ENERGY CONSERVATION IN INDIA: A LEGAL FRAMEWORK

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ABSTRACT

This article comprehensively analyses India's legal framework for energy conservation and sustainable development, focusing on the Energy Conservation Act of 2001and the Electricity Act of 2003. It determines India's role in achieving its commitment under the Nationally Determined Contributions (NDC) of the Paris Agreement. It examines the pivotal role of the Bureau of Energy Efficiency (BEE) in implementing energy efficiency policies, including standards, labelling, and building codes. The National Action Plan on Climate Change (NAPCC) and its National Mission for Enhanced Energy Efficiency (NMEEE) are explored for their contributions to market-based conservation mechanisms. The analysis underscores the framework's critical role in achieving India's climate commitments, such as the net-zero target by 2070 and sustainable development.

Keywords: legal framework, energy conservation, sustainable development, Bureau of Energy Efficiency (BEE) and National Action Plan on Climate Change (NAPCC)

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INTRODUCTION

It has been widely recognised that our planet faces serious environmental challenges that can only be addressed through international cooperation. Environmental challenges like climate change, air and sea pollution, and biodiversity loss are the current issues. It is unequivocal that human influence has raised the global mean temperature of the Earth by 1.1 degrees centigrade above the pre-industrial level (1850-1990).[2] This rise in the Earth's temperature is due to the increased concentration of greenhouse gases, primarily carbon dioxide (CO2), in the atmosphere, which has resulted in severe adverse impacts like frequent extreme heatwaves, droughts, flooding of low-level areas, food insecurity, etc., with high mortality rates.[3] This international crisis requires all stakeholders' attention and response to mitigate and adapt to the negative consequences of climate change. Globally, the energy sector is by far the most significant contributor to the climate change problem, and the carbon dioxide emissions caused by it account for 87% of total GHG emissions in 2022, wherein the developed countries have the highest share.[4] As the world's third-largest energy consumer, accounting for 6.1% of global energy primary consumption in 2021, India faces the dual challenge of meeting rising energy demands while addressing climate change and sustainable development.[5]

India, as a party to multilateral agreements like the Paris Agreement and the SDGs, is responsible for fulfilling its global commitments of reducing the level of GHGs in the atmosphere and achieving its pledge of net zero by 2070.[6] Therefore, energy conservation, defined as reducing energy use through efficient technologies and practices, is central to this effort.[7] The legal framework governing energy conservation and sustainable development in India integrates legislative, institutional, and policy measures to reduce energy intensity, promote renewable energy, and align with global commitments like the Paris Agreement and

[2] Intergovernmental Panel on Climate Change (IPCC), "CLIMATE CHANGE 2023: Synthesis Report" 5 (2023). Available at https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_FullVolume.pdf (last visited on 30/04/2025)
[3] Ibid.
[4] Max Roser (2020) - "The world's energy problem" Published online at OurWorldinData.org. Retrieved from: 'https://ourworldindata.org/worlds-energy-problem' (last visited on 01/05/2025)
[5] International Energy Agency, "India Energy Outlook 2021" 11 (2021). Available at https://www.iea.org/reports/india-energy-outlook-2021 (last visited on 01/05/2025)
[6] International Energy Agency, "World Energy Outlook 2024" 277 (2024). Available at https://www.iea.org/reports/world-energy-outlook-2024 (last visited on 01/05/2025)
[7] Norzalina Zainudin, Nor Diana Mohd Idris, *et.al.*, "Energy Conservation: Concept and Approaches", in Walter Leal Filho, Anabela Marisa Azul, *et.al.* (eds.), *Affordable and Clean Energy* 362-372 (Springer, 1st ed., 2021). Available at https://link.springer.com/referenceworkentry/10.1007/978-3-319-95864-4_42#citeas (last visited on 01/05/2025)

SDGs. This article examines key legislations, institutional mechanisms, state contributions, and challenges, emphasising the framework's role in fostering a sustainable future.

One of the most important steps in India's policy towards addressing energy security concerns was the effort to ensure coordination among various ministries and their activities.[8] The 2006 Integrated Energy Policy (IEP) document was successful in presenting the possibilities of coordinating the different energy sectors managed by five different ministries: the Ministry of New and Renewable Energy, the Department of Atomic Energy, the Ministry of Coal, the Ministry of Power, and the Ministry of Petroleum and Natural Gas.[9] Often, these ministries worked in a highly compartmentalised manner without a single guideline that coordinated their actions; however, to some extent, the IEP successfully brought various government machinery together to make plans and work together through an integrated approach.[10]

ENERGY CONSERVATION ACT 2001

The Energy Conservation Act 2001 was enacted to show India's allegiance to its global commitments under the United Nations Framework Convention on Climate Change (UNFCCC) by institutionalising energy efficiency as a national priority. The preamble of this Act provides for the efficient use of energy and its conservation, and it defines "energy" as any form of energy derived from fossil fuels, non-fossil fuel sources or renewable sources.[11] . Unfortunately, it does not define the basic expression 'energy conservation'. An amendment was introduced to the EC Act 2001, in 2022, to show allegiance to the commitments of COP26 summit held in 2021.[12] The EC Act 2001 establishes a three-tier enforcement structure to achieve its objective of energy efficiency and conservation: a central regulatory mechanism (Bureau of Energy Efficiency), state-level implementation (State Designated Agencies) and the market-based compliance (Carbon Credit Trading Scheme).

Bureau of Energy Efficiency (BEE)

Section 3 of the EC Act establishes a statutory body called the Bureau of Energy Efficiency

[8] Institute of Peace and Conflict Studies and Nanda Kumar Janardhanan, "India's Energy Policy: Energy Needs and Climate Change" 5-6 (2017). Available at https://www.jstor.org/stable/resrep09398.4 (last visited on 03/05/2025)
[9] Ibid.
[10] ibid
[11] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 2(h). Available at https://www.indiacode.nic.in/handle/123456789/2003?sam_handle=123456789/1362 (last visited on 03/05/2025)
[12] For more information visit https://prsindia.org/billtrack/the-energy-conservation-amendment-bill-2022 (last visited on 04/05/2025)

(BEE). The BEE aims to institutionalise energy efficiency services, enable delivery mechanisms in the country and provide leadership in energy efficiency in all sectors.[13] The primary function of BEE is to reduce energy intensity in the economy with the participation of all stakeholders.[14] The function of BEE can be divided into two parts: main functions like setting energy performance standards, labelling schemes, and specifying building codes, and promotional functions like creating awareness, training personnel, supervising pilot projects and encouraging energy-friendly appliances.[15] The EC Act directs an effective coordination between the BEE and designated agencies, designated consumers, and other agencies to perform the functions given under the Act.[16] Further, the EC Act authorises the Central Government to supersede the BEE if it is unable to perform the functions imposed by the Act or has defaulted in complying with the directions of the Government, which results in financial loss, or superseding has become necessary in the interest of the public.[17] However, the Government may reconstitute the Bureau with fresh appointments. Such a provision is necessary to create deterrence in the Bureau from neglecting its duties and committing fraud or corruption for personal gain.[18]

Standards and Labelling Scheme

Section 13 of the Act provides for the powers and functions of the BEE. The BEE may recommend to the Central Government regarding the energy consumption standards[19] for any appliances which consume, transmit, generate or produce electricity, and the particulars to be displayed on the labels of appliances[20]. The 'standard and labelling' programme was launched in 2006 by the Ministry of Power, and since then, it has been one of the most focused areas of BEE.[21] The main objective of this Program is to provide consumers with information about the

[13] Shalinee Shukla and Hina Zia, "Energy Efficiency in India: Policies and Their Impacts" 11 *Energy Sources, Part B: Economics, Planning, and Policy* 986 (2016). Available at http://dx.doi.org/10.1080/15567249.2013.799245 (last visited on 05/05/2025)
[14] Ibid.
[15] C. M. Jariwala, "The Indian Energy Conservation Law", in Usha Tandon (ed.), *Energy Law and Policy* 254 (Oxford University Press, 1st edn., 2018).
[16] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 13(1)
[17] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 47.
[18] C. M. Jariwala, "The Indian Energy Conservation Law", in Usha Tandon (ed.), *Energy Law and Policy* 255 (Oxford University Press, 1st edn., 2018).
[19] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 13(2)(a) read with s. 14(a)
[20] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 13(2)(b)
[21] For more information visit https://beeindia.gov.in/en/programmes/standards-labeling (last visited on 05/05/2025)

energy-saving potential and, ultimately, money-saving potential of star-rated appliances.[22] The programme lays down minimum energy performance standards (MEPs) on a scale of 1 to 5-star ratings, of which a 5-star rating is the most efficient. Currently, 30 appliances are covered under this programme, of which 11 are in the mandatory phase and 19 are in the voluntary phase. Further, the Bureau is authorised to conduct a periodical check-testing of the appliances.[23]

Energy Conservation Building Codes (ECBC)

Buildings consume 33% of total energy in India, which has been growing at 8% per annum, and therefore, BEE developed the Energy Conservation Building Code (ECBC) for efficiency and conservation of energy in buildings.[24] Further, the Indian construction market is expected to add 24.8 billion sq. m to its residential and 1.6 billion sq. m to its commercial building stock by 2027.[25] ECBC, launched in 2007 by BEE, prescribes minimum energy standards for commercial buildings by adopting energy-efficient design and construction measures.[26] The state government can amend the ECBC according to local and regional climatic conditions.[27] ECBC sets minimum energy standards for new commercial buildings with a connected load of 100 kW or contract demand of 120 kVA and above.[28] ECBC aims to achieve energy savings of 15%-50% in compliant buildings by focusing on energy efficiency across key systems.[29] The code covers minimum requirements for building envelope, mechanical systems and equipment,

[22] Sarat Kumar Sahoon, Payal Varma, *et al.*, "Energy Efficiency in India: Achievements, Challenges and Legality" 88 *Energy Sources, Part B: Economics, Planning, and Policy* 496 (2016). Available at https://www.sciencedirect.com/science/article/pii/S0301421515301762?via%3Dihub (last visited on 05/05/2025)
[23] For more information visit https://beeindia.gov.in/en/programmesstandards-labeling/check-testing#: (last visited on 05/05/2025)
[24] Rajan Rawal, Prasad Vaidya, *et al.*, "Energy Code Enforcement for Beginners: A Tiered Approach to Energy Code in India" 4 *ACEEE Summer Study on Energy Efficiency in Buildings* 313 (2012). Available at https://www.econiwas.com/pdf/publication/Energy%20Code%20Enforcement%20for%20Beginners_%20A%20Tiered%20Approach%20to%20Energy%20Code%20in%20India.pdf(last visited on 06/05/2025)
[25] Shirish Bhardwaj, Aafsha Kansal, *et al.*, "Decarbonising India's Building Construction Through Cement Demand Optimisation: Technology and Policy Roadmap" *ACEEE* 1 (2021). Available at https://www.aceee.org/sites/default/files/pdfs/ssi21/panel-4/Kansal.pdf (last visited on 06/05/2025)
[26] Government of India, "Energy Conservation and Sustainable Building Code 2024" 20 (Ministry of Power, 2024). Available at https://beeindia.gov.in/sites/default/files/ECSBC_2024 (last accessed on 05/05/2025)
[27] Dr. Supriya Vyas, Ar. Seemi Ahmed *et al.*, "BEE (Bureau of Energy Efficiency) and Green Buildings" 1 *Energy Sources, Part B: Economics, Planning, and Policy* 26 (2014). Available at https://www.researchgate.net/profile (last visited om 05/05/2025)
[28] Rajan Rawal, Prasad Vaidya, *et al.*, "Energy Code Enforcement for Beginners: A Tiered Approach to Energy Code in India" 4 *ACEEE Summer Study on Energy Efficiency in Buildings* 315 (2012). Available at https://www.econiwas.com/pdf/publication/Energy%20Code%20Enforcement%20for%20Beginners_%20A%20Tiered%20Approach%20to%20Energy%20Code%20in%20India.pdf(last visited on 06/05/2025)
[29] Available at https://www.therealtytoday.com/news/energy-conservation-building-code-ecbc-in-india-a-step-towards-sustainable-construction (last accessed on May 14, 2025)

including heating, ventilation and air conditioning (HVAC) systems, interior and exterior lighting systems, service hot water, electrical power and motors in order to achieve energy efficiency in different climate zones of India.[30] In addition to ECBC, there are voluntary programs to encourage the development of efficient and sustainable buildings, such as the Green Rating for Integrated Habitat Assessment (GRIHA), the BEE Star Rating, and the Leadership in Energy and Environmental Design (LEED).[31]

Perform Achieve and Trade scheme (PAT)

India has adopted a cap and trade system to improve the energy efficiency of energy-intensive industries through a scheme called Perform Achieve and Trade (PAT).[32] The PAT scheme was introduced as an initiative under one of the eight national missions of NAPCC in 2008, the NMEEE (National Mission for Enhanced Energy Efficiency).[33] The first cycle (PAT-I) ran from April 2012 to March 2015, where the BEE assigned targets to 478 identified firms (Designated Consumers) in eight industrial sectors. PAT-I resulted in an energy savings of 8.67 MTOE (million tons of oil equivalent) or equivalent to 31 million tonnes of CO2 emissions.[34] So far, 1333 Designated Consumers across thirteen sectors have been given energy conservation targets under the scheme. These targets are set for three years. During 2022-23, the PAT saved 25.77 MTOE or equivalent to 8% of their total annual energy consumption.[35]

Energy Conservation (Amendment) Act 2022

The Energy Conservation Act 2001 was amended in 2022 as a step toward India's commitment to address climate change at COP26[36]. India has updated its previous NDCs (Nationally

[30] Shalinee Shukla and Hina Zia, "Energy Efficiency in India: Policies and Their Impacts" 11 *Energy Sources, Part B: Economics, Planning, and Policy* 986 (2016). Available at http://dx.doi.org/10.1080/15567249.2013.799245 (last visited on 05/05/2025)

[31] Sha Yu, Qing Tan, *et al.*, "Improving Building Energy Efficiency in India: State-Level Analysis of Building Energy Efficiency Policies" 110 *Energy Policy* 332 (2017). Available at https://www.sciencedirect.com/journal/energy-policy (last visited on 06/05/2025)

[32] Hena Oak and Sangeeta Bansal, "Enhancing Energy Efficiency of Indian Industries: Effectiveness of PAT Scheme" 113 *Energy Economics* 1 (2022). Available at https://pdf.sciencedirectassets.com/271683 (last visited on 06/05/2025)

[33] For more information visit https://pib.gov.in/PressReleasePage.aspx?PRID=1744431 (last visited on 06/05/2025)

[34] For more information visit https://beeindia.gov.in/en/programmes/perform-achieve-and-trade-pat (last visited on 06/05/2025)

[35] For more information visit https://pib.gov.in/PressReleasePage.aspx?PRID=2038503 (last visited on 06/05/2025)

[36] For detailed information visit https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1882840 (last visited on 07/05/2025)

Determined Contributions) at COP26 to strengthen the Paris Agreement by introducing five new commitments: 'achieving the target of net-zero emissions by 2070'; 'bringing non-fossil energy capacity to 500GW by 2030'; 'bring its economy carbon intensity down to 45% by 2030'; 'fulfilling 50% of India's energy requirements through renewable resources by 2030' and 'reducing 1 billion tonnes of carbon emissions from the total projected emissions.'[37]

The 2022 amendment of ECA 2001 has introduced the following transformative elements: carbon credit trading scheme (CCTS), non-fossil fuel obligation, transport sector inclusion, application of ECBC to offices and residential buildings, and enhanced penalty regime.

The Carbon Credit Trading Scheme (CCTS) has been introduced to incentivise companies and organisations to reduce GHG emissions.[38] The core idea is to assign financial value to the right to emit a certain level of CO2 into the atmosphere.[39] The heart of CCTS is the Cap-and-Trade principle, wherein the Government sets a limit (cap) on the emission of CO2, which any assigned companies or organisations are allowed to emit within a specified timeframe.[40] If any entity emits CO2 more than the assigned emission allowance or breaches its 'cap', it would have to purchase the emission allowance from those having a surplus allowance, thus creating a financial obligation for companies to reduce their emissions.[41] Schemes like PAT and CCTS are crucial in achieving the target of cutting down emission intensity by 45% by 2030.

The amended Act substitutes the definition of 'energy conservation building codes' with 'energy conservation and sustainable building code.'[42] This means that the code provides norms and standards for energy efficiency and conservation, the use of renewable energy, and other requirements for green buildings. Prior to the Amendment Act, the Energy Conservation and Building Code applied only to buildings used or intended to be used for commercial purposes. However, the new Energy Conservation and Sustainable Building Code expands the scope to

[37] Shashank Kumar Mehta, "COP26 and Commitment of India" 26 *Geodiversity & Impact on Environment* 12 (2022). Available at https://www.researchgate.net/publication/359338088_COP26_and_Commitment_of_India (last visited on 07/05/2025)
[38] Prajakta Rohit Zirkande and Mayuree Tawade, "Carbon Credit Scenario in India: Challenges and Opportunities" 12 *International Journal of Creative Research Thoughts (IJCRT)* 13 (2024). Available at https://ijcrt.org/papers/IJCRT2401692.pdf (last visited on 13/05/2025)
[39] Ibid.
[40] Manjunatha N and Dr. Ravi Kumar K, "A Study on Carbon Credits Trading in Indian Context" 9 *International Journal of Commerce and Management Studies (IJCAMS)* 14 (2024). Available at https://ijcams.com/wp-content/uploads/2024/09/A-study-on-carbon-credits-trading-in-Indian-context.pdf (last visited on 13/05/2025)
[41] Ibid.
[42] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 14(p). Available at https://www.indiacode.nic.in (last accessed on 13/05/2025)

include buildings used or intended to be used for office or residential purposes.[43]

Under the 'non-fossil fuel use obligation', the Government is empowered to specify a certain percentage of energy mix (use of non-fossil sources like green hydrogen, green ammonia, biomass, ethanol, etc.) for consumption by the designated consumers.[44] Its purpose is to reduce dependence on fossil fuels, promote cleaner alternatives and support India's Nationally Determined Contributions (NDCs) under the Paris Agreement.

Before the Amendment of the Act, the energy consumption standards could be specified for equipment and appliances which consumed, generated, transmitted, or supplied energy. However, the amended Act expands the scope of Section 14 (Power of Central Government to enforce efficient use of energy and its conservation) to include 'vehicles' and 'vessels' (including ships and boats). The inclusion of the transport sector under the ECA 2001 by 2022 amendment shows the seriousness of GHG emissions into the environment, as the transport sector of India is the third most GHG emitting sector; it accounts for 14 % of the total emission of CO2.[45] The Government is empowered to regulate the standards of energy consumption by vehicles.[46]

The amended Act brings in new penalties and aggravates existing penalties for violations of specific provisions of the Act. For instance, the Amended Act enhances penalties for equipment and appliances that fail to conform to the energy consumption standards specified by the Central Government and for equipment and appliances that do not contain particulars as specified by the Regulations.[47] In addition to the maximum penalty of ten lakh rupees under the Act, the Amended Act brings in an additional penalty of a minimum of two thousand and a maximum of five thousand rupees per appliance or equipment against which the non-compliance has occurred.

[43] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 2(c)(iii). Available at https://www.indiacode.nic.in (last accessed on 13/05/2025)
[44] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 14(x). Available at https://www.indiacode.nic.in (last accessed on 13/05/2025)
[45] Siddharth Sinha and Madhav Sharma, "Decarbonising Transport: Redefining Mobility Policies in India", *The Indian Express*, June 23, 2021, *available at*: https://indianexpress.com/article/opinion/decarbonising-transport-redefining-mobility-policies-in-india-7372279/ (last visited on May 13, 2025).
[46] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 14(a). Available at https://www.indiacode.nic.in (last accessed on 13/05/2025)
[47] The Energy Conservation Act, 2001 (Act 52 of 2001), s. 26(2). Available at https://www.indiacode.nic.in (last accessed on 13/05/2025)

ELECTRICITY ACT 2003

The power sector is one of the most dominant catalysts behind any nation's commercial, industrial and agricultural growth. The history of Indias power sector can be traced back to its first legislation, the Electricity Act of 1910, to regulate electricity in India. Later on, the Electricity Supply Act of 1948 was enacted, to regulate electricity in India. However, both the Acts were mainly supply-oriented and did not concern efficiency or conservation policies. But, the evolution of India's electricity laws from the Electricity Act of 1948 to the Electricity Act of 2003 shows a significant shift in policy orientation from infrastructure development to market efficiency and environmental sustainability.[48]

The GOI enacted the Electricity Act 2003, to restructure and develop the electricity sector into a more effective and efficient mechanism. The Act focuses on the generation, transmission, distribution, trading, and use of electricity, and it also talks about promoting efficient and environmentally benign policies.[49] As the paper is based on a legal framework in India regarding energy efficiency and its conservation, only such related provisions are mentioned hereinafter.

The Act mentions for the use of renewable sources under the 'National Electricity Policy and Plan'[50] as: the promotion of electricity generation from renewable sources, which may act as a condition for the determination of tariffs.[51] The state government has been endowed with promoting electricity generation from renewable energy sources by providing suitable measures for connectivity with the grid and its sale or purchase.[52]

The Electricity (Amendment) Bill 2022 was introduced to address India's commitment to COP 26 and provisions regarding the retail distribution of power.[53] It clearly states that the

[48] R. Rameshwar, R. Agrawal, *et al.*, "Review of State Electricity Boards and Indian Energy Sector: A Case Study" 11 *International Energy Journal* 102 (2010). Available at https://www.researchgate.net/publication/293134212 (last visited on May 14, 2025)
[49] The Electricity Act, 2003 (Act 36 of 2003), Preamble. Available at https://www.indiacode.nic.in/handle/7 (last accessed on May 14, 2025)
[50] The Electricity Act, 2003 (Act 36 of 2003), s. 3 & 4. Available at https://www.indiacode.nic.in/handle/7 (last accessed on May 14, 2025)
[51] The Electricity Act, 2003 (Act 36 of 2003), s. 61(h). Available at https://www.indiacode.nic.in/handle/7 (last accessed on May 14, 2025)
[52] The Electricity Act, 2003 (Act 36 of 2003), s. 86(e). Available at https://www.indiacode.nic.in/handle/7 (last accessed on May 14, 2025)
[53] "What Electricity (Amendment) Bill 2022 Seeks to Do and Why It is Raising Concerns", *The Economic Times*, October 11, 2022, *available at*: https://economictimes.indiatimes.com/industry/energy/power/what-electricity-

Amendment was brought "…in view of the importance of green energy for our environment in the context of global climate change concerns and our international commitments to increase the share of renewable energy...".[54]

To articulate the objective of the Bill, the State Electricity Regulatory Commission (SERC) is empowered to specify Renewable Purchase Obligations (RPO) for discoms (distribution licensees). RPO means that the discoms (distribution licensees) are required to purchase a certain percentage of electricity from renewable energy sources. However, the required RPO should not be below a certain percentage prescribed by the Central Government.[55] And if it fails to do so, it will be punishable with a penalty[56].

NATIONAL ACTION PLAN ON CLIMATE CHANGE (NAPCC)

To counter the negative impacts of climate change, such as food security, rising sea level, increasing intensity of natural disasters, species extinction, and the spread of vector-borne disease,[57] the Government of India launched NAPCC in 2008 to lay out a strategic map to enable the country to adapt and mitigate climate change and enhance the ecological sustainability of India's development and growth[58]. It talks about 8 National Missions, which are: National Solar Mission (NSM); National Mission for Enhanced Energy Efficiency (NMEEE); National Mission on Sustainable Habitat; National Water Mission; National Mission for Sustaining the Himalayan Ecosystem; Green India Mission; National Mission for Sustainable Agriculture; and National Mission on strategic knowledge for climate change. Of the eight missions, the first three missions are to be discussed here, as they deal directly with energy conservation and sustainable development in India.

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amendment-bill-2022-seeks-to-do-and-why-it-is-raising-concerns/articleshow/94789824.cms (last visited on May 15, 2025).

[54] The Electricity (Amendment) Bill, 2022 (Bill No. 187 of 2022), Statement of Objects and Reasons. Available at https://prsindia.org/files/bills_acts/bills_parliament/2022/Electricity%20(A)%20Bill,%202022.pdf (last visited on May 15, 2025)

[55] The Electricity (Amendment) Bill, 2022 (Bill No. 187 of 2022), clause 23. Available at https://prsindia.org/files/bills_acts/bills_parliament/2022/Electricity%20(A)%20Bill,%202022.pdf (last visited on May 15, 2025)

[56] The Electricity (Amendment) Bill, 2022 (Bill No. 187 of 2022), clause 29. Available at https://prsindia.org/files/bills_acts/bills_parliament/2022/Electricity%20(A)%20Bill,%202022.pdf (last visited on May 15, 2025)

[57] Pandve and Harshal T, "India′s National Action Plan on Climate Change" 13 *Indian Journal of Occupational and Environmental Medicine* 17-19 (2009). Available at doi: 10.4103/0019-5278.50718 (last visited on May 19, 2025)

[58] Visit https://static.pib.gov.in/WriteReadData/specificdocs/documents/2021/dec/doc202112101.pdf (last accessed on May 19, 2025)

Jawaharlal Nehru National Solar Mission (JNNSM)

As an initiative under the NAPCC, the 'Jawaharlal Nehru National Solar Mission' (JNNSM) was launched in 2010 to transform India into a global leader in harnessing solar energy. Geographically, India lies in the tropical region of the Earth and has the potential to harness solar energy into electricity. India's average daily solar energy incident ranges from 4 to 7 kWh/m depending on the location, and there are roughly 1500–2000 hours of sunshine annually, producing an annual total incident radiation of about 5000 trillion kWh.[59]

In its earliest phase, the target of JNSM was to achieve 20 GW of solar energy by 2022, which was raised to 100 GW in 2015. In order to achieve the above target, the Government of India has launched various schemes to encourage the generation of solar power in the country, like Solar Park Schemes, VGF Schemes, CPSU Schemes, Defence Schemes, Bundling Schemes, Grid Connected Solar Rooftop Schemes, etc. In 2016, the total installed solar capacity was 9.01 GW; by 2024, the total installed solar capacity was upgraded to 81.81 GW; as of January 28, 2025, India's total installed solar capacity has reached 97.86 GW.[60]

National Mission for Enhanced Energy Efficiency (NMEEE)

NMEEE is one of the eight core missions of NAPCC; its foundation stone was laid down by the EC Act 2001. It has been in operation since 2011. NMEEE aims to strengthen the energy efficiency market by implementing innovative business models in the energy efficiency sector.[61] NMEEE consists of four initiatives to enhance energy efficiency in India, which are as follows:

- Perform Achieve and Trade (PAT)- It is a competitive mechanism to improve efficiency in energy-intensive sectors.

- The Energy Efficient Financing Platform (EEPF) is a platform for the capacity enhancement of stakeholders like bankers and financial institutions dealing with energy

[59] Abhinav Kumar, "Evaluation of the National Solar Mission Since its Inception in Achieving its Objectives", 9 *International Journal of Novel Research and Development* 68-69 (2024). Available at https://www.ijnrd.org/papers/IJNRD2406401.pdf (last accessed on May 21, 2025)

[60] For more information visit https://www.pib.gov.in/FactsheetDetails.aspx?Id=149102&reg=3&lang=1 (last accessed on May 21, 2025)

[61] Government of India, "National Mission for Enhanced Energy Efficiency" (Ministry of Power, 2021). Available at https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=1744431 (last accessed on May 22, 2025)

efficiency.

- Market Transformation for Energy Efficiency (MTEE) focused on accelerating the shift towards energy-efficient appliances.

- Framework for Energy Efficient Economic Development (FEEED)- It involves the development of fiscal instruments, like risk sharing, to promote energy efficiency.

Out of these four NMEEE initiatives, only PAT has been the most successful in achieving its objective because it has been accessed by several stakeholders like designated agencies, auditors, energy consumers, vendors, and suppliers working to improve energy efficiency and create an ecosystem.[62] It reached thousands of industries and aspiring professionals interested in entering the energy auditing space, the Ministry of Power, and other experts for baseline, verification, and certification settings.[63] In contrast, the other schemes targeted niche stakeholders, and few programmes were planned under them.[64] For instance, under MTEE, only two programmes were developed, i.e. Bachat Lamp Yojana (BLY) and the Super-Efficient Equipment Programme (SEEP). Similarly, in its first phase, the Energy Efficiency Financing Platform (EEFP) conducted only four training programmes to serve, especially bankers and financial institutions.

National Mission on Sustainable Habitat (NMSH)

The NMSH consists of three components, namely, (i) Promoting energy efficiency in the residential and commercial sector, (ii) Management of municipal solid wastes, and (iii) Promotion of urban public transport. To promote energy efficiency in the residential and commercial sectors, the mission emphasises the extension of the Energy Conservation Building Code (ECBC), using energy-efficient appliances and creating mechanisms that would help finance demand-side management.[65]

[62] Centre for Science and Environment, "Perform, Achieve and Trade (PAT) Scheme of Thermal Power Plants: A Critical Analysis" 8 (2021). Available at http___cdn.cseindia.org_attachments_0.39290800_1638522872_pat-of-top-report.pdf (last visited on May 22, 2025)
[63] Ibid.
[64] Ibid.
[65] Hina Zia and Shalinee Shukla, "Energy Efficiency in India: Policies and Their Impacts" 11 *Energy Sources, Part B: Economics, Planning, and Policy* 989 (2016). Available at https://doi.org/10.1080/15567249.2013.799245 (last visited on May 22, 2025)

CONCLUSION

India's legal framework for energy conservation—anchored in the Energy Conservation Act 2001, the Electricity Act 2003, and the National Action Plan on Climate Change (2008)—constitutes one of the most comprehensive approaches in the developing world to foster sustainable energy use and climate responsibility. The Energy Conservation Act, 2001 established the Bureau of Energy Efficiency (BEE) for setting statutory standards, mandatory audits, and labelling for appliances and industrial sectors, and enabled the government to prescribe energy use norms for major consumers. It has also introduced the Energy Conservation Building Code (ECBC) and empowered both central and state governments to mandate energy-efficient practices for designated sectors. Further, the Amendments (notably in 2022) expanded its scope to include carbon markets and minimum use of non-fossil energy, making it dynamic in line with climate goals.

The Electricity Act, 2003 has transformed India's power sector by introducing competition, open access, and transparent regulation. It has mandated the promotion of renewable energy by introducing Renewable Purchase Obligations (RPOs) that legally require utilities to procure a minimum share of power from renewables. It has paved the way for unbundling state electricity boards, independent regulation, and private participation—all crucial for grid modernization and integration of clean energy.

The National Action Plan on Climate Change (2008)**,** has brought synergy to climate and energy policies by launching eight missions, notably the National Mission for Enhanced Energy Efficiency (NMEEE) and the National Solar Mission. NMEEE introduced policies such as Perform, Achieve, and Trade (PAT) for energy-intensive industries—creating a market for tradable energy-saving certificates and financing frameworks for efficiency improvements.

Collectively, these legal instruments and policies have made India's vision on energy efficiency, expanding renewables, and meeting international commitments like the Paris Agreement, more functional. The laws have empowered agencies, defined sectoral obligations, and created enforceable minimum standards—features vital for translating policy intent into outcomes. Continuous amendments and targeted missions (PAT Scheme, Solar Mission, ECBC, carbon credit trading, RPOs) demonstrate adaptive governance, which is essential for navigating policy, market, and technological challenges as India transitions toward a sustainable, low-carbon future. India's evolving legal framework on energy conservation is

notable for its structured, enforceable, and adaptive approach, ensuring that both energy efficiency and climate action remain central to its sustainable development agenda. The interplay of the Energy Conservation Act, the Electricity Act, and NAPCC places India on an accelerating path toward national and global energy, economic, and climate objectives.