even in India and that is why renewable energy for the first time was dealt within the framework of electricity act. Legislation in order to be effective should be comprehensive and adequate. A single statue should preferably contain the entire legal mandate that is required for the development of particular sector.

In India as of today as is evident from the discussion above the current legal or regulatory regime is inadequate and fragmented. Even if we think with the existing legal framework which is limited to electricity act, energy conservation act, tariff policy, electricity policy, rural electrification policy, we would not be able to touch upon all the issues that are relevant for the development of this sector in the country [62].

Suggestions

The author puts forward the following suggestions:

i). There is a pressing need to promote vigorous and robust research in the energy sector, with a dual focus on fostering innovation and achieving indigenisation of existing technologies.

ii). A centralised and dedicated authority-the National Renewable Energy Regulatory Authority should be

established to oversee the regulation, coordination, and holistic development of the renewable energy sector.

iii). Unlike a fragmented set of policies, legislation offers greater certainty and enforceability. Therefore, the author advocates for the enactment of a comprehensive Renewable Energy Act to provide a strong legal foundation for the sector's sustainable growth.

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