ANALYSING URBAN ENERGY TRANSITION IN LIGHT OF THE ENERGY CONSERVATION ACT, 2001

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1. SETTING THE CONTEXT

Urban areas play a pivotal role in the global discourse on energy consumption since they house a substantial portion of the global population and bear significant responsibility for a considerable share of worldwide energy usage. 55% of the global population resides in cities which is set to rise by nearly two-thirds by 2050.[1] Population projections presented by the Population Division of the United Nations Department of Economic and Social Affairs reflect that by 2050, half of Asia's countries will have levels of urbanization greater than 74%. India ranks relatively high in this list of Asian countries and has seen its level of urbanization nearly double between 1950 and 1980.[2] Presently India boasts of 5 megacities, which will increase to 7 by 2030.[3] 34% of

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[1]UNDESA (Population Division), 'World Urbanization Prospects: The 2018 Revision' (2019) ST/ESA/SER.A/420.

[2]ibid.

[3]ibid.

India's population currently resides in urban areas, which could rise to 46% by 2040, meaning that India's urban population is projected to rise by approximately 270 million people over the coming two decades, and India would add an equivalent of Los Angeles, each year to its urban population.[4]

A significant proportion of energy consumption is attributed to urban areas due to their role as hubs of economic activities and their heightened need for energy-intensive services. Cities make a substantial contribution to the growing energy demand accounting for two-thirds of global energy consumption, and are responsible for 70% of Global Greenhouse Gas ("GHG") emissions.[5] Despite India's aggressive policies, introduced in the recent past towards the adoption of renewable energy alternatives, India continues to be reliant on coal, which is the mainstay to meet its energy requirements. India recorded a drop in CO_2 emissions for the first time since 1982, not only owing to the COVID-19 lockdown but also as a result of the reduced demand for coal.[6] However, the International Energy Agency (IEA)

[4]International Energy Agency, 'India Energy Outlook 2021' (IEA 2021).
[5]United Nations Human Settlements Programme, 'World cities report 2020: The Value of Sustainable Urbanization' (2020) HS/045/20E, xviii.
[6]Lauri Myllyvirta & Sunil Dahiya, 'Analysis: India's CO2 emissions fall for first time in four decades amid coronavirus' (*CarbonBrief,* 12 May 2020) <https://www.carbonbrief.org/analysis-indias-co2-emissions-fall-for-first-time-in-four-decades-amid-coronavirus/> accessed 21 January, 2023.

reported the highest-ever global increase in CO_2 emissions in absolute terms in 2021, accounting for a 6% increase driven by growth in coal use. India recorded a 13% jump in coal-based electricity generation compared to 2020, partly owing to the slow growth in the use of renewable energy.[7]

The figures reflect that India's energy needs have increased considerably post-recovery from the COVID-induced slump. A considerable share of India's energy use is being employed to fuel urban areas. Rapid urbanization has driven up India's energy use and GHG emissions. In 2018, India ranked 131st in per capita GHG emissions of 1.94 metric tonnes[8] and has recorded an annual 6% increase over the past decade.[9] Given the global expanse and importance of urban areas in energy consumption, it is important to address the energy needs of these areas sustainably and efficiently. Urban areas are extremely critical in overcoming future challenges of energy deficiencies; in facilitating a nation's transition to renewable energy alternatives and in mitigating climate change. In pursuance of the Glasgow Climate Pact

[7]International Energy Agency, 'Global Energy Review: CO2 Emissions in 2021' (IEA 2021).
[8]M. Crippaet al.,'Fossil CO2 & GHG emissions of all world countries' (EUR 28766 EN, Publications Office of the European Union, Luxembourg, European Commission, 2017).
[9]R. Andrew, 'Why India's CO2 emissions grew strongly in 2017' (*CarbonBrief,* 2018) <https://www.carbonbrief.org/guest-post-why-indiasco2-emissions-grew-strongly-in-2017> accessed 21 January, 2023.

adopted by over 200 countries in COP26, mitigation measures have to be deployed across different governance levels to meet the global efforts of limiting warming to 1.5 degrees Celsius.[10] Urban areas and cities play an instrumental role in limiting climate warming since they are bastions of human energy-intensive activities and have a direct impact on energy end-users in the field of urban transport, buildings and other key sectors that support urban infrastructure. While national contributions and progress in the race to mitigate climate change continue to struggle, cities assume an emerging role with efforts to the likes of C40, a network of mayors of nearly 100 world-leading cities collaborating in urgent action to meet the climate crisis[11] and global campaigns like Cities Race to Zero[12], as the nucleus of global climate change governance and mitigation efforts. Cities and Urban Local Governments are increasingly recognized as important components for fulfilling the avowed objectives of global climate policies. The rapid rate of India's urbanization, therefore, presents a crucial opportunity for its urban planners in curbing its energy demands and reducing carbon emissions thereby meeting

[10]United Nations Climate Action, 'COP26 Day 13: An Agreement to Build On' (*UN*) <https://www.un.org/en/climatechange/cop26-day-13-agreement-build> accessed 21 January, 2023.
[11]'About C40' (*C40 Cities*) <https://www.c40.org/about-c40/> accessed 21 January, 2023.
[12]'Cities Race to Zero' (*C40 Cities*) <https://www.c40.org/what-we-do/building-a-movement/cities-race-to-zero/> accessed 21 January, 2023.

both its domestic and global commitments. This can be achieved through a combination of policies and technologies that promote energy efficiency, reduce energy waste, and increase the use of renewable energy sources. What is material at this juncture is to appreciate India's domestic and international commitments towards energy use transition and to identify the instrumentalities responsible for meeting these objectives.

The paper is divided into four parts. The introductory part of the paper has set the context and underscored the important role that Indian urban spaces can play in achieving the shift to efficient and renewable energy resources. Part II of the paper draws attention to the broad framework of the Indian policy landscape on urban energy transition. Part III highlights the objectives of the Energy Conservation Act, 2001 - the first legislation specifically targeting energy conservation efforts of the country and the institutional and structural mechanisms under it. Special attention is paid to examining the efforts undertaken by states to implement this legislation, locating urban areas as the focal point of action, and probing into the Centre-State convergence to meet the avowed objectives of this statute. In the concluding section of the paper, insights and conclusions drawn from the research presented in the preceding sections are provided.

2. ENERGY TRANSITION - POLICY LANDSCAPE

For every nation of the twenty-first century and the times to come, energy generation, use, import and consumption are germane for the discourse on their energy resilience and contribution to global climate change mitigation efforts. Today, nations across the globe confront interconnected challenges related to climate change, energy consumption, and energy security, all of which are deeply intertwined and cannot be effectively tackled in isolation. These phenomena no longer operate in silos and are difficult to decouple. This was not always the case. Energy and climate change began to be interlinked by policymakers only in the later decades of the twentieth century when the international community began to grasp the unalterable effects on the atmosphere and climate triggered by the enhanced use of fossil fuels to power the global economy.[13] Although many nations, particularly those heavily dependent on fossil fuels, were initially hesitant to recognize the connection between these fuels and global warming during the early days of the Intergovernmental Panel on Climate Change, in the current decade it is now widely acknowledged that the

[13]Michael Stephenson, *Energy and Climate Change: An Introduction to Geological Controls, Interventions and Mitigations* (1st ed, Elsevier 2018) 175-178.

production and consumption of energy are deeply interconnected with climate change, and this fact requires no further proof. This is evidenced by the goals and targets set by different actors of the international community working in these spheres, which invariably require nation-states to commit to policy, and governance changes that involve aspects of both.

India has garnered significant global attention and scrutiny due to its status as the third-largest electricity producer, accompanied by concerns about elevated carbon emissions that necessitate both domestic and international focus. Its heavy reliance on coal and imported oil to meet its electricity needs has created formidable challenges in complying with the Sustainable Development Goals (SDGs) and in meeting climate mitigation goals.[14] However, in line with its SDG commitments, particularly SDG7 - ensuring access to affordable, reliable, sustainable and modern energy for all; SDG 11 - sustainable cities and communities and SDG13 - taking urgent action to combat climate change and its impacts, India has directed its efforts towards economic growth in tandem with efforts to make its energy system

[14]Hanying Wang, 'How SDG 7 fosters hope for India's Energy Sector' (*The Borgen Project*, 7 October 2022) <https://borgenproject.org/indias-energysector/#:~:text=With%20ambitions%20to%20achieve%20net,of%20infrastructure%20and%20technology%20improvements> accessed 21 January, 2023.

sustainable and climate resilient. In the recent past, the focus of the government has been towards strengthening its renewable energy resources. This is evident from India's stance at United Nations Framework Convention on Climate Change (UNFCCC)'s COP26 where it has updated its Nationally Determined Contribution (NDC) and has pledged to achieve 500 GW of non-fossil fuel-based energy capacity by 2030 to meet 50% of its energy requirements from renewable sources by 2030. The country has further avowed to reduce total projected carbon emissions by one billion tonnes from the present till 2030, to reduce the carbon intensity of its economy by less than 45% by 2030 as compared to the 2005 levels and to achieve the target of Net Zero by 2070.[15] The Indian Government has also put forward its ambitions of adopting a citizen-centric mass movement - LIFE-Lifestyle for Environment as a key initiative towards combating climate change where citizens play a central role in adopting a way of life that is conducive to the planet's well-being.[16] The Indian Government's updated NDCs and other incentives seek to enhance green jobs in automobiles, electric vehicles, appliances etc. [17]

[15]Ministry of Environment, Forest and Climate Change, 'India's Stand at COP-26'(*PIB*, 03 February,2022) <https://pib.gov.in/PressReleasePage.aspx?PRID=1795071> accessed 21 January, 2023.

[16]ibid.

[17]Ministry of Environment, Forest and Climate Change, 'Cabinet approves India's Updated Nationally Determined Contribution to be

However, the cabinet press release on the updated NDCs does not identify any specific Ministry or Department responsible for spearheading these amended targets. It enjoins this task of meeting them on 'relevant' Ministries/Departments with support from States and Union Territories. The press release unequivocally states that 'India's NDC does not bind it to any sector-specific mitigation obligation or action.' It affirms the country's objective of reducing overall emission intensity and improving the economy's energy efficiency over time while protecting the vulnerable sectors of the economy.[18]

While the NDCs do not delineate the role of Ministries and Departments involved with the task of urban planning and development in meeting energy efficiency and climate change targets, the Central Government has floated several policies, schemes, and programmes primarily under the aegis of the Ministry of Housing and Urban Affairs (MoHUA) that have attempted to mainstream energy management in urban development and planning. Before delving into the urban development and infrastructure policies with energy use and climate change implications, it is important to delineate the

communicated to the United Nations Framework Convention on Climate Change' (*PIB*, 03August 2022)<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847812> accessed 19 January, 2023.

[18]ibid.

division of power between the Central and State Governments in governing the Indian urban spaces.

The Central Government's work in the sphere of urban affairs, development and housing is undertaken by the MoHUA which plans, monitors and coordinates activities and programmes of various Central Ministries, State Governments, and other nodal authorities in the country. However, the constitutional authority of the Central Government to legislate on matters of urban development and planning is restricted to Delhi, the Union Territories and any other subject that the State Legislatures may authorise the Union Parliament to legislate on.[19] Vide the 74th Constitutional Amendment Act, 1992, which added Part IX A (Articles 243P - 243ZG) to the Constitution, the responsibility of urban development has been vested in the State Governments and the urban local bodies comprising, Municipal Corporations, Municipal Councils for urban areas and Nagar Panchayats for areas in transition from rural to urban. These bodies responsible for urban local governance have their jurisdictional limits over specified urban areas demarcated by the State Governments and are manned by elected representatives. 18 functions have been identified in the XII Schedule to the Constitution

[19]The Constitution of India, 1950, art 249.

which was added vide the amendment that includes *inter alia* subjects that are of direct relevance to energy use and climate change. Pertinent among these include urban planning including town planning; regulation of building construction; roads and bridges; water supply for domestic, industrial, and commercial purposes; public amenities including street lighting, parking lots, bus stops, and public conveniences; burials and burial grounds including electric crematoriums; urban amenities and facilities; sanitation and waste management; urban forestry, parks, playgrounds, and gardens. Most of these functions are discharged by the Municipal bodies in pursuance of laws drafted by the state legislature or Rules and By-Laws promulgated by the bodies. However, even before the 74th constitutional amendment, most states had drafted their town and country planning laws[20] between 1951 and 1990, which coincided with the Five-Year Plans spearheaded by the Planning Commission of India, which supported most of the urban planning and development programmes. It was also during this period

[20]Bihar Town and Country Improvement Act 1951; Bombay Town Planning Act 1954; Delhi Development Authority Act 1957; Assam Town and Country Planning Act 1959; Jammu and Kashmir Town Planning Act 1963; The Maharashtra Regional and Town Planning Act 1966; The Pondicherry Town and Country Planning Act 1967; The Tamil Nadu Town and Country Planning Act 1971; The. U.P. Urban Planning and Development Act 1973; Madhya Pradesh Town and Country Planning Act 1973; Tripura Town and Country Planning Act 1975; Gujarat Town Planning and Urban Development Act 1976; Bangalore Development Authority Act 1976; Himachal Pradesh Town and Country Planning Act 1977.

that Central Government's Public Sector Undertakings (PSUs), the likes of the Housing and Urban Development Corporation, and City and Industrial Development Corporation with a specific focus on urban development, were established.[21] This reflects that urban planning efforts in the country have largely advanced in a fragmented manner, with states and the Central Government creating separate plans, thereby increasing the potential for conflicts or friction.

To underscore this point, we can reference initiatives introduced by the Central Government that pertain directly to climate change and are situated at the intersection of urban development and energy efficiency. The National Action Plan on Climate Change (NAPCC) was unveiled on June 30, 2008. This plan outlines a national strategy to help India adapt to climate change while simultaneously enhancing the country's ecological sustainability in its development endeavours. At the heart of the National Action Plan are eight "National Missions,"[22] which serve as its fundamental components.

[21]NITI Aayog, 'Reforms in Urban Planning Capacity in India' (*NITI Aayog*,2021)<https://www.niti.gov.in/sites/default/files/2021-09/UrbanPlanningCapacity-in-India-Annexures-16092021.pdf> accessed 21 January, 2023.

[22] National Solar Mission; National Mission for Enhanced Energy Efficiency; National Mission on Sustainable Habitat; National Water Mission; National Mission for Sustaining the Himalayan Eco-system; National Mission for a Green India; National Mission for Sustainable

These missions are centred around advancing knowledge and awareness of climate change, addressing both adaptation and mitigation strategies, promoting energy efficiency, and conserving natural resources.[23] Among these eight missions, consider the National Mission on Sustainable Habitat (NMSH).

NMSH has two primary objectives: (i) Promoting environmentally friendly urban growth to reduce GHG emissions intensity, aligning with India's NDC commitments, and (ii) Enhancing cities' resilience to climate change impacts and bolstering their ability to recover effectively from climate-related extreme events and disaster risks. The initial version of NMSH, introduced in 2010, has undergone revisions in light of the NDCs stipulated by the Paris Agreement, SDGs, and the UN Habitat's New Urban Agenda. The updated NMSH has delineated five thematic domains, which include (i) Energy and Green Building, (ii) Urban Planning, Greenery, and Biodiversity, (iii) Mobility and Air Quality, (iv) Water Resource Management, and (v) Waste Management. Within each thematic area, essential

Agriculture and National Mission on Strategic Knowledge for Climate Change.

[23]Ministry of Environment, Forest and Climate Change, 'National Action Plan on Climate Change (NAPCC) FAQs' (*PIB*, 1 December, 2021)<https://static.pib.gov.in/WriteReadData/specificdocs/documents/2021/dec/doc202112101.pdf> accessed 21 January, 2023.

strategies for both mitigation and adaptation to support the establishment of sustainable habitats have been proposed. The first thematic area, "Energy and Green Buildings," centers around the reduction of energy consumption within India's real estate sector, particularly for lighting, heating, cooling, and similar purposes. This involves transitioning towards cleaner and renewable energy sources by embracing green building technologies. Some of the crucial mitigation and adaptation strategies proposed in this domain encompass conducting yearly energy audits for all municipal services, including water supply, sewage, and stormwater management, as well as promoting renewable energy adoption and achieving 100% deployment of energy-efficient street lighting. The NMSH 2.0 is slated for execution from 2020-21 to 2030. The objectives of NMSH 2.0 are expected to be met through several other initiatives and programs within the MoHUA, launched by the Ministry in 2015 to integrate sustainable development and climate action into all urban investments and development activities. These urban missions and programs include the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana -Urban (PMAY-U), Deendayal Upadhyay Antyoday Yojana - National Urban Livelihoods Mission (DAY-NULM), Swachh Bharat Mission - Urban (SBM-U), and the Smart Cities Mission (SCM). These missions aim to establish exemplary models

of sustainable urban development, serving as replicable examples to enhance the quality of life for urban citizens.[24]

A closer look at the Mission document, particularly the key priorities under the first thematic thrust area- 'Energy and Green Building' reveals that most measures and strategies that could facilitate energy-efficient and sustainable urban habitats are in the form of recommendations from the Ministry. These include *inter alia* conducting annual energy audits of all municipal services, including water supply, sewage, and stormwater management; promoting 100% installation of energy-efficient streetlights and use of renewable energy-operated streetlights; promoting the installation of renewable energy systems in buildings (premises), including all municipal corporation buildings, to reduce the dependency on fossil fuels.[25]

When these strategies are read together with other programmes launched by the Ministry of New and Renewable Energy such as Municipal Energy Efficiency Programme (MEEP), Street Lighting National

[24] Ministry of Housing and Urban Affairs, 'National Mission on Sustainable Habitat 2021-2030' (*MoHUA*, October, 2021) <https://mohua.gov.in/upload/uploadfiles/files/NMSH-2021.pdf> accessed 9 September, 2023.
[25] ibid.

Programme (SLNP), and Unnat Jeevan by Affordable LEDs and Appliances for All (UJALA), it becomes apparent that these schemes such as SLNP work in collaboration with Urban Local Bodies, Municipal Bodies, Gram Panchayats and State Governments and target transforming the market by lowering prices through demand consolidation and changing the preference for purchasing from Sodium Vapour/Fluorescent Lighting to LED-based State Lighting. When the Energy Service Company (ESCO) Model is opted for conventional street lights are replaced with LED lights without any need for municipalities to invest. [26] The core concept of the business model revolves around the idea that the facility owner does not need to provide upfront capital for energy efficiency projects. Instead, they are obligated to fund these investments solely from the actual savings they accrue through the implemented energy efficiency projects. ESCOs offer their services through the Energy Saving Performance Contracting (ESPC) model which has several variants. The Bureau of Energy Efficiency (BEE) has undertaken measures to develop the ESCO market.[27]

[26] Ministry of Power, 'Salient features of UJALA and SLNP programmes'(PIB,22March,2022)<https://pib.gov.in/PressReleseDetailm.aspx?PRID=1808264> accessed 2 September, 2023.

[27]Ministry of Power, 'Energy Saving Companies' (*Bureau of Energy Efficiency*)<https://saathee.beeindia.gov.in/Common/BEEContent?MID=2&SMID=31> accessed 2 September, 2023.

Another key strategy identified under the first thematic thrust area recommends municipal corporations with a population exceeding 10 lakhs to establish a green building action cell responsible for various tasks, including knowledge dissemination, public awareness, accrediting green building vendors, designing green building initiatives and promoting them, conducting verifications, and expediting approvals for green constructions within the city. Additionally, it is recommended that such municipal corporations should form a high-level green building committee or its equivalent, comprising ex-officio members from the municipal corporation, smart city Special Purpose Vehicles (SPV), Urban Development Department, Public Works Department, green building certification agencies, and civil engineering/architectural associations to offer strategic guidance to encourage the adoption of energy-efficient and environmentally friendly buildings in the city.[28]

Another recent initiative of the MoHUA under the Smart Cities Mission was the launch of the Climate Smart Cities Assessment Framework (CSCAF) in 2019. Currently, in its third phase of implementation, CSCAF serves as a

[28]Ministry of Housing and Urban Affairs, 'National Mission on Sustainable Habitat 2021-2030' (*MoHUA*, October, 2021) <https://mohua.gov.in/upload/uploadfiles/files/NMSH-2021.pdf> accessed 2 September, 2023.

comprehensive monitoring framework to gauge the advancement made in alignment with NMSH guidelines. It offers cities 28 indicators (mapped with 5 thrust areas under NMSH) to evaluate their yearly performance and offers a step-by-step plan for integrating pertinent climate actions. The outcomes derived from CSCAF play a vital role in tracking progress and providing insights to inform NMSH.[29] In line with CSCAF, the Ministry has also spearheaded the Climate Centre for Cities (C-Cube) at the National Institute of Urban Affairs (NIUA),[30] to foster collaboration and coordination among diverse stakeholders engaged in climate initiatives within Indian cities, to enhance overall impact. Currently, 126 cities including the 100 Smart Cities, with a combined population exceeding 140 million individuals, are actively documenting their climate-related initiatives and are evaluated on six indicators under the Energy and Green Building component which include electricity consumption in the city, total electrical energy in the city derived from renewable sources, fossil fuel consumption,

[29]Ministry of Housing & Urban Affairs, 'ClimateSmart Cities Assessment Framework 3.0: Technical Document', (*MoHUA*, 2022) <https://niua.in/ccube/sites/all/themes/zap/assets/pdf/CSCAF_3_0_Technical_document.pdf> accessed 2 September, 2023.

[30] An autonomous think tank on urban planning and development set up in 1976 under the aegis of the Ministry of Housing and Urban Affairs. NIUA, <https://niua.in/About_NIUA#aboutNiua> accessed 2 September, 2023.

energy efficient street lighting, promotion of green buildings and green building adoption.[31]

Therefore, a perusal of these schemes working in tandem with the NMSH's Energy and Green Building vertical reflects a significant dependence on Urban Local Bodies and State Governments and to a certain extent consumer awareness (especially in the case of LED lights under the UJALA scheme)[32] to implement many of these schemes and initiatives. These entities play a crucial role in executing and overseeing various urban development and energy efficiency programs, including the adoption of LED lighting, green building initiatives, and other sustainability measures.

The decentralization of urban governance in India allows for flexibility, responsiveness, and adaptation to local needs. However, it also necessitates effective coordination and capacity-building efforts to ensure that the Central Government's objectives are met consistently across the country. States with more resources and administrative capacity may benefit more from these

[31]Climate Data Observatory, NIUA <https://niua.in/c-cube/cdot/index.html> accessed 2 September, 2023.

[32] Radhika Khosla and Ankit Bhardwaj, 'Illuminating Affordable Homes', in Radhika Khosla and Aditya Chunekar (Eds.) (2017). Plugging In: A Collection of Insights on Electricity Use in Indian Homes,<https://cprindia.org/wpcontent/uploads/2022/01/Plugging-In-Residential-Electricity-in-India_CPR-Prayas-2017.pdf> accessed 2 September, 2023.

schemes floated by the Union Government, while those with fewer resources may struggle to effectively implement initiatives. This claim finds credence from the fact that all cities that stood out as forerunners on the six indicators under the Energy and Green Building component in the Second Phase of CSCAF were a part of the Smart Cities Mission which enjoyed relative advantages over cities not part of the Mission in terms of resource allocation, utilization and urban planning.[33] Thus, although the Central Government has the authority to introduce schemes, plans, and model laws[34] related to urban governance, it lacks the power to enact legislation on this subject. These initiatives of the Central Government serve as persuasive nudges and are required to be accepted and adopted by the respective states and municipal bodies to ensure that their effects are felt across the country.

3. THE ENERGY CONSERVATION ACT, 2001

The Energy Conservation Act, of 2001 (ECA) was the first legislation to directly target the energy conservation

[33] Surat, Diu, Tirupati, Pune, Rajkot, Nagpur, Warangal, Chandigarh and Pimpri Chinchwad, 'Best Practices', (*CSCAF 2.0*) <https://niua.in/c-cube/cdot/best-practices.html> accessed 2 September, 2023.

[34] The Ministry of Housing and Urban Affairs has drafted several model laws to serve as guidance materials for the State Governments, Urban Local Bodies, Urban Development Authorities Model Municipal Law, 2003; Model Building Bye-Laws 2016; Model Tenancy Act 2021.

efforts of the country. Despite the close interlinkages between energy consumption and climate change, this Act predates the NAPCC which was launched in 2008. From the perspective of urban areas and their share in the country's energy consumption and conservation efforts, the application of the ECA could be very relevant. Three of the major thrust areas of the Act – carbon credit trading, the energy efficiency of buildings and the energy efficiency of appliances have a direct correlation with urban areas and could aid in achieving energy efficiency. Urban areas present unique challenges for implementing central laws for reasons already mentioned. The ECA which has direct implications for urban buildings and use of appliances functions under the aegis of the Ministry of Power. The energy sector in general falls under the ambit of the Central Government with certain aspects such as electricity, governed by states. Given this context, it is crucial to examine the strategies for implementing the Act and explore potential alignment between the Central and State Governments in its execution.

The ECA was drafted to ensure the efficient use of energy and its conservation and specified norms and standards for appliances, equipment, and construction of buildings. The latest amendment to the Act in 2022 seems to align the law to meet India's new energy targets

and seeks to support India's journey towards a Net-Zero economy by 2070. The Act is implemented by the BEE established in March 2002 under Section 3 as a Central statutory body comprising 31-37 members with representation from energy-intensive Central Ministries[35] and the recent addition of representation from the Ministries of Environment, Forest and Climate Change, Housing and Urban Affairs, Road Transport and Highways, Steel, Civil Aviation, Ports, Shipping and Waterways, Railway. The BEE, which works under the auspices of the Ministry of Power also has nominated representation from the energy or power department of five states from the five power regions and a maximum of seven experts or persons capable of representing industry, equipment and appliance manufacturers, architects, institutes and consumers nominated by the Central Government.[36] This appears to be a pertinent step in recognising the importance of adopting an economy-wide perspective to regulate energy consumption and enhance energy efficiency through inter-ministerial coordination. The Act largely applies to 'designated consumers' who include any user or class of users in energy-intensive industries and other establishments identified by the Central Government in

[35]Central Ministries and Secretaries of the Government of India associated with Power, Petroleum and Natural Gas, Coal, Non-conventional Energy Sources, Atomic Energy.
[36]Energy Conservation Act 2002, s 4.

cognizance of the intensity or quantity of energy consumed.[37] The list of designated consumers is enlisted in the Schedule appended to the Act and the BEE reserves the power to recommend the inclusion of any class of energy consumer as 'designated' under the Act.[38]

The provisions of the Act that could impact urban areas in achieving energy efficiency are (i)the carbon credit trading scheme; (ii) the energy efficiency of appliances and (iii) the actual implementation of the Act in the states. The 2022 amendment to the ECA empowers the Central Government to enforce a carbon credit trading scheme and prescribe a minimum share of consumption of non-fossil sources, with penalties for non-compliance. The proposed carbon market aims to increase demand for renewable energy certificates and emissions reduction units, with the potential to extend to sectors beyond energy-intensive industries, such as commercial buildings, establishments, and the transport sector. In so far as energy efficiency of electronic appliances is concerned, BEE's Standards and Labelling Programme aims to promote energy efficiency in India by mandating energy efficiency standards for popular home appliances. The Central Government has also floated some appliance and sector-specific initiatives to push towards energy

[37]ibid, s 14 (e).
[38]ibid, s 13(c).

efficiency. However, the ultimate success of this law lies in the country-wide implementation of its provisions and allied regulations that largely depend on municipal approval and state-by-state acceptance.

The following section has emphasized the importance of these three aspects of the ECA for achieving energy efficiency in urban areas.

Carbon Credit Trading Scheme

Powers of the Central Government under Section 14 to enforce efficient use of energy and its conservation have been expanded vide the 2022 amendment to include the issuance of a carbon credit trading scheme[39] and prescribing minimum share of consumption of non-fossil sources by designated consumers as energy or feedstock, who have registered for carbon credit trading schemes with different consumption benchmarks for different designated consumers.[40] Failure to comply with the requirement of meeting a minimum share of consumption of non-fossil sources could attract a penalty of up to 10 lakh rupees for each transgression. To establish a carbon market, the Central Government or any agency authorised by it may issue a carbon credit

[39]ibid, s 14(w).
[40]ibid, s 14(x).

certificate to registered entities that comply with the carbon credit trading scheme and allow the registered entity to trade in carbon credits.[41] The Central Government or its authorised agency can also issue Energy Savings Certificates (ESCerts) to the designated consumers who have consumed energy lower than the prescribed norms and standards. The amendment further allows persons other than registered consumers to purchase energy-saving certificates or carbon credit certificates voluntarily.[42]

The 2022 amendments to the ECA appear to tie in with the objectives of the Draft Blueprint of the National Carbon Market issued by the Ministry of Power and BEE published in October 2021. The draft clearly states that to facilitate the country in achieving 2030 NDC targets, the development of a domestic carbon market with adequate support mechanisms is crucial. The proposed voluntary carbon market could be instrumental in three ways - creating a market framework for wider energy saving with fair and transparent price discovery; increasing potential for those climate-conscious organizations and individuals who could voluntarily participate in reducing their emissions and offsetting remaining GHG emissions with

[41]ibid, s 14AA.
[42]ibid, s 14A.

the use of carbon credits and incentivising a shift to renewable energy. [43]

As per the draft blueprint, the primary target players of the carbon market would be voluntary entities whose active participation would aid in meeting India's NDC. The voluntary carbon market proposed to be carried out in three phases would focus on increasing demand for ESCerts and Renewable Energy Certificates (RECs) in the market in the first phase. This would involve converting ESCerts and RECs to tradable carbon credits to be traded with voluntary buyers, existing designated consumers, State Designated Agencies (SDAs)[44], DISCOMs – who have Renewable Purchase Obligations under the Electricity Act, 2003 and the airlines sector. In the second phase, project-level registration would generate a supply-side push, facilitated by the proper validation of projects by a third-party auditor, followed by verification and issuance of emission reduction units. The final phase would involve transitioning to a cap-and-trade system, modelled after the one currently in operation in

[43]Ministry of Power & Bureau of Energy Efficiency, 'National Carbon's Market: Draft Blueprint on "National Carbon Market"' (*EQ International*)<https://beeindia.gov.in/sites/default/files/NCM%20Final.pdf> accessed 21 January, 2023.

[44]Energy Conservation Act 2001, s 15 (d) (The Ministry of Power reports that SDAs have been established in 32 states and Union Territories and the role of the SDA is undertaken by different departments across states such as the Renewable Energy Development Agency; Electrical Inspectorate, Distribution Companies, Power Departments and others).

the European Union. This would involve allocating a specific number of emissions to individual sectors and companies.[45] This scheme, if introduced, would be administered by the BEE, with the Central Electricity Regulatory Commission acting as the market regulator for trading in carbon credits. The carbon credit trading scheme purported to be introduced by the 2022 amendment is not the first of its kind in India, since the Perform Achieve Trade (PAT) Scheme launched in 2011 under the National Mission for Enhanced Energy Efficiency is already in place which incentivises energy-intensive industries to save energy and procure tradable ESCerts from the authorities. However, the ECA could have a wider impact in so far as energy consumption in urban India is concerned since its application. Consequently, the carbon credit trading scheme could be extended to not only energy-intensive industries but also voluntary buyers, SDAs, commercial buildings and establishments and the transport sector which feature in the urban map.

Energy Efficiency of Appliances

India achieved near universal household connectivity to electricity in 2019, a historic achievement for over 900 million citizens who gained electric connections to their

[45]MoP, supra note 43.

households. While there continue to be challenges in providing affordable and sustainable access to all potential consumers of the country, the past decade has witnessed electricity consumption by buildings outpacing the electricity consumption of the wider economy. This has been attributed to the increase in appliance use in Indian households. Most households with access to electricity use LED bulbs, ceiling fans and televisions. There is a stark divide in the categories of electrical appliances that are used in urban and rural households except televisions and smartphones which are owned by over 60% of households in rural areas. Energy consumption from energy-intensive appliances is largely due to urban households having a much greater likelihood of owning refrigerators, washing machines and air-conditioning units as compared to rural households.[46]

Under the ECA, the Central Government reserves the power to prescribe norms and processes for energy consumption standards of appliances, industrial units, buildings, or establishments; and prohibit the manufacture or import of any equipment or appliance that does not conform to the standards prescribed. The scope of Section 14 has been expanded vide the 2022 Amendment to include 'vehicles' (as defined under

[46]International Energy Agency, 'Global Energy Review: CO2 Emissions in 2021' (IEA 2021).

Section 2(28) of the Motor Vehicles Act, 1988) and vessels (including ships and boats).[47] The Government can also direct appliances and equipment to display particulars on labels that reflect energy consumption. The Central Government also has the power to prohibit the manufacture or import of equipment appliances vehicles or vessels and the closure of industrial units that do not comply with energy consumption regulations.[48] Both the BEE and the Central Government have the power to notify any user or class of users of energy as a designated consumer under the Act which would require them to comply with the requirements of the Act and directions issued by the Central or the State Government.[49]

In pursuance of these provisions, the BEE has been operating the Standards and Labelling Programme since 2006 which allows consumers of electrical appliances to make an informed choice about energy saving and consumption. Energy-intensive electrical appliances and equipment recognised under the programme must bear energy performance labels and lay down minimum energy performance standards. Presently the programme covers a list of 30 appliances and equipment that all have been

[47]Energy Conservation (Amendment) Act 2022, s 6.
[48]Energy Conservation Act 2001, s 14.
[49]ibid, s 13 (c) & 14 (e).

notified via gazette notifications.[50] The programme operates as a rating system that operates between 1 star being the least energy efficient and 5 stars being the most energy efficient given to appliances and equipment by BEE. Some appliances have to mandatorily[51] carry these labels and cannot be sold till they meet the minimum 1-star rating. Appliances under the voluntary category do have prescribed energy efficiency levels but can be sold even without labels and with an efficiency of less than a 1-star rating. BEE revises its star rating system periodically to encourage more energy-efficient technologies, which implies that a 5-star appliance model rated today may become 3-star rated in the times to come. Amongst the list of appliances that need to mandatorily carry the BEE labels and bear star ratings, the humble ceiling fan which is ubiquitous in rural and urban areas has had a rather late entrance with notifications issued in May 2022.[52]

Steps taken by the BEE in mandating energy efficiency standards for popular home appliances look promising. However, mandating tighter norms does not always translate into compliant consumer behaviour or large-

[50]Bureau of Energy Efficiency, 'Standards and Labelling' (*BEE*) < https://beeindia.gov.in/content/standards-labeling> accessed 21 January, 2023.
[51]ibid.
[52]Bureau of Energy Efficiency, 'Electric Type Ceiling Fan' (*BEE*) <https://www.beestarlabel.com/Content/Files/CFN_Notification.pdf > accessed 21 January, 2023.

scale adoption of such appliances. For instance, there has been a significant drop in 5-star-rated appliance production for frost-free refrigerators after energy efficiency requirements were made more stringent in 2014 and 2016. Consumer research has shown that buyers are more likely to choose an option that falls somewhere in between the best compliance standards possible and the least.[53] The Press release of the Ministry of Power in June 2021 has however reflected encouraging figures and hailed the performance of the BEE Standard and Labelling Programme. The release noted that the use of energy-efficient products by the citizens has resulted in an estimated electricity savings of 56 billion units during 2020-21, worth over Rs. 30,000 crore which was effective in reducing CO_2 emissions of approx. 46 million tonnes every year.[54] In addition to initiatives that directly target households, the Central Government has implemented UJALA, and SLNP, which target specific appliances or sectors. As of February 2022, 36.79 crore LED bulbs, 72.18 lakh LED tube lights and 23.59 lakh, energy-efficient fans have been distributed across the country

[53]Aditya Chunekar & Mrudula Kelkar, 'The Efficiency Of Appliances' (*CPR&Prayas(energygroup*,24October2017) <https://energy.prayaspune.org/our-work/article-and-blog/the-efficiency-of-appliances> accessed 21 January, 2023.

[54]Ministry of Power, 'Standards and Labelling (S&L) Program results into estimated electricity savings of 56 Billion Units during 2020-21' (*PIB*,8June2021)<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1725448> accessed 16 January, 2023.

under the UJALA program.[55] Over 10 million LED smart street lights have been installed by Energy Efficiency Services Limited, a government-owned energy services company.[56]

Implementation of ECA in States

Chapter VI of ECA delineates the role of State Governments. A perusal of the provisions reveals that the bulk of its power is restricted to energy use and energy efficiency of buildings. The State Government in consultation with the BEE can amend the energy conservation and sustainable building codes to suit the regional and local climatic conditions. Furthermore, states may specify and notify energy codes concerning the use of energy in the buildings and implement the same through building bylaws. It can direct designated consumers who are owners or occupiers of a building or building complex to comply with the provisions of the codes and direct such consumers if necessary to conduct energy audits by a certified auditor. The power of the states to vary the energy conservation and sustainable building codes has likely been granted by the Act to ensure alignment with the powers already vested in them

[55]Ministry of Power, 'Status of Implementation of National Mission for Enhanced Energy Efficiency (NMEEE)' (*PIB* 2022).
[56]International Energy Agency, 'Global Energy Review: CO2 Emissions in 2021' (*IEA 2021*).

under the XII Schedule of the Constitution. This division of power is particularly relevant from the perspective of energy consumption in urban areas which are populated by buildings, particularly commercial buildings that are the second-highest consumers of electricity.

The amended Act mandates an "Energy Conservation and Sustainable Building Code" to be prescribed by the BEE. Before the 2022 amendment, the Act required an energy conservation building code that focused on energy consumption expressed in terms of per square metre of the area occupied by the building. This has been altered to a code that focuses on sustainability and prescribes norms and standards for energy efficiency and its conservation, use of renewable energy and other green building requirements for a building.[57] The amended definition of 'building' has been expanded to include a building which has a minimum connected load of 100 Kilowatt (kW) or contract demand of 120 Kilovolt Ampere used or intended to be used for commercial purposes or as an office building or for residential purpose.[58] The earlier definition made no mention of residential complexes. Further, the amendment also allows State Governments to prescribe a lower threshold for connected load or contract demand which enhances

[57]Energy Conservation Act 2001, s 2(j).
[58]Energy Conservation Act 2001, s 2(c).

their power to direct smaller commercial and residential buildings to use renewable energy and sustainable materials for construction and comply with energy efficiency and conservation standards.[59]

The Energy Conservation Building Code (ECBC) was released by the BEE in 2007 and revised in 2017 to incorporate advanced technologies and additional parameters of renewable energy integration, ease of compliance, the inclusion of passive building design strategies and flexibility for the designers.[60] Estimates show that by 2030, India is slated to add nearly one billion square metres of new commercial floor space—more than the land area of New York City and Washington D.C combined and the implementation of the ECBC across the country could avoid 1,065 metric tons of carbon dioxide emissions till 2030.[61] The FAQs on the ECBC released by the BEE and the Ministry of Power note that the building construction boom in India which is yet to reach its full potential will pose grave challenges to energy efficiency. By setting minimum energy efficiency levels for commercial buildings, and

[59]ibid.

[60] Ministry of Power & Bureau of Energy Efficiency, 'Energy ConservationBuildingCode2017'(*BEE*)<https://beeindia.gov.in/sites/default/files/BEE_ECBC%202017.pdf> accessed 21 January, 2023.

[61]Sameer Kwatra & Prima Madam, 'Constructing Change with Building Energy Codes in India' (*Natural Resources Defence Council,* 6 August 2021) <https://www.nrdc.org/experts/sameer-kwatra/constructing-change-building-energy-codes-india> accessed 18 January, 2023.

locking in energy savings for years to come, the ECBC seeks to ensure the comfort of the occupants while ensuring climate mitigation efforts. The ECBC has no application to residential buildings and complexes and is restricted to the hospitality sector, assembly (theatre, transport service facilities, multiplex), healthcare, business, education sector and shopping facilities.[62]

The ECA and the ECBC had left residential buildings outside its scope, but the 2022 amendment has attempted to plug that gap. Even before this amendment, the BEE and the Ministry of Power introduced the Eco Niwas Samhita (ENS) in 2018 targeting the energy efficiency of the residential building sector taking cognizance of the fact that 70% of the electricity consumed by buildings is reportedly consumed by residential buildings. Part I: Building Envelope of ENS prescribed minimum building envelope performance requirements to limit heat gains (for cooling-dominated climates) and to limit heat loss (for heating-dominated climates), as well as for ensuring adequate natural ventilation and daylighting potential.[63] Part II of ENS launched in July 2021 titled Compliance

[62]Ministry of Power & Bureau of Energy Efficiency, 'Energy ConservationBuildingCodeFAQs'<https://beeindia.gov.in/sites/default/files/ECBC_FAQs_0.pdf> accessed 19 January, 2023.
[63]Ministry of Power & Bureau of Energy Efficiency, 'Eco-Niwas Samhita 2021 (Code Compliance and Part-II: Electro-Mechanical and RenewableEnergySystems)'(July2021)<https://beeindia.gov.in/sites/default/files/ENS%202021.pdf> accessed 20 January, 2023.

Code and Electro-Mechanical and Renewable Energy Systems prescribes minimum energy performance requirements for building services, indoor electrical end-use and renewable energy systems. The Code applies to residential buildings and residential parts of Mixed land-use building projects built on a plot area measuring more than or equal to 500 square metres. The Code also applies to additions to existing infrastructure in residential buildings that could result in the renovated or remodelled building surpassing the designated threshold. The electromechanical systems covered under the Code include building services such as common area and exterior lighting, elevators, pumps, basement ventilation, transformers, power distribution losses, power factor correction, electrical vehicle supply equipment etc. and indoor electrical end-use services such as indoor lighting, comfort systems, service hot water etc.[64]

While the provisions of this Central Code that apply to residential buildings look promising and could positively impact urban areas in attaining energy efficiency, its implementation like most other codes in the domain of urban development largely depends on municipal approval and state-by-state acceptance and incorporation into law. Further, the document on the Code released by

[64]ibid.

the BEE clearly states that in case of conflict between ENS 2021 and any other rules on safety, security, health, or environment by Central, State, or Local Government, the Code prescribed by the government would take precedence.[65] This leaves it to the discretion of the respective state and municipal authorities to adopt and implement the Code.

Other powers and responsibilities of the State Governments under the ECA include establishing SDAs to coordinate and enforce the provisions of the Act, encouraging the use of energy-efficient equipment or appliances, undertaking awareness drives and capacity-building exercises for personnel for efficient use of energy and its conservation and setting up of the State Energy Conservation Fund for promotion of efficient use of energy and its conservation within the State.[66] The provisions of the Act have been supplemented by several rules, the most material amongst them when viewed from the perspective of energy consumption of designated consumers being the Energy Conservation (PAT) Rules, 2012.[67] These Rules vest the responsibility of establishing

[65]ibid.
[66]Energy Conservation Act 2001, s 15 & 16.
[67]Energy Conservation (Energy Consumption Norms and Standards for Designated Consumers, Form, Time within which, and Manner of Preparation and Implementation of Scheme, Procedure for Issue of Energy Savings Certificate and Value of Per Metric Tonne of Oil Equivalent of Energy Consumed) Rule 2012.

energy consumption norms and standards on the technical committee set up by the BEE.[68] Under these Rules, the SDAs are responsible for receiving the action plans submitted by designated consumers that detail their identified energy-saving measures. Further, they are also responsible for assessing the performance of the consumers.[69]

Section 18 of the Act is broadly worded and gives power to the Central and State Governments to issue directions to any person, officer, authority, or any designated consumer for the efficient use of energy and its conservation. The section clarifies that the government's authority to issue directions encompasses the authority to issue regulations and norms for process and energy consumption standards in any industry; building or building complex. The government also has the authority to instruct the establishment of standards for regulating the energy consumption for equipment and appliances. This provision gives the sense that the State Government has also been empowered to issue norms and regulations on energy consumption standards for equipment and appliances. While the Energy Conservation (PAT) Rules, 2012 restrict the role of the State Government and its designated agencies to a supervisory capacity, Section 18

[68]Energy Conservation (PAT) Rules 2012, Rule 4.
[69]Energy Conservation (PAT) Rules 2012, Rule 5 & 6.

envisages a broader role of the state since it also empowers it to regulate energy consumption standards. Neither the Act nor the Rules clarify to what extent the powers of the State Governments under Section 18 can be stretched. However, operational guidelines issued by the BEE for strengthening the SDAs reflect that the ECA follows a two-tier structure for its implementation with the BEE at the Centre assisted by the notified SDAs acting as nodal agencies in the states and union territories.[70]

SDAs have been established in 36 States and Union Territories.[71] Kerala and Andhra Pradesh have established Stand-Alone SDAs. However, the remaining 34 States and UTs have assigned the additional responsibility of facilitation and enforcement of the provisions of the ECA at the State level to one of their existing agencies or departments, such as the Renewable Energy Development Agency, Electrical Inspectorate, Distribution Companies, and Power Departments. In states where SDAs are housed within pre-existing departments, the SDA shares key facilities, staff, and

[70]MoP & Bureau of Energy Efficiency, 'Scheme for Strengthening SDAs,OperationalGuidelines'<https://beeindia.gov.in/sites/default/files/Guidelines%20SDA%20Book%20PRINTED%20ONE_0.pdf> accessed 20 January, 2023.

[71]BureauofEnergyEfficiency,'SDAs'<https://beeindia.gov.in/content/sdas-0> accessed 17 January, 2023.

budget with the parent department. [72]The following paragraphs examine some of the initiatives undertaken by SDA in a select few states to identify whether there is any parity in the measures and implementation strategies adopted by them in complying with the provisions of the ECA with specific reference to the ECBC (the Code).

In Karnataka, the body designated as the SDA is the Karnataka Renewable Energy Development Ltd (KREDL).[73] A perusal of the agency's website reflects that vide Section 18 of the ECA, the Government of Karnataka has issued several directions in the field of energy efficiency to comply with the provisions of the Act. The Karnataka Energy Conservation Building Code (ECBC) was introduced in 2014 and revised in 2018,[74] with the KREDL identified as the nodal agency responsible for the implementation of the Code. The enforcing authority for ensuring compliance of private and public buildings with the code is the Urban Development Department and the Directorate of

[72]Bureau of Energy Efficiency, 'Scheme for Strengthening SDAs, OperationalGuidelines'<https://beeindia.gov.in/sites/default/files/Guidelines%20SDA%20Book%20PRINTED%20ONE_0.pdf> accessed 18 January, 2023.

[73]Energy Department, Government of Karnataka, 'Notification No. DE 22 PSR 2002/363' <https://kredl.karnataka.gov.in/storage/pdf-files/EC/SDA%20-NOTIFICATION.pdf> accessed 17 January, 2023.

[74]Energy Department, Government of Karnataka, 'KECBC 2018 Notification No. EN 171 VSC 2018 dt 25-11-2019' <https://kredl.karnataka.gov.in/storage/pdf> accessed 18 January, 2023.

Municipal Administration. These departments have been directed to incorporate the code into their building bylaws. For government buildings, the enforcing authority is the Public Works Department (PWD) and Architecture Department. Since the Karnataka Code is read with the Karnataka Municipalities Model Building Bye-Laws 2017, its application extends to all categories of buildings[75] in urban areas. [76]The other initiatives undertaken by the Karnataka Government and SDA include awareness building and publicity about energy conservation and energy efficiency, the establishment of the Karnataka State Energy Conservation fund to promote, develop and implement pilot projects. The Government has mandated the use of solar water heating systems in industries, hospitals, govt. offices, hotels, residential buildings, and commercial buildings since 2007, use of LED lights in Govt. buildings since 2015. The use of energy-efficient BEE 4/5 star rated pump sets for drinking water supply in the city, town or gram panchayath under the Social Welfare Department and Rural Development and Panchayat Raj Department; and the use of BEE 5 Star rated electrical appliances in Government and Public undertaking Departments have also been mandated. Furthermore, as per the BEE guidelines, the operating temperature of air conditioners

[75]Karnataka Municipalities Model Building Bye-Laws 2017, Cl. 3.2.
[76]Karnataka Energy Conservation Building Code (ECBC) 2014.

has been set to 24° C - 25° C in all Government and Public Undertaking Departments in the state.[77]

In Odisha, the Engineer-In-Chief (Electricity) – cum – Principal Chief Electrical Inspector of the Department of Energy is the SDA.[78] Odisha was one of the first states to adopt the ECBC and introduced the Odisha Energy Conservation Building Code in 2011 which was revised in 2018.[79] It is interesting to note that, unlike Karnataka, the Odisha Code does not apply to residential areas. The application of the code is restricted to buildings or building complexes that have a connected load of 100 kilowatts (kW) or greater or a contract demand of 120 kilo-Volt-Amperes kVA or greater and are intended to be used for commercial purposes.[80] Instead of the Model Building Bye Laws prescribed by the Central Government, the Housing and Urban Development Department of Odisha has adopted the Odisha Development Authorities (Planning and Building Standards) Rules 2020. These Rules apply to residential, commercial, and institutional buildings. These Rules

[77]Karnataka Renewable Energy Development Limited, 'EC Related OrdersissuedbyGOK'<https://kredl.karnataka.gov.in/page/Energy+Conservation/Policies%20and%20Acts/EC+Related+Orders+Issued+by+GOK/en> accessed 18 January, 2023.
[78]'Odisha Energy Conservation Building Code', (*SDA, Odisha)* <https://eicelectricityodisha.nic.in/ECONS/ECBC.aspx> accessed 20 January, 2023.
[79]Odisha Energy Conservation Building Code 2018.
[80]ibid, Cl. 2.

provide for the application of Green Building norms under Rule 51 which prescribe norms on water conservation and management, solar energy utilization, energy efficiency and waste management for both residential and non-residential buildings. Rule 51(2) of the 2020 Rules makes a mention of the 2011 Odisha Energy Conservation Building Code and not the recently updated 2018 Code. Further, it merely states that the development authorities shall 'encourage' adoption of the Odisha ECBC Code and Guidelines, 2011 for new and existing buildings but the incentive for the same would be based on applicable State Government policy as applicable from time to time. This appears to be a dichotomous situation since there is a lack of clarity under the Rules as to what should count as an incentive to adopt the Code adopted under the ECA.

Kerala prides itself as the first state to establish a standalone Energy Management Centre which functions as the SDA. The state adopted the Kerala State Energy Conservation Building Code Rules in 2017.[81] While the Code does not apply to residential buildings, its clauses have been Kerala Municipal Building Rules and Kerala Panchayat Building Rules that apply to residential

[81]Kerala State Energy Conservation Building Code 2017.

buildings.[82] In Tripura, the State Electricity Corporation Limited has been assigned the role of the SDA. The state adopted the Tripura Energy Conservation Building Code in 2020 which, like most other states, does not apply to residential building complexes. The Tripura Building Rules, 2017 last amended in 2019 has taken an approach like the Odisha Rules where it prescribes that the State Government may by Notification in the Official gazette prescribe a separate green rating system for buildings similar to the task performed by the energy conservation code by selectively combining or amending the provisions of the ECBC.[83]

Similar to the other building standards like the Model Building Bye-Laws, 2016 issued by the Ministry of Housing and Urban Affairs, the ECBC has a persuasive value for states, since they enjoy the prerogative to adopt, notify, amend and implement such codes. However, the ECBC has been readily adopted by 18 States and 2 Union Territories with respective state amendments to suit the local requirements. Uttar Pradesh (UP) was the first among the states to adopt the updated 2017 Code. While notification of the updated code and its alignment with existing building codes is underway in some states like Gujarat and Maharashtra, other states like Telangana and

[82]Kerala Municipality Building Rules 2019, Rule 17.
[83]Tripura Building Rules 2017, Rule 105.

Andhra Pradesh are mobilizing personnel to ensure compliance. While adoption of these codes by the states is the first step to realising its full potential, timely and large-scale implementation and compliance with the Code across the country is pertinent.[84] On examining the ECBCs adopted by 4 states it became apparent that even under the ECA, the State Governments continue to exercise their discretion in deciding the extent to which they would incorporate or implement the Codes.

Under the 2022 amendment to the ECA which has revised the ECBC to introduce energy conservation and sustainable building codes and expanded the scope of 'buildings' to include those used for residential purposes, the 2017 version of the ECBC would require supplemental amendments to incorporate the use of renewable energy and other green building requirements. Sixteen years since the introduction of the ECBC, 20 states and Union Territories have adopted certain versions of the code. The 2022 amendment would require further compliances to be met by buildings and could further delay the country-wide implementation of the Code, subject to the extent that the states permit its application within their respective jurisdictions.

[84]Sameer Kwatra & Prima Madam. 'Constructing Change with Building Energy Codes in India' (*Natural Resources Defence Council,* 6 August 2021) <https://www.nrdc.org/experts/sameer-kwatra/constructing-change-building-energy-codes-india> accessed 16 January, 2023.

4. CONCLUSION: CITY AS CENTRES FOR ENERGY TRANSITION - WHO DECIDES AND WHO IMPLEMENTS?

Division of legislative power and inter-ministerial convergence can do little to impact socio-economic factors that influence energy conservation across states. Analysis of India's Energy Outlook 2021 presented by the IEA reflects that energy consumption levels of urban areas are closely intertwined with socio-economic considerations and interstate variances amongst others. The wealthiest states in India have an average per capita income of almost twice as high as the poorest states. The wealthy states house 44% of the urban population of the country which is twice as urbanised as the lower income states and account for 40% higher energy consumption with a few outlier states like Jharkhand, Odisha in the energy-intensive industry belt.[85] Nearly 40% of Indians reside in states with both low per capita incomes and low per capita energy use.[86] These figures are further overlaid by other considerations of gender, rural-urban divide and caste.[87] The success of India's energy efficiency efforts targeting urban areas would require more than just

[85]International Energy Agency, 'Global Energy Review: CO2 Emissions in 2021' (*IEA 2021*), 44.
[86]ibid.
[87]ibid.

support and participation from states. The lack of adequate data tools to map the energy use and transition in different sectors could act as an impediment to recording any success achieved. The use of data tools that collect energy use and efficiency across sectors and map it on a city, state and national scale would help the country identify and overcome barriers and track progress.

The division of legislative power on planning and development puts urban areas at the confluence of the Centre and state policies that envisage different goals and strategies. This division makes it further challenging to ensure the adoption of an urban planning and development policy that is uniformly implemented across the country since a lot is contingent on the laws and initiatives independently launched by State Governments and their propensity to espouse the central schemes. A similar challenge is likely to be faced by urban policies that impact energy transition and climate change mitigation. In this backdrop of fragmented regulatory and governance framework for the urban areas in India, it is trite to raise apprehension about the contribution that urban areas can make to meet the avowed energy transition targets. Three decades of experience in electricity reform indicate that solutions that aim to fit all

situations have not proven effective.[88] The situation would not be very different for the overall energy sector. Political and economic frameworks within the energy sector vary from one state to another, and the sector operates within diverse political and economic contexts at the state level. These variations underscore the importance of tailoring energy approaches to the specific needs of each state.

Most efforts in the field of energy have come as broad goals laid down by the Central Government to be achieved by the respective states. The ECA is a little different from earlier policies and guidelines since it has put in place certain concrete mechanisms with the establishment of the BEE and SDAs in states. Efforts of BEE to introduce energy efficiency standards for electronic appliances have not faced much resistance from states, since there is little scope for conflict. However, schemes on Energy Efficiency Building Codes that directly come within the states' jurisdiction on urban development and planning have not been optimally introduced. Thus, this legislation is not very different from other urban development initiatives launched by the

[88] Ashwini K Swain, Navroz K Dubash, et al, 'Comments on Budget Proposal for Electricity Reforms' (*Centre for Policy Research*, *15 March 2021*)<https://cprindia.org/wp-content/uploads/2021/12/Comments-on-Budget-Proposal-for-Electricity-Reforms-1.pdf>accessed September, 2023.

Central Ministries that require active participation from the State Governments for their adoption and implementation. Despite efforts made by the BEE to seek the active involvement of SDAs, states suffer from constraints that go beyond the provisions of the ECA to address. India has set its energy objectives primarily on a national scale, however, as with most policies, the rate of progress towards an energy transition will vary across various states. To achieve uniform energy efficiency across states, the focus should be directed at improving inter-ministerial and center-state convergence to ensure that national goals translate into local realities.