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ENERGY LAWS AND SUSTAINABLE DEVELOPMENT IN INDIA: A BRIEF REVIEW IN QUEST OF ENVIRONMENTAL JUSTICE

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Abstract: Indeed, energy is a fundamental requirement for sustenance and the progress of developmental activities. It plays a crucial role in powering various aspects of human life, from basic necessities to complex industrial processes. Energy is essential for economic growth and development. It fuels industries, businesses, and infrastructure, enabling the production and transportation of goods and services. Adequate and reliable energy sources are vital for creating jobs, stimulating investment, and improving the overall standard of living. On the one hand, energy plays very pivotal role as the wheels of the vehicle of overall development. On the other hand, there is a need to regulate and streamline the energy sector in tune with sustainable development perspectives and goals as per national and international commitments. This research paper presents a comprehensive review of energy laws and their role and impact on sustainable development in India. With a focus on the Indian context, the paper examines the legal framework, policies, and regulatory mechanisms governing energy production, distribution, and consumption and the management of non-renewable and renewable sources of energy. The study explores the challenges and opportunities associated with sustainable energy development and highlights the importance of effective energy laws in achieving the nation's sustainable development goals. It concludes with recommendations for enhancing the legal framework to promote a sustainable and inclusive energy sector in India in tandem with environmental justice.

Keywords **– Sustainable Development, Energy Law, Renewable Energy,**

1. INTRODUCTION

India's pursuit of environmental justice is inextricably linked to its energy laws and sustainable development practices. This paper delves into an exploration of the nation's energy regulations, scrutinizes their impact on fostering sustainable growth, and addresses the pivotal role of environmental justice. We will embark on a journey through the multi-faceted layers of legal frameworks, evaluating their effectiveness in harmonizing economic progress with ecological conservation. Our thoughtful review extends beyond just the letter of the law, offering insights into the real-world challenges and triumphs in India's ongoing quest to balance human aspirations with the planet's well-being.[1]

The use of energy in India has doubled since 2000 and fossil fuels and biomass still meet 80% of the demand. On a per capita basis, India's energy use and emissions are less than half the world average, as are other key indicators such as vehicle ownership, steel, and cement output. Even though Per-capita Energy Consumption increased from 20,874 Mega joules in 2012-13 to 24,453 Mega joules in 2021-22(P). At the same time, the population is also increasing at an alarming rate. Consequently, India's Total Emissions from the Energy

[1] N. P. Hariram et al., "Sustainalism: An Integrated Socio-Economic-Environmental Model to Address Sustainable Development and Sustainability," 15 *Sustainability* 10682 (2023).

Sector have increased from 16,51,928 GgCO2 Equivalent in 2011 to 21,29,428 GgCO2 Equivalent in 2016 as per the latest estimates Ministry of Environment, Forest, and Climate Change (MoEFCC) in February 2021. The major sector contributing to total emissions remains Energy Industries with its share increasing marginally from 55.95% in 2011 to 56.66 in 2016.[2] This clearly shows the increasing burden on sources of energy, especially on fossil fuels for the energy demands, as still we are substantially dependent on non-renewable sources of energy.

Energy is not merely a singular commodity but rather a combination of products and services. This combination plays a crucial role in the well-being of individuals, the sustainable progress of nations, and the life-sustaining functions of the global ecosystem. Historically, the combination of these elements has been permitted to blend without a clear plan, with the ratios influenced by immediate pressures and goals of governments, institutions, and companies. The development of energy is too crucial to persist in such a chaotic manner. Establishing a secure, environmentally friendly, and economically feasible energy trajectory that can support long-term human advancement is unquestionably necessary. It is also feasible, but attaining it will demand a fresh level of political determination and collaborative efforts among institutions.[3]

Apart from the political will of the government and associated institutions, there is a need for active participation from the public at large in the materialization of the sustainable production and consumption of energy products. In other words, all the stakeholders involved in the production, supply, and consumption of energy resources should play a pivotal role in energy justice. They should work in sync in tandem keeping in view the long-term goal of sustainable growth and sustainable development.

2. ENERGY LAW AND SUSTAINABLE DEVELOPMENT: CONCEPTUAL ASPECT

At the start, it is crucial to grasp the notion of Energy Law and Sustainable development and how they are interconnected. This understanding helps in evaluating the impact of energy and energy laws on sustainable development, whether positive or negative. Energy law, as an area of study and application, has significantly progressed in the last thirty years due to factors like privatization, liberalization of energy markets, and the global shift towards sustainable energy influenced by climate change concerns. This evolution led to the acknowledgment of energy law as a significant practice area, prompting governments to establish energy departments and regulators to handle the environmental and economic consequences. However, when compared to fields like environmental and climate change law, the theoretical development of energy law in academia has been slower. Despite ongoing discussions about its definition and extent, there has been a recent surge in academic interest in advancing energy law as a subject. Unlike other legal and energy disciplines, energy law has not been regularly reviewed, resulting in efforts to divide the field into separate domains such as oil and gas law or mining law, although such attempts have been criticized by scholars. The last comprehensive review of energy law was presented in Adrian Bradbrook's influential paper in 1996, underscoring the necessity for renewed scholarly focus on the subject.[4]

2. 1 Evolution of Energy Law Scholarship

Energy law scholarship has transformed since Bradbrook's pivotal article in 1986. Current scholarship characterizes and defines 'energy law as the regulation of rights and responsibilities of stakeholders throughout the energy life cycle.[5] Broadly, Energy law encompasses the legal principles, regulations, and policies governing the production, distribution, and utilization including conservation of energy resources, non-renewable and renewable both. It covers various aspects, including:

Energy Resources Regulation: Covers oil, gas, coal, nuclear, and renewable energy sources like wind, solar, and hydroelectric power.

Environmental Regulations: Involves issues like pollution control, greenhouse gas emissions, and environmental impact assessments.

[2] *Energy Statistics India 2023*, 151 (Govt. of India, Ministry of Statistics and Programme Implementation, New Delhi, 9 March 2023).

[3] World Commission on Environment and Development Our Common Future (Oxford University Press, Melbourne: 1990) 246.

[4] Raphael J Heffron et al., "A treatise for energy law," 11 *The Journal of World Energy Law & Business* 34–48 (2018).

[5] *Ibid*

Energy Infrastructure: Focusing on the regulation of energy infrastructure like pipelines, transmission lines, power plants, and distribution networks.
Energy Contracts and Transactions: Encompassing legal aspects of energy contracts and agreements governing the sale, purchase, and distribution of energy resources.
Electricity Market Regulation: Governing pricing, competition, and grid management in electricity markets.
Renewable Energy Incentives and Policies: Addressing incentives, subsidies, and policies promoting renewable energy technologies.
International Energy Law: Involves agreements, treaties, and cooperation on global energy-related issues and trade.
In essence, energy law embraces a wide range of legal frameworks and policies aiming at ensuring efficient and sustainable management of energy requirements & resources while addressing environmental concerns and fostering innovation in the energy sector. How far the laws and policies have succeeded in achieving the desired result will be discussed in the proceeding sections of this study.

2. 2 Concept of Sustainable Development

By the early 1990s, more than 70 interpretations of sustainable development had emerged. Diverse fields of study have shaped and enriched the discourse on sustainable development, offering varied perspectives on the interplay between the environment and humanity. Among these, the definition put forth in the Brundtland Commission's Report, 'Our Common Future,' has garnered widespread acceptance. According to this definition, sustainable development entails meeting the needs of the present generation while safeguarding the capacity of future generations to fulfill their own needs.[6] This definition encompasses two key elements:

(a) Prioritizing the fulfilment of basic needs, especially for the world's impoverished populations.
(b) Recognizing the finite capacity of the environment to satisfy both current and future requirements.

The objective of sustainable development is to strike a harmonious balance between fulfilling present requirements and safeguarding the opportunity for future generations to meet their needs. Sustainable development recognizes the interconnection of economic, social, and environmental factors in developmental processes. It seeks to address the challenges posed by unrestricted resource consumption and environmental degradation while promoting human well-being and equitable resource distribution. There are certain cardinal principles of sustainable development on which the stakeholders should focus as an expression of its accomplishment. These are Intergenerational equity, the use and conservation of natural resources, environmental protection, the precautionary principle, the polluter pays principle, the obligation to assist and cooperate, the eradication of poverty, and financial assistance to developing countries.[7]

Emphasizing accountability in resource management and conservation, sustainable development strives to meet current needs without compromising the ability of future generations to meet their own needs. It places importance on fairness and equity, advocating for equal access to resources and opportunities regardless of socio-economic status. Furthermore, sustainable development emphasizes the intrinsic value of biodiversity, underscoring the significance of ecological integrity and biodiversity conservation for the planet's long-term health and resilience.[8] Sustainable development stands as a holistic approach to development that integrates economic, social, and environmental considerations, urging a shift towards sustainable consumption and production patterns while endorsing inclusive and equitable development strategies for the well-being of current and future generations.[9]

This approach of sustainability has matured since its inception in 1987 to the targeted goals in the name of Millenium Development Goals (MDG) 2000 to 2015, which focused on improving well-being in the developing world and most recently to the adoption of 17 Sustainable Development Goals (SDGs) in 2015 till 2030 which addresses all countries and aim at reconciling economic and social with ecological goals.

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[6] Jennifer Elliott, *An Introduction to Sustainable Development* (Routledge, 2012).
[7] P.S. Jaswal and Nishtha Jaswal, *Environmental Law* 120 (Allahabad Law Agency, Faridabad, Haryana, 3rd Edn., 2009).
[8] "Sustainable Development," *International Institute for Sustainable Development available at*: https://www.iisd.org/mission-and-goals/sustainable-development (last visited February 18, 2024).
[9] N. P. Hariram *et. al.*., "Sustainalism: An Integrated Socio-Economic-Environmental Model to Address Sustainable Development and Sustainability," 15 *Sustainability* 10682 (2023).

3. LINKAGE BETWEEN ENERGY AND SUSTAINABLE DEVELOPMENT

The linkage between energy and sustainable development is integral and multi-faceted. Energy plays a pivotal role in driving economic, social, and environmental progress, and its sustainable production and consumption are essential for achieving the broader goals of sustainable development. The concept of sustainable development has gained paramount importance as a guiding principle for contemporary societies, particularly in the context of India's burgeoning economic and energy demands. Keeping in view the importance of energy in tandem with sustainable development and environmental conservation, the UN in its SDGs 2030 agenda, one important Goal has been appended as Goal-7 viz. 'clean and affordable energy' which is the hallmark of sustainable development and very much associated other SDGs and promotes them as well in the frame. Energy is the fuel and live blood to run the processes all around affecting all living beings. Life cannot be imagined without energy and a consequential source of energy that must be consistent, affordable, and climate-friendly. Here are some key aspects of the linkage between energy and sustainable development:

Economic Growth: Access to reliable and affordable energy is a fundamental requirement for economic development. It powers industries, businesses, and infrastructure, leading to increased productivity and economic growth. Sustainable energy sources and efficient energy use can contribute to cost savings, boost productivity, and stimulate investment in clean technologies, thereby fostering sustainable economic development.[10]

Poverty Alleviation: Lack of access to modern energy services, such as electricity and clean cooking facilities, is closely tied to poverty. Sustainable energy solutions can help lift people out of poverty by improving living conditions, enabling income-generating activities, and creating job opportunities in the renewable energy sector.[11]

Social Development: Social development is very much dependent on access to affordable energy. Education is one of the important factors for overall social development. So, energy facilitates education in various ways viz. by providing lighting for schools and access to digital technology. Energy access in healthcare facilities enables the proper functioning of medical equipment, refrigeration for vaccines, and extended operating hours. Additionally, access to clean cooking solutions reduces indoor air pollution, which has significant health benefits, especially for women and children.[12]

Environmental Protection: The traditional reliance on fossil fuels for energy production has resulted in environmental degradation and contributed to climate change through greenhouse gas emissions. Transitioning to sustainable energy sources, such as solar, wind, hydro, and geothermal power, is essential to mitigate the impacts of climate change and reduce pollution. Renewable energy is a key component of global efforts to combat climate change and ensure a more sustainable future.[13]

Climate Change Mitigation: Energy production and consumption are responsible for a significant portion of global greenhouse gas emissions. By promoting renewable energy and energy efficiency, sustainable development can help reduce emissions and limit the rate of global warming. Combating climate change is closely linked to achieving sustainable development goals, as the impacts of climate change can exacerbate poverty, hinder economic growth, and threaten ecosystems.[14]

Resource Efficiency: Sustainable energy solutions often involve improved resource management and reduced waste. For example, renewable energy sources are generally more resource-efficient than fossil fuels,

[10] "Goal 7 | Department of Economic and Social Affairs," *available at*: https://sdgs.un.org/goals/goal7 (last visited February 23, 2024).

[11] Emily Christley *et. al.*, "Sustainable energy for slums? Using the Sustainable Development Goals to guide energy access efforts in a Kenyan informal settlement," 79 *Energy Research & Social Science* 102176 (2021).

[12] Rajabrata Banerjee, Vinod Mishra, and Admasu Asfaw Maruta, "Energy poverty, health and education outcomes: Evidence from the developing world," 101 *Energy Economics* 105447 (2021).

[13] Ahmed I. Osman et al., "Cost, environmental impact, and resilience of renewable energy under a changing climate: a review," 21 *Environmental Chemistry Letters* 741–64 (2023).

[14] "How Energy Efficiency Will Power Net Zero Climate Goals – Analysis," *IEA available at*: https://www.iea.org/commentaries/how-energy-efficiency-will-power-net-zero-climate-goals (last visited February 23, 2024).

which are finite and require significant extraction and transportation efforts. Energy efficiency measures also help optimize resource use and reduce the overall environmental footprint.[15]

Resilience and Security: A diversified and decentralized energy system based on sustainable sources enhances energy security and resilience. Relying less on imported fossil fuels reduces vulnerability to price fluctuations and supply disruptions. Distributed renewable energy systems, such as solar panels on rooftops, empower communities to generate their power and become more resilient in the face of natural disasters or other disruptions to centralized energy grids.[16]

In a nutshell, we can say that energy and sustainable development are deeply interconnected. Sustainable energy is not only crucial for meeting the specific targets of SDG 7 (Affordable and Clean Energy) but also serves as an enabler for achieving progress across all the other Sustainable Development Goals. By promoting sustainable energy solutions, we can create a more inclusive, equitable, and environmentally responsible future for all.

4. ENERGY LAWS IN INDIA

The concept of energy law encompasses a broad array of legal principles and regulations that govern the production, distribution, transition, and consumption of energy resources. India's energy sector is governed by a labyrinth of laws and regulations designed to catalyze industrial growth while safeguarding environmental sanctity. The Electricity Act of 2003, the Energy Conservation Act of 2001, and the National Green Tribunal Act of 2010 collectively form the cornerstone of India's energy legislation apart from some other auxiliary and indirect laws. These acts aim to provide a stable supply of electricity, promote efficient energy use, and address environmental concerns arising from energy projects. Let us dive into the nuances of these significant statutes, unraveling their intent and dissecting their impact on India's vast and diverse energy landscape.[17]

Further, the Renewable Energy Act, still in its draft form, aspires to revolutionize the sector by setting ambitious targets for clean energy production. Such regulations underscore the nation's commitment to align with global standards in reducing carbon emissions and fostering a green economy. The statute's role in the context of India's energy portfolio is paramount, for it encapsulates the ethos of sustainable development. The Legislation and policies related to the energy sector having a direct bearing on sustainable development and environmental concerns as per the national and international commitment are briefly discussed here. A few of them will be discussed in detail.

4.1 Specific Legislations and Policies related to electricity and allied matters.

Electricity Act, 2003: This legislation governs the generation, transmission, distribution, trading, and use of electricity in India. It aims to promote competition, efficiency, and rationalization in the electricity sector.
National Electricity Policy (NEP): The NEP outlines the government's vision and strategies for the development of the electricity sector in India. It focuses on aspects like availability, accessibility, affordability, and quality of electricity supply.
National Tariff Policy (NTP): The NTP provides guidelines for the determination of tariffs by electricity regulatory commissions. It aims to ensure transparency, accountability, and affordability in tariff fixation.

[15] "Renewable Energy vs Sustainable Energy | JHU Online, "*available at*: https://energy.sais.jhu.edu/articles/renewable-energy-vs-sustainable-energy/ (last visited February 23, 2024).
[16] "Explained: Why should we use renewable energy? - Times of India," *available at*: https://timesofindia.indiatimes.com/education/learning-with-toi/explained-why-should-we-use-renewable energy/articles how/103930324.cms (last visited February 23, 2024).
[17] "Energy Laws and Regulations | India | GLI," *GLI - Global Legal Insights - International legal business solutions* (Global Legal Group), United Kingdom *available at*: https://www.globallegalinsights.com/practice-areas/energy-laws-and-regulations/india (last visited February 28, 2024).

Renewable Energy Policy and Regulations: India has various policies and regulations to promote renewable energy sources such as solar, wind, biomass, and hydroelectric power. Some key initiatives include the National Solar Mission, Wind Energy Policy, and Bioenergy Policy.
The Electricity (Amendment) Bill, 2020: This proposed amendment to the Electricity Act, 2003 seeks to introduce reforms in the power sector, including provisions related to renewable energy integration, tariff reforms, and the establishment of a National Renewable Energy Policy.
Energy Conservation Act, 2001: This legislation aims to promote energy efficiency and conservation across various sectors of the economy. It mandates energy audits, energy consumption norms, and the implementation of energy-saving measures.
Bureau of Energy Efficiency (BEE): The BEE, established under the Energy Conservation Act, of 2001, is responsible for coordinating energy efficiency and conservation programs in India. It sets energy performance standards for appliances and equipment and promotes energy efficiency labeling.
Clean Energy Cess Act, 2010: This Act provides for the levy and collection of a cess on coal, lignite, and peat produced or imported into India. The proceeds from this cess are intended for the financing of activities to promote clean energy and environmental projects.
National Biofuel Policy, 2018: While not exclusively related to fossil fuels, this policy encourages the use of biofuels, which can have implications for reducing dependence on traditional fossil fuels.
State Electricity Regulatory Commissions (SERCs): Each state in India has its electricity regulatory commission responsible for regulating the electricity sector within the state, including tariff determination, licensing, and dispute resolution.
National Smart Grid Mission (NSGM): The NSGM aims to modernize the electricity grid infrastructure in India by implementing smart grid technologies. It focuses on improving efficiency, reliability, and sustainability in electricity distribution.

4.2 Legislations related to fossil fuels. Here are some key laws related to fossil fuels in India:

Oilfields (Regulation and Development) Act, 1948: This Act provides for the regulation of oilfields and the development of petroleum resources. It empowers the government to control and regulate the exploration and production of petroleum.
Oil Industry (Development) Act, 1974: This legislation aims to promote the development of the oil industry and secure the coordination of activities in the petroleum sector.
Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006: The PNGRB Act establishes the PNGRB to regulate the refining, processing, storage, transportation, distribution, marketing, and sale of petroleum and petroleum products.

4.3 General Legislations and Policies Related to the Energy Sector.

Hydrocarbon Exploration and Licensing Policy (HELP): This policy framework, introduced in 2016, replaced the New Exploration Licensing Policy (NELP) and aimed to simplify the process of exploration and production of hydrocarbons, including oil and natural gas.
Environment Impact Assessment (EIA) Notifications, 1994 and subsequent amendments, most recently 2020 notification: The EIA notification, issued under the Environment (Protection) Act, 1986, mandates the environmental clearance process for various industrial and developmental activities, including those related to fossil fuels.
National Green Tribunal (NGT) Act, 2010: While not specific to fossil fuels, the NGT deals with matters related to environmental protection and conservation of natural resources, including those impacted by activities related to fossil fuels.

These are some of the key laws, regulations, and policies related to the energy sector in India. The sector is dynamic, and new policies and amendments may be introduced to address emerging challenges and opportunities in the energy landscape.

5. ROLE OF ENERGY LAWS AND POLICIES IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS

The energy sector has taken center stage in the fulfillment of Sustainable Development Goals in one way or the other. Now this is very important to identify and analyze the energy laws and policies and how they are aligning with sustainable development in tandem with environmental justice.

In the current Indian context, energy laws are aimed at simultaneously promoting energy development and sustainability. The energy demand increased exponentially even after various energy efficiency measures since energy has become live blood for all activities related to humans starting from day-to-day affairs to the running of big institutions and industrial establishments.[18] The Per-capita Energy Consumption has increased from 20,874 Mega joules in 2012-13 to 24,453 Mega joules in 2021-22(P).[19] At the same time, the population is also increasing at an alarming rate. The burden on energy sources can be assessed from the above figures. This can be achieved through a focus on energy security, accessibility, affordability, and addressing environmental concerns. The emphasis is on diversifying the energy mix by incorporating renewable sources such as solar, wind, and hydroelectric power. The government has implemented policies and regulations, including subsidies, tax benefits, and renewable purchase obligations to incentivize the adoption of renewable energy and reduce reliance on fossil fuels. Energy efficiency measures are also prioritized across various sectors, managed by the Bureau of Energy Efficiency, to reduce energy consumption and promote sustainable practices.

Here at this juncture, I would like to discuss and analyze some of the important provisions of fundament legislation dealing with the energy sector in India. The laws dealing with fossil fuels predominantly prioritize facilitating development and economic growth rather than emphasizing resource conservation and sustainability. They primarily focus on promoting energy production and supply to meet the escalating demands of industrialization and urbanization. As of now, fossil fuels are primary sources for the generation of electricity which is the most important energy required to run most of the activities related to human beings from domestic needs to big establishments and institutions.

So, as per the national and international commitments to sustainable development, the Electricity Act, of 2003 has some important provisions aligning with the above-mentioned objective. In the long title of the Act which sets out the objective of the Act that includes environment-friendly initiatives. It says that "an Act to consolidate the laws relating to generation, transmission, distribution, trading, and use of electricity and …. promotion of efficient and environmentally benign policies."[20]

In sections 3 & 4 of the Act, the Central Government is obligated to prepare the National Electricity Policy and tariff policy for the development of the power system based on the optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy. In compliance with this the Ministry of Power, govt. of India came up with a National Electricity Policy in 2005 which addresses various issues like the generation of affordable electricity with a focus on the use of renewable energy sources and environmental protections as crucial considerations. The Policy emphasizes the importance of increasing the share of non-conventional energy resources, including nuclear power, as a means of addressing environmental issues. Additionally, the focus on rural electrification includes promoting the use of decentralized renewable energy solutions in off-grid and remote areas, contributing to both electricity access and environmental sustainability. The Policy has paved the way for five-year National Electricity Plans to review and take sustainable initiatives for the production, generation, and transmission of affordable electricity to every household.

[18] www.ETEnergyworld.com, "How India is leading the energy efficiency revolution - Opinion by Saurabh Kumar | ET Energy World" *ETEnergyworld.com available at*: http://energy.economictimes.indiatimes.com/energy-speak/how-india-is-leading-the-energy-efficiency-revolution/2423 (last visited February 29, 2024).

[19] *Energy Statistics India 2023*, 82-83 (Govt. of India, Ministry of Statistics and Programme Implementation, New Delhi, 9 March 2023).

[20] *THE ELECTRICITY ACT, 2003*.

Ss.61 & 62 of the Act which deal with regulations of Tariffs, specifies that the terms and conditions for the determination of tariff shall also be guided by the promotion of co-generation and generation of electricity from renewable sources of energy among others like the principles rewarding efficiency in performance, multi-year tariff principles etc.[21] It talks of a kind of incentive to boost the use of renewable sources of energy.

The primary energy demand in India has grown from about 441 Mtoe in 2000 to about 775 Mtoe in 2013. This demand is expected to increase from about 1250 (estimated by the International Energy Agency) to 1500 (estimated in the Integrated Energy Policy Report) million toe in 2030. Improving energy efficiency meets the dual objectives of promoting sustainable development and of making the economy competitive.[22]

For that purpose, the Govt. of India enacted The Energy Conservation Act 2001 which was even before the Electricity Act, of 2023 to reduce the energy intensity of the Indian economy. Bureau of Energy Efficiency (BEE), a statutory body constituted u/S. 3 of the EC Act to facilitate the implementation of the EC Act. The Act under sections 14 & 15 empowers the Central Government and state Govts. to develop a standards and labeling(S&L) program and execute it through the Bureau of Energy Efficiency (BEE). This is one of the most cost-effective policy tools for improving appliance and equipment energy efficiency and lowering energy costs to the consumer. Mandatory energy efficiency standards coupled with labels that describe energy performance enable consumers to make informed choices for purchasing efficient products that save energy and reduce expenses. Here both the govt initiative and public participation are encouraged for a sustainable future.[23]

Though the Energy Conservation Act, of 2001 does not specifically mention the promotion of electric vehicles. The Act primarily focuses on the efficient use of energy and its conservation1. However, the Bureau of Energy Efficiency (BEE), established under the provisions of the Energy Conservation Act, plays a role in the rollout of EV Public Charging Infrastructure. This could indirectly promote the use of electric vehicles by enhancing the necessary infrastructure and this way the burden and environmental hazards of the use of fossil fuels can be reduced to some extent. This way climate action is boosted as well against the menace of climate change which is an alarming global issue.[24]

The Renewable Energy Act, still in its draft form, aspires to revolutionize the sector by setting ambitious targets for clean energy production. The Govt. of India has a special ministry by the name of the Ministry of New and Renewable Energy (MNRE) which works in sync with the Electricity Act, of 2003 and The Energy Conservation Act, of 2001 and has a vision "to develop new and renewable energy technologies, processes, materials, components, sub-systems, products & services at par with international specifications, standards, and performance parameters to make the country a net foreign exchange earner in the sector and deploy such indigenously developed and/or manufactured products and services in furtherance of the national goal of energy security."[25]

The ministry is working towards the development and deployment of alternate fuels like hydrogen, bio-fuels, and synthetic fuels and their applications to contribute towards bridging the gap between domestic oil supply and demand; and lesser dependency on oil imports. It is also working to increase the share of clean power with the use of renewables like wind, hydro, solar, geothermal, bio & tidal power to supplement fossil fuel-based electricity generation. Apart the electricity generation it also focuses on supplementing energy needs of cooking, heating, motive power, and captive generation in rural, urban, industrial, and commercial sectors which is affordable and easily accessible as well.[26]

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[21] *Ibid.*

[22] "Overview | Government of India | Ministry of Power," *available at*: https://powermin.gov.in/en/content/overview-2 (last visited February 29, 2024).

[23] *Ibid.*

[24] "Energy Efficiency (EE) for Climate Action: Evolution of India's EE Policies and Way Forward | SpringerLink," *available at*: https://link.springer.com/referenceworkentry/10.1007/978-981-19-6778-8_28 (last visited February 29, 2024).

[25] "Introduction | Ministry of New and Renewable Energy | India, *"available at*: https://mnre.gov.in/about-department/introduction/ (last visited March 1, 2024).

[26] *Ibid.*

6. CHALLENGES TO THE SUSTAINABLE ENERGY PRODUCTION

India experiences a significant increase in energy demand due to rapid economic growth. However, fossil fuels still dominate global energy consumption, leading to high greenhouse gas (GHG) emissions. To do away with the problem India needs to triple its wind, solar, and large hydro capacity, exceeding 500 GW in renewable power generation over the next decade. This requires substantial investments and a shift away from fossil fuels.[27]

The energy transition necessitates substantial investments. An estimated $9.2 trillion in annual average spending on clean energy assets is needed, which must scale up by an additional $3.5 trillion. This amounts to around $275 trillion between 2021 and 2050. Meeting this financial challenge is crucial for sustainable development. For this India needs to incentivize the investment in this sector. [28]

Apart from this Expanding renewable energy capacity requires robust infrastructure and efficient grid integration. Balancing supply and demand, ensuring grid stability, and managing intermittent renewable sources pose challenges. India must enhance its transmission and distribution networks to accommodate renewable energy influx. At the same, we need to regulate the consumption pattern as well to lessen the burden of saving the environment from climate change and its resultant catastrophes.[29]

7. CONCLUSION

Existing energy laws predominantly prioritize facilitating development and economic growth rather than emphasizing resource conservation and sustainability. They primarily focus on promoting energy production and supply to meet the escalating demands of industrialization and urbanization. These laws aim to stimulate investment in energy infrastructure, foster innovation in energy technologies, and ensure consistent access to energy resources across diverse sectors of the economy. However, this emphasis on development often sidelines the crucial aspects of resource conservation and environmental sustainability. Consequently, energy laws lack robust provisions for regulating energy consumption and wastage, which exacerbates the unsustainable exploitation of natural resources, including fossil fuels, minerals, and water.

But India has come up with legislations and policies for the last two decades in the form of the Electricity Act, 2003, The Energy Conservation Act, 2001, and various policies out of these Acts and the renewable energy sector which are in tune with the principles of sustainable development. These are also the results of catastrophic effects of climate change due to unsustainable use and exploitation of resources.

However, there are challenges are still there such as inadequate infrastructure, limited financing options, and bureaucratic hurdles that hinder the widespread adoption of renewable energy technologies. Balancing energy needs with environmental sustainability is also a significant challenge due to India's growing population and expanding economy. To address these challenges, comprehensive reforms in India's energy laws and policies are being recognized as essential. Initiatives like the National Action Plan on Climate Change (NAPCC) and the International Solar Alliance (ISA) demonstrate India's commitment to promoting sustainable energy development globally. Collaborations with international partners and organizations further facilitate knowledge sharing and technology transfer, accelerating India's transition towards a more sustainable energy future.

Indian energy laws are crucial in promoting sustainable development by encouraging renewable energy adoption, improving energy efficiency, and addressing environmental concerns. In summary, while existing energy laws prioritize development and resource utilization, there is a pressing need to recalibrate these laws to prioritize conservation and sustainability. By regulating consumption patterns and promoting resource efficiency, energy laws can play a pivotal role in safeguarding natural resources and fostering a more sustainable energy future.

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[27] Rajat Verma, "India's energy transition: Challenges and opportunities for a sustainable future" *The Times of India,* August 7, 2023.
[28] *Ibid.*
[29] *Ibid.*