

## Mandating Green Building Principles in Bangladesh: Prospects and Challenges of Energy Efficiency

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*This article aims to analyze the emerging green building provisions within the broader context of construction sustainability in Bangladesh. It examines green building components by exploring different available parameters of energy efficiency. Despite Bangladesh's commitments to Sustainable Development Goals (SDGs), including resilient infrastructure and lower carbon emissions, there are policy and legal gaps regarding green building. This article investigates the prospects of regional green building rating systems. A doctrinal research approach is integrated with analysis of parliamentary enactments, cases, relevant journals and reports. The article also scrutinizes the theoretical discourse of environmental justice to rationalize green building. Findings focus on the gap between various mandatory effects of energy-efficient factors and the absence of an enforceable national green building rating system. A Comparative assessment has been developed to examine how neighboring countries introduced customized green rating systems and mandated energy efficiency. It also demonstrates relevant administrative, regional, technological and economic challenges in the implementation process. It advocates for a comprehensive revision of energy law and policies to achieve cross-sectional energy efficiency in the building sector.*

**Keywords:** green building, energy efficiency, sustainability, climate change

### Introduction

With the backdrop of the international imperative to combat climate change, mainstreaming sustainable development has been a significant discourse in the Global South. The twin constants of rapid urbanization and population growth are creating substantial challenges to infrastructure,

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environment, and social well-being in Bangladesh. The goal of ‘sustainable consumption’ of Sustainable Development implies sustainable infrastructure to attain ‘global peace’. The existing construction practices in Bangladesh are based on non-renewable energy sources. Most policies aligning with sustainable development standards are fostering avenues to incorporate energy-efficient building principles and practices. Passive energy-saving practices were evident in the structural design of the world's most civilized societies in ancient times<sup>2</sup>. The modern sustainable building designs and movement can be attributed to the Rio Earth Summit, 1992; the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC), and the 2015 Paris Agreement on Climate Change. Green building principles can be one of the vital means to reach the threshold of carbon control rules and to achieve the 1.5-degree emission by 2030. Moreover, Bangladesh's Nationally Determined Contributions (NDCs), registered on the UNFCCC NDC Registry in September 2016, demonstrate the country's commitment to reduce its greenhouse gas emissions by 12 million tonnes (5%) from the business-as-usual (BAU) scenario without exception by 2030.<sup>3</sup> Additionally, the National Energy Policy (NEP) 2004 aims to promote energy efficiency measures and reduce reliance on fossil fuels through regulatory incentives and investments in clean energy technologies. Moreover, one of the goals of NEP is to leverage energy efficiency by diversifying energy sources.<sup>4</sup> To facilitate various aims of the NEP 2004, there is a mandate to modify and revise the existing laws.<sup>5</sup> Furthermore, the Energy Efficiency and Conservation (EE&C) Master Plan features actions to reduce energy consumption. This master plan is developed along with seven policy axes. It also obliges green building implementations and approval.<sup>6</sup> The Sustainable and Renewable Energy Development Authority (SREDA)<sup>7</sup> is constituted in Bangladesh to assist, facilitate, and coordinate energy-efficient programs and

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<sup>2</sup> Sam Kubba, *Handbook of Green Building Design and Construction: LEED, BREEAM, and Green Globes*, (Butterworth-Heinemann, 2012), 1-19.

<sup>3</sup> *Nationally Determined Contributions (NDCs), 2021*, (2021, Ministry of Environment, Forest and Climate Change, Government of People's Republic of Bangladesh).

[https://unfccc.int/sites/default/files/NDC/2022-06/NDC\\_submission\\_20210826revised.pdf](https://unfccc.int/sites/default/files/NDC/2022-06/NDC_submission_20210826revised.pdf)

<sup>4</sup> *National Energy Policy 2004*, (2004, Ministry of Power, Energy and Mineral Resources, Government of People's Republic of Bangladesh).

<sup>5</sup> Ibid.

<sup>6</sup> *Energy Efficiency and Conservation Master Plan up to 2030*, (2016, Ministry of Power, Energy and Mineral Resources, Government of People's Republic of Bangladesh).

[https://elibrary.sreda.gov.bd/public/admin/files/books\\_202104281990004944.pdf](https://elibrary.sreda.gov.bd/public/admin/files/books_202104281990004944.pdf)

<sup>7</sup> “Sustainable and Renewable Energy Development Authority Act, 2012”, Pub. L. No. 48, § 4

projects. Though various passive energy efficiency principles are present in the existing building construction rules, no active energy-efficient principles are evident.

Green building is no longer an option; it is becoming an imperative to ensure environmental justice. The construction pattern of developing countries involves a pollution-centric mechanism and requires the consumption of non-renewable resources.<sup>8</sup> While neighbouring countries have introduced separate energy-efficient building codes, Bangladesh still lags in enacting a new energy-saving building code. A building energy code is essential in Bangladesh, which will be feasible with the climatic and regional characteristics. Moreover, efficient building strategies have a direct and indirect impact on the climatic conditions of Bangladesh, where natural calamities are a frequent issue. Furthermore, due to unpredictable climatic trends, South Asia faces unique climate challenges, including energy crisis and water insecurity. The local electricity manufacturing and consumption pattern placed Bhutan in the highest position in South Asia regarding energy efficiency.<sup>9</sup> A sustainable growth in energy efficiency is required to realize the development agenda in South Asian countries. Due to having numerous energy-based sectors, South Asia is becoming a major contributor to total electricity consumption. South Asia's total energy consumption is 6.42% of global energy. "India, Pakistan, and Bangladesh (IPB) are the major countries in terms of their energy consumption, land area, GDP, and population."<sup>10</sup> "Energy consumption in IPB is considered quite high, with India ranked 4th globally (5.57%) and 1st (86%) among the South Asian countries."<sup>11</sup> Therefore, sustainability should be reflected in the planning of buildings.

Bangladesh is one of the lowest-performing countries in terms of environmental sustainability. "According to the "Environmental Performance Index" (EPI), prepared by Yale and Columbia

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<sup>8</sup> Alohan, Ernest O., and Abiodun Kolawole Oyetunji, "Hindrances and benefits to green building implementation: evidence from Benin City, Nigeria." *Real Estate Management and Valuation* 29, no. 3 (2021): 65-76, <https://doi.org/10.2478/remav-2021-0022>.

<sup>9</sup> Yumei Hou, Wasim Iqbal, Ghulam Muhammad Shaikh, Nadeem Iqbal, Yasir Ahmad Solangi, and Arooj Fatima, "Measuring energy efficiency and environmental performance: a case of South Asia." *Processes* 7, no. 6 (2019): 325, <https://doi.org/10.3390/pr7060325>.

<sup>10</sup> Abdus Salam et al., "An Overview on Energy and Development of Energy Integration in Major South Asian Countries: The Building Sector," *Energies* 13, no. 21 (2020): 5776, <https://doi.org/10.3390/en13215776>.

<sup>11</sup> Ibid.

universities in the United States, the country ranked 162nd out of 180 countries in 2020”.<sup>12</sup> “It reveals the condition of environmental health and vitality of their ecosystems.”<sup>13</sup> Bangladesh is committed to Sustainable Development Goal (SDG) Target 7.3 by 2030, doubling the global rate of improvement in energy efficiency.<sup>14</sup> “However, “it is believed that the building sector in Dhaka will continue to be key energy users in the years ahead.”<sup>15</sup> “One way of reducing energy demand is to have more energy-efficient buildings and ensure energy conservation programs in these buildings.”<sup>16</sup> “This challenge will require the development and implementation of new technologies, codes and standards.”<sup>17</sup> Moreover, the paradigm shift towards green building technologies and clean energy solutions can maximize urban benefits, investments, and socio-economic development to a greater extent.

This article aims to evaluate the prospect of mandatory energy-efficient building rules. It examines the feasibility of energy efficiency by scrutinizing the experience of neighbouring countries. Additionally, it analyzes the challenges of adopting such principles. Consequently, recommendations are formulated for implementing energy-efficient principles in the building industry. However, the sustainable provisions of many countries regarding cultural diversity and area-specific green rules within the same country are not taken into account. Moreover, green building is considered from an energy-efficient perspective. Energy efficiency is measured by green building rating systems, energy factors for different building types, distinct climatic conditions, and Heating, Ventilation, and Air-Conditioning (HVAC) requirements. The other green building accounts, such as construction materials, water efficiency, sustainable site management, and indoor air quality, are not addressed extensively.

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<sup>12</sup> Md Anowar Hossain Bhuiyan, Shafiqul Hassan, Md Abud Darda, Md Wahidul Habib, and Md Belal Hossain, "Government Initiatives for Green Development in Bangladesh."(2020), <https://doi.org/10.20944/preprints202008.0298.v1>.

<sup>13</sup> Ibid

<sup>14</sup> *Bangladesh National Conservation Strategy (2021-2036)*,(2021,Ministry of Environment, Forest and Climate Change, Government of People’s Republic of Bangladesh) <https://faolex.fao.org/docs/pdf/BGD219210.pdf>.

<sup>15</sup> Anisur Rahman, Optimizing the performance of building envelope for energy efficiency considering adaptive thermal comfort: a case of tropical climate in Dhaka, Illinois Institute of Technology, 2014:6. <https://www.proquest.com/openview/235617906e73561a5d62e43d6b08aefc/1?pq-origsite=gscholar&cbl=18750>

<sup>16</sup> Ibid

<sup>17</sup> Ibid

## Green Building

A ‘Green Building’(GB) refers to a building that minimizes its negative impact on the environment and creates a positive impact through sustainable mechanisms. When a full building cycle can be renewed with sustainable principles, a positive effect on the environment can be comprehended. A full building cycle includes several phases, including design, construction, operation, and demolition. Various dimensions of climate, culture, and diversity have framed the concept of GB over the years.

GB can combine efficient energy usage, low carbon emissions, and the use of renewable energy, thereby improving the indoor environment of buildings where humans work and live. Moreover, it is cost-effective and is more adaptable to alternative uses. A GB is as much about the process as it is about the product.<sup>18</sup> GB has a nexus with human rights. It can serve as a paramount instrument for the government and private sectors for safeguarding human rights.<sup>19</sup> Moreover, environmental rights should also cover the built environment.<sup>20</sup> The right to a healthy environment cannot be secured, excluding the regulation on the inner and outer spaces of the building structure. To enjoy a guaranteed right to life, the spectrum should be enhanced to address a healthy built environment. When the living environment subscribes to sustainable principles, automation of enhancement can also be observed in several other human rights.

The general components of GB include energy efficiency, usage of renewable energy, water efficiency, sustainable construction materials, and indoor air quality. Energy efficiency is referred to as the “first fuel” in the clean energy transition, as it offers rapid and economic alternatives for CO<sub>2</sub> abatement.<sup>21</sup> The major aim of energy efficiency is to decrease “energy consumption”. Moreover, energy efficiency in a building can be materialized through

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<sup>18</sup> Raymond J. Cole, “Building Green: Moving Beyond Regulations and Voluntary Initiatives,” *Policy Options* (2005): 55 <https://irpp.org/wp-content/uploads/sites/2/assets/po/sustainable-development/cole.pdf>

<sup>19</sup> Josh Gellers, “New Article Shows How Green Buildings Promote Human Rights,” GBIG Insight, October 2016, [http://insight.gbig.org/new-article-shows-how-green-buildings-promote-human-rights/#\\_ftn1](http://insight.gbig.org/new-article-shows-how-green-buildings-promote-human-rights/#_ftn1).

<sup>20</sup> Joshua C Geller, “The great indoors: linking human rights and the built environment”, *Journal of Human Rights and Environment* 7.No. 2(2016) , <https://doi.org/10.4337/jhre.2016.02.03>.

<sup>21</sup> “Energy Efficiency,” International Energy Agency (IEA), last updated December 17, 2024, <https://www.iea.org/energy-system/energy-efficiency-and-demand/energy-efficiency>.

conventional and modern methods, including natural cooling systems, active daylighting, effective LED lighting, efficient building envelope, solar energy, and earth sheltering.<sup>22</sup>

### **Environmental Justice Argument**

The Environmental Justice Argument placed its strength on the equitable treatment and pragmatic engagement in environmental decision-making and resource allocation. According to Dr. Robert D. Bullard, the father of environmental justice, “everyone deserves a clean, healthy, sustainable, and livable environment.” As a result of an unhealthy environment, uneven health conditions, and various diseases may be the consequences.<sup>23</sup> Environmental justice encompasses several factors ranging from the national to the behavioral level.<sup>24</sup> GB provisions play a critical role in environmental justice. The components of GB can mitigate flood crises, consumption of conventional energy, and urban heat challenges. The European Union also recognized the impact of green buildings on environmental justice and has introduced the “Green Buildings Pact”.<sup>25</sup> However, there is significant opposition in the Global South against the West-backed discourse developed by the economic and political elite.<sup>26</sup> The Global South reiterates the principle of local needs in environmental justice.<sup>27</sup> Therefore, these binary discourses put sustainable building provisions in a framework of constant evolution.

### **Energy Efficient Building Industry**

The representation of energy efficiency in the building sector is inadequate. The booming real estate industry is more focused on designing and constructing establishments based on conventional energy sources, which tends to create more carbon emissions. The main source of energy in commercial buildings is Electricity.<sup>28</sup> It is estimated that Air conditioners are

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<sup>22</sup> Sangeeta, Sripriya, Rishita, “A Review of Energy Efficiency in Building Construction”, *Journal of Industrial Pollution Control* 33, (2017): 1362, <https://www.icontrolpollution.com/articles/a-review-of-energy-efficiency-in-building-construction-.pdf>.

<sup>23</sup> Monica Ramirez Andreotta, *Environment and Pollution Science*, (Academic Press, 2019), 573.

<sup>24</sup> Francine Pickup, “Five Steps to Environmental Justice,” *United Nations Development Programme* (blog), June 23, 2022, <https://www.undp.org/blog/five-steps-environmental-justice>.

<sup>25</sup> The ‘Green Building Pact’ denotes a set of initiatives adopted by the European Union to decrease carbon emissions, increase innovation, accelerate sustainability and promote collaboration.

<sup>26</sup> Usha Natarajan, “Environmental Justice in the Global South,” in *The Cambridge Handbook of Environmental Justice and Sustainable Development*, ed. Sumudu A. Atapattu, Carmen G. Gonzalez, and Sara L. Seck (Cambridge University Press, 2021), 11.

<sup>27</sup> Ibid.

<sup>28</sup> *Energy Efficiency and Conservation Master Plan up to 2030*, (2016, Ministry of Power, Energy and Mineral Resources, Government of People’s Republic of Bangladesh),

responsible for 50% of energy consumption in commercial buildings.<sup>29</sup> Moreover, per capita electricity consumption is 0.596 MWh.<sup>30</sup> Therefore, sustainability in urban structures presupposes resilient energy designs. A robust legal framework of energy systems must be tailored through equal consideration of social, economic and health risks.<sup>31</sup> A well-rounded energy assessment is necessary to develop principles aligned with the essence of environmental justice.

### **Access to Justice**

The objectives of environmental justice cannot be realized if the justice delivery system is not accessible to all. The link between easy access to justice and greening the justice system is inseparable. Social, legal and economic barriers to accessing the green justice mechanism are fundamental obstacles. Environmental justice requires green tailoring of the state machinery. If the public has few funding opportunities for filing cases against environmental pollution, the noble pursuit of the judiciary will be in question.<sup>32</sup> Therefore, essential renovation of judicial access is justified for upholding environmental justice. A holistic approach is necessary for coordination among legislative, judicial and executive departments of the Government to unify green schemes.

### **Intergenerational Equity**

The principle of “intergenerational equity” has its origin in environmental justice. The principle aims to conserve natural resources and the environment for future generations.<sup>33</sup> The current demand for economic development and housing should not conflict with the future generation’s right to a safe and healthy environment. The welfare of unborn individuals must be taken into consideration in present policies, both morally and practically.<sup>34</sup> Intergenerational equity cannot

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[https://elibrary.sreda.gov.bd/public/admin/files/books\\_202104281990004944.pdf](https://elibrary.sreda.gov.bd/public/admin/files/books_202104281990004944.pdf).

<sup>29</sup> Ibid.

<sup>30</sup> “Bangladesh: Electricity”, International Energy Agency (IEA) 2022, accessed September 20, 2025, <https://www.iea.org/countries/bangladesh/electricity>.

<sup>31</sup> “Energy, the Environment, and Justice,” Understand Energy Learning Hub, Stanford University, updated June 2025, <https://understand-energy.stanford.edu/why-we-care/environment>.

<sup>32</sup> Jona Razzaque "Access to environmental justice: Role of the judiciary in Bangladesh." *Bangladesh Journal of Law* 4, no. 1-2 (2000): 19, <https://www.biliabd.org/wp-content/uploads/2021/08/Jona-Razzaque.pdf>.

<sup>33</sup> “Intergenerational Equity,” ScienceDirect Topics, Earth and Planetary Sciences, accessed September 22, 2025, <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/intergenerational-equity>.

<sup>34</sup> Urmee Khan and Maxwell. B. Stinchcombe, “Intergenerational Equity and Sustainability: A Large Population Approach,” *Social Choice and Welfare* (2023), <https://link.springer.com/article/10.1007/s00355-023-01450-w>.

be propagated without proper state and non-state initiatives. With effective green building integration, the real estate sector may produce equitable future beneficiaries.

### **Shared Responsibility**

The principle of “shared responsibility” imposes a duty on states to ensure sustainable management of the “energy transition”. As green building principles shape energy mechanisms, it is the duty of the state to restructure the responsibilities of different stakeholders during the transition. A comprehensive environmental justice is implausible without effective “energy governance”<sup>35</sup>. Moreover, global governance and geopolitical considerations mould energy transition in nations.<sup>36</sup> Effective governance implements the principle of “shared responsibility” by bolstering participation, accountability, empowerment and coordination in the decision-making process. Therefore, the substantive green transition must have procedural clarity to establish equitable distribution of green obligations.

### **Economic Benefits Argument**

It is argued that GB has fascinating environmental impacts, but incurs a significant cost.<sup>37</sup> It is a major factor for its non-adoption.<sup>38</sup> The perception is based on fewer resources, a lack of strategies, and insufficient experience with GB in developing countries. However, the challenge of initial cost enhancement can be countered by the economic benefits argument. It is more focused on gross development cost effectiveness. If environmental conditions are constantly affected by conventional construction methods, it will have a negative repercussion on human life, the economy, climate change and international trade. The initial cost can be subtracted from the gross expenses of environmental degradation.

### **Cost Optimization**

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<sup>35</sup> Hari Krishnan Govindarajan, L.S. Ganesh, “Integrating energy governance and environmental justice: Role of renewable energy”, *Renewable Energy Focus* 43, (2022): 24-36, <https://doi.org/10.1016/j.ref.2022.08.006>.

<sup>36</sup> “Strengthening Energy Governance Systems: An Energy Governance Framework for a Just Energy Transition”, United Nation Development Programme (UNDP), (2023):7 <https://www.undp.org/sites/g/files/zskgke326/files/2023-11/undp-strengthening-energy-governance-systems.pdf>

<sup>37</sup> Dina Azhgaliyeva and Dil Bahadur Rahut, “Promoting Green Buildings: Barriers, Solutions, and Policies”, No 1331.ADBI working paper (2022):4, <https://www.econstor.eu/bitstream/10419/267764/1/1813290679.pdf>.

<sup>38</sup>Ibid.

The efficiency requirements of GB in terms of energy and water minimizes the total utility cost of a building. The energy sources include natural gas, oil, and coal. These are limited in nature. On the other hand, energy efficiency emphasizes alternative methods of energy based on renewable sources. It accelerates benefits through different building strategies. It is estimated that GB materials and strategies increase the upfront cost. Moreover, the industry's apprehension about the "actual cost premium" of GB is lower than its perception.<sup>39</sup> Additionally, rainwater preservation and water recycling minimize costs. Moreover, a 40% return on investment is possible in GB, while it can reduce maintenance costs by 12% by saving 25% to 50% energy and 10% to 40% of water consumption.<sup>40</sup>

### **Sustainable Employment Growth**

Employment opportunities can be increased by investing in the green construction sector. A sustainable workforce is integral to green construction, which will eventually lead to a booming economy. The local industry will flourish if sufficient green efforts can be consolidated at the policy and industry levels. The green building sector has the potential to create job stability, boost the economy, and meet the demand for decent work possibilities. Moreover, GB currently focuses on socio-economic factors, including gender equality, local employment and training, occupational health and safety, and equitable access to employment.<sup>41</sup> In addition, there are instructions for borrowing countries to ensure pollution prevention and improve working conditions in the "Environment and Social Standards" of the World Bank.<sup>42</sup> Furthermore, the

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<sup>39</sup> WGBC Report, The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors, and Occupants, (2013), [https://worldgbc.org/wp-content/uploads/2022/03/Business\\_Case\\_For\\_Green\\_Building\\_Report\\_WEB\\_2013-04-11-2.pdf](https://worldgbc.org/wp-content/uploads/2022/03/Business_Case_For_Green_Building_Report_WEB_2013-04-11-2.pdf).

<sup>40</sup> Vanishri A. Patil, Shruti Wadalkar, Vinayak Kale, Rohan Sawant, and Deepa A. Joshi, "Optimizing Sustainable Construction Costs: A Green Building Approach for Residential Development," *E3S Web of Conferences* 559, 04034 (2024) [https://www.e3s-conferences.org/articles/e3sconf/pdf/2024/89/e3sconf\\_icstce2024\\_04034.pdf](https://www.e3s-conferences.org/articles/e3sconf/pdf/2024/89/e3sconf_icstce2024_04034.pdf).

<sup>41</sup> Dominika Czerwinska, "How Green Building Can Curb Youth Unemployment and Boost Green Economic Growth in Africa," World Green Building Council (WGBC), last updated March 2022, <https://worldgbc.org/article/how-green-building-can-curb-youth-unemployment-and-boost-green-economic-growth-in-africa>.

<sup>42</sup> "Environmental and Social Standards," World Bank (WB), accessed September 22, 2025, <https://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards>.

International Monetary Fund(IMF) developed the “framework on Resilience and Sustainability Facility”(RSF) to support economies which confront climate change challenges.<sup>43</sup>

### **Energy Freedom**

When a demand can be created in the existing market for renewable energy sources, the production of local building materials and alternative raw materials for energy will be decreased. It also reduces the importation of traditional raw materials. The reduction of fossil fuel dependence can play a role in mitigating climate change.<sup>44</sup> According to the International Finance Corporation (IFC), “Investment in GB” may expand to 24 trillion US dollars within the next decade.<sup>45</sup> The energy independence through GB policy and laws not only protects the environment but also has the potential to attract foreign investment. Moreover, the directions of Foreign Direct Investment (FDI) for sustainable development are diverse in nature.<sup>46</sup>

### **Green Building under the National Legal Framework**

Intergenerational equity and conservation principles are encapsulated in the constitution of Bangladesh to protect biodiversity and the environment.<sup>47</sup> However, Bangladesh still lacks strong preventive measures for sustainable building design. The Environment Conservation Act (ECA) 1995<sup>48</sup> has several mandates to abate pollution and upgrade the environment. The principles of ECA emphasizes regulating the outer impact of the built environment. The provisions of “Environmental Impact Assessment”<sup>49</sup> (EIA) and “Ecologically Critical Areas”<sup>50</sup>

<sup>43</sup> Fahmida Khatun, Syed Yusuf Saadat, Afrin Mahbub, and Marium Binte Islam, “IMF’s Resilience and Sustainability Facility: An Opportunity for Green Cities,” Centre for Policy Dialogue(CPD), last updated May 27, 2023, <https://cpd.org.bd/imfs-resilience-and-sustainability-facility-an-opportunity-for-green-cities>.

<sup>44</sup> Lin Chen et al, “Green building practices to integrate renewable energy in the construction sector: a review”, *Environmental Chemistry Letters* 22, no. 2:751-784 (2024), <https://doi.org/10.1007/s10311-023-01675-2>.

<sup>45</sup> “Green Buildings,” International Finance Corporation(IFC), last modified April 2025 <https://www.ifc.org/en/what-we-do/sector-expertise/climate-business/promoting-sustainable-innovation/green-buildings>.

<sup>46</sup>United Nations Environment Programme (UNEP), Green Foreign Direct Investment in Developing Countries (2017), [https://ccsi.columbia.edu/sites/ccsi.columbia.edu/files/content/docs/Green\\_Foreign\\_Direct\\_Investment\\_in\\_Developing\\_Countries.pdf](https://ccsi.columbia.edu/sites/ccsi.columbia.edu/files/content/docs/Green_Foreign_Direct_Investment_in_Developing_Countries.pdf).

<sup>47</sup> Article 18A, Constitution of the People’s Republic of Bangladesh.

<sup>48</sup> Act No. 1, 1995.

<sup>49</sup> “Environmental Impact Assessment” is a procedural tool to track the potential consequences of a particular development on the living environment. Generally, it is required before the implementation of certain development project.

<sup>50</sup> “Ecologically critical areas” are specific areas full of biodiversity. The ecosystem of ECA is hampered due to the destructive activities of humans. To restore the natural environment, certain restrictions on different activities are maintained in ECAs.

(ECAs) aim to conserve the environment. However, none of these initiatives regulates the inner space of the built area to improve the standard of the Environment. Both EIA and ECA imply directions to develop sustainable built areas. Nevertheless, the Bangladesh Environment Conservation Rules 2023<sup>51</sup>, embodied only procedural details for obtaining “environmental clearance”. It specifies four categories and procedures for issuing clearance certificates. The categories are green, yellow, orange and red. The industries under the red categories demand a rigid and mandatory environmental assessment.<sup>52</sup> In contrast, the green category requires less procedural rigidity and obligatory assessment due to its overall impact on the environment.<sup>53</sup> Moreover, the Ecologically Critical Area Management Rules were promulgated to protect the biodiversity of specific areas. “Biodiversity” includes “species diversity”, “genetic diversity” and “ecosystem diversity”.<sup>54</sup> It enumerated approaches to conserving areas which are declared as ECAs in the official gazettes. The Rule cast an obligation on the “Directorate of Environment” to prepare a “site-specific” plan for managing developments in ECAs.<sup>55</sup> Therefore, it can be said that the core environmental laws of Bangladesh indirectly regulate the built environment to mitigate harshness arising from development activities. Notwithstanding, the preventive mechanism of the Environment Conservation Act 1995 does not comprehensively embrace the climatic impact of the built environment.

The Building Construction Act (BCA)<sup>56</sup>, 1952 was formulated to prevent “haphazard construction”. The essence of replacing haphazard construction with sustainable construction can be perceived by the phrases used in the preamble of the Act. This Act also took into account the harmful effects of hill cutting and improper excavation of tanks on the environment. A relevant authority has been created under this Act to authorize and regulate building construction. The government is empowered to enact relevant construction rules to implement the purpose of the Act.<sup>57</sup> However, the corresponding Building Construction Rules of 1996<sup>58</sup> and Dhaka Metropolitan Building (Construction, Development, Preservation, and Demolition) Rules 2008<sup>59</sup>

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<sup>51</sup> S.R.O No. 53,2023

<sup>52</sup> Environment Conservation Rules, 2023, rule 5(1)(d)

<sup>53</sup> Environment Conservation Rules, 2023, rule 5(1)(a)

<sup>54</sup> Ecologically Critical Areas Management Rules 2016, rule 4(2).

<sup>55</sup> *Ibid.*, rule 21.

<sup>56</sup> Act No. 2, 1953.

<sup>57</sup> Town Improvement Act 1953, §18.

<sup>58</sup> S.R.O No. 112,1996

<sup>59</sup> S.R.O No.120, 2008

adopted a passive approach to ensure building sustainability. The rules mandate building safety clauses, such as “Floor Area Ratio” (FAR), “maximum ground coverage” and “setback area”. By virtue of Section 18A of the BCA 1952, the Government first enacted the Bangladesh National Building Code (BNBC) in 1993. Apart from general building construction rules, this code directs provisions on fire protection, building materials, structural design, universal accessibility, and building services. Nevertheless, there is no specific energy conservation building code in Bangladesh. The BNBC was amended in 2006 to increase the safety and maintenance requirements of buildings. The BNBC, 2020, repeals the BNBC, 2006<sup>60</sup>. BNBC 2020 adopted sustainability approaches with safety concerns. A chapter on energy efficiency and sustainability was added, which was drafted by the House Building Research Institute.<sup>61</sup> However, in the absence of a building monitoring authority or code-enforcing agency, the effectiveness of prescribed sustainable provisions cannot be assumed properly.

According to BCA 1952, liability will be borne by the designer, approver and implementing body for violating relevant construction rules. Even the punishment may be extended to a maximum of 7 years imprisonment.<sup>62</sup> But ambiguity arises in terms of attributing liabilities. Because the building construction process comprises multiple and complex contractual relationships. The penal clause of BCA 1952 is somewhat misleading for determining individual and joint criminal responsibilities for construction malpractices. The construction malpractices may result in various public injuries. Sometimes, these public injuries involve environmental harms. The absence of specification of “liability” and relevant “evaluating factors” of liability creates double jeopardy for justice seekers. The enforcement of sustainable building rules is challenging due to obscure liability clauses enshrined in the BCA, 1952.

A similar pattern can be identified in the Town Improvement Act<sup>63</sup> (TIA) of 1953. For the improvement and expansion of Dhaka city, the TIA was enacted in 1953. Rajdhani Unnayan Katripakha (RAJUK)<sup>64</sup> has been empowered to adopt “improvement schemes”<sup>65</sup> and “rehousing

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<sup>60</sup> S.R.O No. 55, 2020

<sup>61</sup> SWITCH-Asia, European Commission, *Green Buildings Assessment Report for Bangladesh* (2022), [https://www.switch-asia.eu/site/assets/files/3548/green\\_building\\_assessment\\_report\\_3-1.pdf](https://www.switch-asia.eu/site/assets/files/3548/green_building_assessment_report_3-1.pdf).

<sup>62</sup> Building Construction Act 1952, §12

<sup>63</sup> Act No. 12,1953

<sup>64</sup> Town Improvement Act 1953, § 3

<sup>65</sup> Town Improvement Act, 1953, § 38

schemes”<sup>66</sup> under this Act. There is a mandate for public participation in preparing the “master plan”<sup>67</sup>. However, no assessing authority was created to examine the “sustainability” of the building designs and structures included in the master plan. RAJUK can acquire and dismantle buildings to execute the “improvement scheme”<sup>68</sup>. Nonetheless, no “sustainable demolition principles” are suggested in TIA 1953. In fact, the demolition process degrades the environment through different kinds of pollution. Additionally, the haphazard demolition of buildings minimizes public safety. Moreover, the psychological and physical well-being of the occupant of the adjacent structure is disturbed as a consequence. A huge regulatory gap exists regarding sustainable building demolition in Bangladesh. Moreover, the sustainable management of building construction and demolition waste conserves the environment.<sup>69</sup> As waste is considered a resource<sup>70</sup>, there should be rules on building waste recycling. Furthermore, energy-efficient demolition rules can change consumption patterns.

The perception of “development” has different ramifications for “sustainability”. The judiciary gradually recognizes the significance of incorporating the approach of “integrated development” instead of “vertical development”. The High Court Division reached a conclusion in a case regarding the development authority’s power to deviate from the objectives of “improvement” prescribed in TIA 1953 and observed that:

*“Although under the Town Improvement Act 1953, RAJUK may alter the layout plan, this power must be exercised for 'Improvement'. Conversion of parks and open spaces enjoyed by the allottees of a planned township cannot be converted into residential plots.”<sup>71</sup>*

A similar approach was followed in a subsequent case where the court prioritized the right to the environment and ecology over the property claims of third-party purchasers.<sup>72</sup> The construction of a satellite township in a sub-flooded zone had been challenged in that particular case. The

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<sup>66</sup> Town Improvement Act, 1953, § 42

<sup>67</sup> The Master Plan refers to a comprehensive development plan. It is distinct from the individual layout plan of structures. The master plan may include massive areas of a township.

<sup>68</sup> Town Improvement Act, 1953, § 40

<sup>69</sup> Md. Sahil Rafiq and Nadim Khandaker, “Sustainable Management of Construction and Demolition Waste in Bangladesh: Advancing a Greener Industry through Resource Recovery and Recycling” (2024), <https://doi.org/10.21203/rs.3.rs-3954758/v1>

<sup>70</sup> National 3R Strategy for Waste Management, (2010, Ministry of Environment and Forest, Government of the People’s Republic of Bangladesh).

<sup>71</sup> RAJUK v. Mohshinul Islam, 53 DLR (AD) (2001), para. 9

<sup>72</sup> Metro Makers and Developers Limited v. BELA, 65 DLR (AD) 181 (2012)

judgements of the higher judiciary project direction to uphold future construction and town plans in light of sustainable building principles.

### **Mandatory Green Building Principles**

The European Union directed its member states to adopt the “Energy Performance of Buildings Directive” by 2026.<sup>73</sup> The directives focus on four areas to save energy, including renovation, decarbonization, digitalization, financing, and technical assistance.<sup>74</sup> Under the renovation scheme, member states are instructed to develop a “National Building Renovation Plan” to decarbonize building stock.<sup>75</sup> Decarbonization inspires all new EU buildings to install solar mechanism.<sup>76</sup> Digitalization emphasizes technical building automation and a national building database for tracking energy performance.<sup>77</sup> EU members must introduce financial assistance through rent support and caps on rent increases.<sup>78</sup> Currently, 75% of building stock in Europe is energy inefficient.<sup>79</sup>

To ensure spatial development and promote a healthy physical environment, the Environment and Planning Act came into force in the Netherlands in 2024.<sup>80</sup> The Act assigns to the Municipal Council the obligation of establishing a “single physical environment plan”.<sup>81</sup> It also obliges building activities, operation and demolition to align with “sustainability and usability.”<sup>82</sup> Moreover, the Environment Decree of the Netherlands lays a procedural legal framework for implementing sustainability requirements, such as energy performance, materials and

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<sup>73</sup> Energy Performance of Building Directive, (EU) 2024/1275 of the European Parliament and of the Council, April 2024 [https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=OJ:L\\_202401275&pk\\_keyword=Energy&pk\\_content=Directive](https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=OJ:L_202401275&pk_keyword=Energy&pk_content=Directive)

<sup>74</sup> “Energy Performance of Buildings Directive,” European Commission(EC), last modified June 30, 2025 [https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive\\_en](https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive_en)

<sup>75</sup> Ibid

<sup>76</sup> Ibid

<sup>77</sup> Ibid

<sup>78</sup> Ibid

<sup>79</sup> “Energy Performance of Buildings Directive Adopted to Bring down Energy Bills and Reduce Emissions,” European Commission (EC), updated on April 12, 2024, [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_24\\_1965](https://ec.europa.eu/commission/presscorner/detail/en/ip_24_1965)

<sup>80</sup> Informatiepunt Leefomgeving (IPL0), Environment and Planning Act of the Netherlands, consolidated version, June 2025, <https://iplo.nl/regelgeving/omgevingswet/english-environment-and-planning-act>

<sup>81</sup> Environment and Planning Act of the Netherlands, 2021, Article 2.4

<sup>82</sup> Ibid., Article 4.21,

environmental impact.<sup>83</sup> Moreover, the “Green Deal” was developed in 2011 to remove various barriers to green investment by facilitating authorities, companies and other stakeholders.<sup>84</sup> Furthermore, the Netherlands aimed for a 55% reduction of greenhouse gas emissions by 2030.<sup>85</sup> In this regard, it developed a climate plan with the vision of 90% reduced carbon emissions by 2040.<sup>86</sup> The climate plan covers “built environment” as one of the sectors to take measures for carbon removal.<sup>87</sup> In addition, the Climate Act of 2019 introduced a “CO2 tax” starting from EUR 30 per ton in 2021.<sup>88</sup> The Netherlands’ high ranking in the Climate Change Performance Index (CCPI) demonstrates the effectiveness of various green measures and incentives. In 2025, it placed 5<sup>th</sup> and achieved a high rating for renewable energy.<sup>89</sup>

On the other hand, Germany offers various carbon incentives through ‘shared responsibility’. For example, a landlord can increase rent up to 8% annually after completing modernizing measures, including mechanism for energy efficiency in households.<sup>90</sup> Moreover, the Building Energy Act integrates “renewable heating”. The Act sets a target of annual energy consumption for non-residential buildings.<sup>91</sup> As part of its obligations under the EU ‘Taxonomy Regulation’, Germany declared several incentives for green financing.<sup>92</sup> The EU treaty mandates a sustainable internal market in Europe. “EU taxonomy regulation” provides a robust framework for sustainable financing.<sup>93</sup> To promote sustainable investment, it suggests several criteria for environmentally

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<sup>83</sup> The Environment Decree of the Netherlands, 2020

file:///C:/Users/LAPTOP%20GADGET/Downloads/the-environment-decree-ob-2020.pdf

<sup>84</sup> “Incentives for Green Retrofit: Global Sustainable Buildings Guide – Netherlands”, Baker McKenzie, accessed September 22, 2025, <https://resourcehub.bakermckenzie.com/en/resources/global-sustainable-buildings/europe-middle-east-and-africa/netherlands/topics/incentives-for-green-retrofit>.

<sup>85</sup> Government of the Netherlands, “Mitigating Climate Change,” accessed September 22, 2025, <https://www.government.nl/topics/climate-change/mitigating-climate-change>

<sup>86</sup> Ibid

<sup>87</sup> Ibid

<sup>88</sup> “Carbon Removal in the Netherlands – National Policy Overview,” *Carbon Gap Policy Tracker*, accessed September 22, 2025, <https://tracker.carbongap.org/regional-analysis/national/netherlands>.

<sup>89</sup> Germanwatch, *Climate Change Performance Index 2025: Netherlands*, accessed September 22, 2025, <https://ccpi.org/country/nld>

<sup>90</sup> German Civil Code, §559

<sup>91</sup> *Germany’s Regulatory Framework and Instruments for Energy Efficiency in Industry* (2023, German Energy Agency, German Federal Ministry for Economic Affairs and Climate Action), [https://www.dena.de/fileadmin/dena/Dokumente/Projektportrait/Projektarchiv/Entrans/Germany\\_s\\_Regulatory\\_Framework\\_and\\_Instruments\\_for\\_Energy\\_Efficiency\\_in\\_Industry\\_EN.pdf](https://www.dena.de/fileadmin/dena/Dokumente/Projektportrait/Projektarchiv/Entrans/Germany_s_Regulatory_Framework_and_Instruments_for_Energy_Efficiency_in_Industry_EN.pdf).

<sup>92</sup> “Financing: Global Sustainable Buildings Guide – Germany”, Baker McKenzie, accessed September 22, 2025, <https://resourcehub.bakermckenzie.com/en/resources/global-sustainable-buildings/europe-middle-east-and-africa/germany/topics/financing>.

<sup>93</sup> European Parliament and of the Council, Regulation (EU) 2020/852.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852>.

sustainable economic activities.<sup>94</sup> Additionally, infrastructure projects, focused on “Environment, Social and Governance” (ESG), enjoy lower interest rates.<sup>95</sup>

### **Regionalized Green Building Rating System and Bangladesh**

As a policy tool, the green building rating system is based on several green components used in the building life cycle. The rating system aims to produce resource-efficient and ecologically conscious projects. Additionally, it demands an integrated design approach. Green building certification consists of two types, addressing single attributes and multiple attributes. Single attributes primarily focus on water and energy efficiency, while multiple attributes incorporate aspects such as emissions, toxicity, and overall environmental performance of the building.<sup>96</sup> Among different approaches and certification methods, one core similarity is to ensure better functionality of infrastructures for human health and the environment.<sup>97</sup>

In the UK, the first grading system was introduced, termed “the Building Research Establishment Environmental Assessment Method” (BREEAM) in 1990. On the other hand, the United States Green Building Council (USGBC) launched the most popular one at the moment, called “Leadership in Energy and Environmental Design” (LEED) in 1998. USGBC was founded in 1993 to advance sustainability through the building and construction industry.<sup>98</sup> More than 160 countries use LEED as a sustainable benchmark of buildings. LEED allocated 30% of the total 110 credits to energy efficiency.<sup>99</sup> LEED is globally recognized for universality, adaptability and credibility. Various building types can be integrated into LEED.<sup>100</sup> Every day,

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<sup>94</sup> Ibid., Article 3

<sup>95</sup> “Financing: Global Sustainable Buildings Guide – Germany”, Baker McKenzie, accessed September 22, 2025, <https://resourcehub.bakermckenzie.com/en/resources/global-sustainable-buildings/europe-middle-east-and-africa/germany/topics/financing>.

<sup>96</sup> Kushal Jain, “A Comparative Analysis of Green Building Rating Systems and Building Intelligence Evaluation Systems,” (2018) <https://doi.org/10.13140/RG.2.2.33871.64167>

<sup>97</sup> Ibid

<sup>98</sup> Megan Rosa, “Looking Back: LEED History,” *Green Building Basic Information*, US Environmental Protection Agency (EPA), August 8, 2016, <https://www.epa.gov/green-building/green-building-basic-information>.

<sup>99</sup> Leite Ribeiro, L. M., T. Piccinini Scolaro, and E. Ghisi. “LEED Certification in Building Energy Efficiency: A Review of Its Performance Efficacy and Global Applicability.” *Sustainability* 17, no. 1876 (2025). <https://doi.org/10.3390/su17051876>

<sup>100</sup> Hasibullah Khan and Samiullah Safi, The Next Frontier of Green Building Certifications: Evaluating the Future of LEED, BREEAM and WELL Standards, *Journal of Engineering and Applied Sciences Technology* (2025): 2-7 [doi.org/10.47363/JEAST/2025\(7\)318](https://doi.org/10.47363/JEAST/2025(7)318)

1.85 million square feet of construction area is being certified using LEED.<sup>101</sup> However, the different parameters of energy efficiency in LEED are not fully compatible in regions with hot climates.<sup>102</sup> Similarly, the most recent iterations of Green Star Australia and Green Star New Zealand were released in mid-2015 and mid-2016, respectively.<sup>103</sup> Therefore, the GB standard is a continuous process through which a building project is certified by the evolving criteria from its inception. Later, the dynamic nature of the GB was embodied in the customized standards in Asia.

Moreover, the voluntary building rating system played a critical role in promoting green design.<sup>104</sup> However, the regionalized building rating system requires local features to measure sustainability. For example, in India, the Green Rating for Integrated Habitat Assessment (GRIHA) was introduced in 2007. GRIHA is India's official Green Building rating program.<sup>105</sup> Agro-climatic conditions of India were prioritized in formulating this national green building rating system.<sup>106</sup> GRIHA is a 100-point system consisting of some mandatory core points, while the rest are optional. Different levels of certification (one star to five stars) are awarded based on the number of points earned. The minimum points required for certification are 50.<sup>107</sup> Sustainability in Energy and Environmental Development (SEED) was published by the Pakistan Green Building Council in 2016. On the other hand, Sri Lanka adopts two

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<sup>101</sup> I. M. Chethana S. Illankoon, Vivian W. Y. Tam, Khoa N. Le, Cuong N. N. Tran, and Mingxue Ma, "Review on Green Building Rating Tools Worldwide: Recommendations for Australia," *Journal of Civil Engineering and Management* 25, no. 8 (2019): 831–847, <https://doi.org/10.3846/jcem.2019.10928>

<sup>102</sup> Ribeiro et al, "LEED Certification" 17

<sup>103</sup> Dat Tien Doan, Ali Ghaffarianhoseini, Nicola Naismith, Tongrui Zhang, Amirhosein Ghaffarianhoseini, and John Tookey, "A Critical Comparison on Green Building Rating System," *Building and Environment* 123,2017:243-260 <https://doi.org/10.1016/j.buildenv.2017.07.007>

<sup>104</sup> Samreen S. Makandar and Nadeem A. Sanadi "Limitations of Green Building Rating Systems – A case of LEED and GRIHA" *International Research Journal of Engineering and Technology (IRJET)* 6, no. 5 (2019), <https://www.irjet.net/archives/V6/i5/IRJET-V6I5955.pdf>

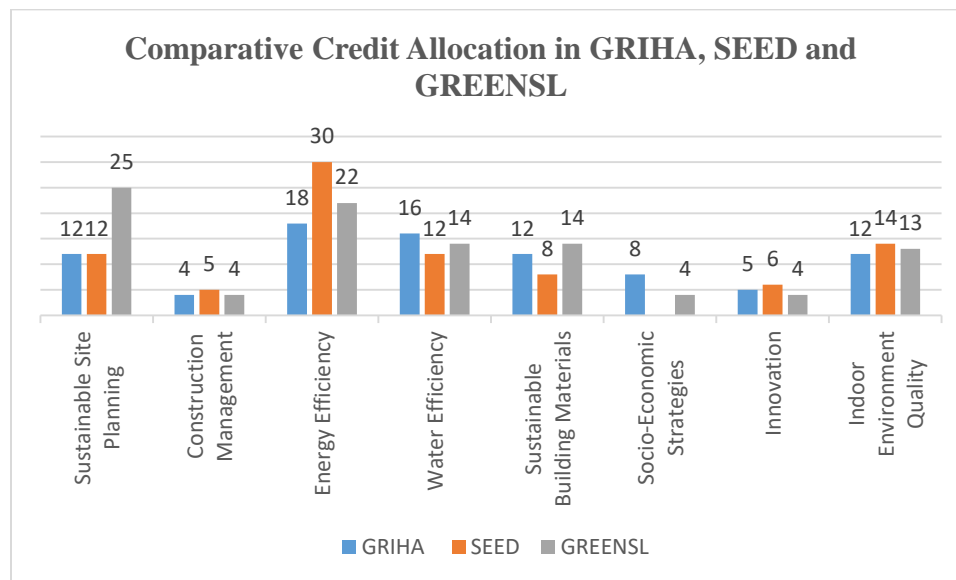
<sup>105</sup> Ibid

<sup>106</sup> Pleasa Serin Abraham and HariPriya Gundimeda, "'Greening' the Buildings – An Analysis of Barriers to Adoption in India," *Cities and the Environment (CATE)* 10, no. 1 (2018), DOI: 10.15365/1932-7048.1228.

<sup>107</sup> "GRIHA Rating Version 19" Green Rating for Integrated Habitat Assessment, Accessed September 22, 2025. <https://www.grihaIndia.org/griha-rating>

GREENSL Rating Systems. GREENSL version 1.0 applies to the existing buildings.<sup>108</sup> GREENSL version 2.1 is suitable for new buildings.<sup>109</sup>

Figure-1



Source: data driven from GRIHA<sup>110</sup>, GREENSL (version 2.1)<sup>111</sup> and SEED<sup>112</sup>

These regional certification programs in India, Pakistan and Sri Lanka are based on several green building elements. The overall green components include sustainable site planning, construction materials, energy efficiency, indoor environmental quality, water efficiency, socio-economic performance of the building, and innovation. “Energy efficiency” comprises 18 to 30 points in GRIHA, SEED and GREENSL. On Construction Site Planning, GREENSL allocated higher credit than India and Pakistan. Pakistan’s SEED is more focused on “energy efficiency”. Three countries kept 4 to 5 points on “construction materials”. “Indoor Environment quality” ranges from 12 to 14 points in the three rating systems. Similar standing was found in terms of “water efficiency”. It is a matter of concern that all three countries are less focused on innovation,

<sup>108</sup> GreenSL Rating System for Existing Building (version 1.0) (2013, Green Building Council of Sri Lanka), <https://www.srilankagbc.org/wp-content/uploads/2022/05/Rating-System-for-Existing-Buildings-Version-1.pdf>.

<sup>109</sup> GreenSL Rating System for New Constructions (version 2.1) (2022, Green Building Council of Sri Lanka, <https://www.srilankagbc.org/wp-content/uploads/2022/08/Green-Building-Rating-System-Version-2.1-FINAL-25-02-2022-1.pdf>.

<sup>110</sup> GRIHA V. 2019, Volume 1, The Energy and Resources Institute, (2021), <https://www.grihaindia.org/sites/default/files/pdf/Manuals/griha-manual-vol1.pdf>

<sup>111</sup> “Green Building Council of Sri Lanka, GreenSL Rating”.

<sup>112</sup> Sustainability in Energy and Environmental Development (SEED), Pakistan Green Building Council, (2016) <https://pakistangbc.org/seed-intro.php>

which should be highlighted more to adopt sustainability. On the other hand, India and Sri Lanka are progressive enough to trace the socio-economic aspects of green building, having introduced a few credits on “socio-economic strategies”. Moreover, the inclusion of socio-economic aspects symbolizes various dimensions of the sustainability of GB. This diversification among the green components expands the horizon of the regional rating system.

Simultaneously, the Green Building Energy and Environment Rating System for Bangladesh was Drafted by the SREDA in 2018. The proposed rating system is titled “Building Energy Efficiency and Environment Rating” (BEEER) for design and building construction. In addition, the Bangladesh Bank, with the support of SREDA, developed a point-based rating system for its Refinancing scheme in 2017. Still, the US-based LEED certification is popular in the building industry. According to the Bangladesh Garment Manufacturers and Exporters Association (BGMEA), the total number of LEED-certified garment factories in Bangladesh is 223, including 93 platinum-rated.<sup>113</sup> However, a total of 49 credits is allocated for 10 categories in BEEER.<sup>114</sup> The total sum of credit is 115.<sup>115</sup> Like Pakistan, Bangladesh is more focused on energy efficiency. BEEER allocated 48 points on building envelope requirements and energy management.<sup>116</sup> A bonus point is secured for Corporate Social Responsibility (CSR) performance under BEEER.<sup>117</sup> The CSR points in BEEER emphasize the policy inclusion of socio-economic aspects of building in GB.

### **Energy Efficient Variants in Building Space**

India, Pakistan and Sri Lanka have respective energy conservation building codes. All types of Buildings are included within the purview of the Building Energy Code of India. On the other hand, in Pakistan, only large commercial buildings are targeted. Sri Lanka has a broader scope as

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<sup>113</sup> “Bangladesh Leads with 233 LEED-Certified Green Garment Factories,” *The Daily Star*, January 7, 2025, <https://www.thedailystar.net/business/news/bangladesh-leads-233-leed-certified-green-garment-factories-3793911>

<sup>114</sup> Building Energy Efficiency & Environment Rating: Guideline for New Constructions & Existing Buildings, Version II, (2023, Sustainable and Renewable Energy Development Authority), [https://sreda.portal.gov.bd/sites/default/files/files/sreda.portal.gov.bd/page/049ce602\\_4203\\_49ac\\_8237\\_59e6776e255f/2021-06-22-04-59-58db0b0bfb323aa7c8cc05e7c0c8a5c0.pdf](https://sreda.portal.gov.bd/sites/default/files/files/sreda.portal.gov.bd/page/049ce602_4203_49ac_8237_59e6776e255f/2021-06-22-04-59-58db0b0bfb323aa7c8cc05e7c0c8a5c0.pdf).

<sup>115</sup> Ibid

<sup>116</sup> Ibid

<sup>117</sup> Ibid

it includes commercial buildings, industrial installations and large-scale housing. Nowadays, the energy consumption of residential buildings is increasing alarmingly. The minimum energy mandate for the residential building sector is also crucial in Bangladesh.

Besides, different climate zones play a role in setting the green building standard in a particular area of the country. Building energy efficiency and sustainable development requires climate classification.<sup>118</sup> One climatic zone is determined in the Pakistan building code (energy provision). In contrast, India and Sri Lanka have five and three climatic zones, respectively. Determining the climatic zone for enforcing the envelop requirement is pivotal, as building energy performance varies according to different climatic zones. Bangladesh also needs to include standard provisions in the building code based on climate classification.

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<sup>118</sup> Lujian Bai and Shusheng Wang, “Definition of New Thermal Climate Zones for Building Energy Efficiency Response to the Climate Change During the Past Decades in China,” *Energy* 170 (2019): 709–19, <https://doi.org/10.1016/j.energy.2019.01.104>,

Table 1: The legal status of energy-efficiency in the Building Codes of Bangladesh, India, Pakistan and Sri Lanka

Energy Efficient Building Factors	Bangladesh	India	Pakistan	SriLanka
Relevant Building Code	Bangladesh National Building Code (BNBC),2020	Energy Conservation Building Code (ECBC),2017	Energy Conservation Building Code (ECBC),2023	Energy Efficiency Building Code,2020
Provisions on Building Envelope requirements	Directory <sup>119</sup> in nature, more focused on passive energy design.	Mandatory <sup>120</sup> . Specific energy-efficient formulation is attached.	Mandatory <sup>121</sup>	Directory <sup>122</sup>
Provisions on HVAC (Heating, Ventilation and Air Conditioning)	Directory	Mandatory	Mandatory	General and Mandatory effects on specific formulations
Lightning Efficiency	Directory; passive in nature	Mandatory	Mandatory	Mandatory
Incorporation of Renewable Energy	Partially Mandatory, depending on building types	Mandatory	No specific formulation is attached to solar or other renewable energy	No specific formulation is attached to solar or other renewable energy
Energy Management	specific directory standard	Mandatory standard	specific directory standard	Mandatory standard

Source: Information driven from Bangladesh National Building Code 2020, Energy Conservation Building Code,2020 of India, Energy Conservation Building Code,2023 of Pakistan, Energy Efficiency Building Code,2020 of Sri Lanka

<sup>119</sup> Bangladesh National Building Code (2020), chapter 4.

<sup>120</sup> Energy Conservation Building Code (2017), chapter 4.

<sup>121</sup> Energy Conservation Building Code (2023), chapter 4.

<sup>122</sup> Energy Efficiency Building Code (2020)

Moreover, a significant portion of energy consumption can be linked with the building envelope. The building envelope design is responsible for 36% of the peak cooling loads in office buildings.<sup>123</sup> Envelope efficiency by building type is recognized in India and Sri Lanka. On the other hand, Pakistan still has the scope to improve the building envelope requirement by including building types. However, maintaining the envelope requirement is mandatory in Pakistan, India and Sri Lanka. HVAC efficiency standards are gradually advancing in India and Pakistan, whereas Bangladesh uses passive cooling methods. In contrast, Sri Lanka integrates renewable energy in HVAC due to the climate conditions. In terms of lighting, India emphasizes “Light Emitting Diode” (LED), power density limits and smart metering, while Bangladesh focuses on passive daylighting with weaker mandates.

Furthermore, net metering policies play a crucial role in the solar energy mechanism. Through the net metering policy, consumers can achieve credit in their electricity bill for contributing to solar energy production. India developed extensive net metering policies. In contrast, Bangladesh and Pakistan are still in the developing stage. It can be said that India integrates energy efficiency in building with advanced enforcement. Bangladesh, Pakistan and Sri Lanka need to develop enforcement policies for energy efficiency in the building cycle.

### **Relevant Constraints**

In developing countries like Bangladesh and other countries of South Asia, the implementation process of green building regulations is slow due to a lack of government and administrative support. The SREDA has the power to take energy-efficient initiatives. However, the nonexistence of an independent agency is raising concerns about the administrative order for implementing GB principles. Rushing towards establishing the development template of the modern West without understanding market readiness and local climatic context has counterproductive aspects.

### **Cost-Benefit Analysis**

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<sup>123</sup> Noura Ghabra, Lucelia Rodrigues, and Philip Oldfield, “The Impact of the Building Envelope on the Energy Efficiency of Residential Tall Buildings in Saudi Arabia,” *International Journal of Low-Carbon Technologies* 12, no. 4 (2017): 411–19, <https://doi.org/10.1093/ijlct/ctx065>

The absence of cost-benefit analysis of green buildings acts as a demotivating factor for market stakeholders. Developing countries face more organizational and market challenges than technical restraints in terms of green building.<sup>124</sup> Data insufficiency on the gap between the industry's perception of green building and reality is another challenge for stakeholders. As green building is an emerging phenomenon in the Global South, a more focused survey on actual cost-benefit analysis can shift the trend of the corporate sector from investing in conventional building establishments to sustainable building projects.

### **Research Gap**

The dearth of research on energy efficiency is a key factor behind the non-growth of green urbanization. Energy-efficient consultancy sometimes increases the total estimated cost of a green project. Adopting ambitious green plan without assessing the total impact ratio is also instrumental in lowering the GB acceptability. GB research based on the Western context is not convincing enough for the local industry. Jurisprudential and criminological discourse should also be advanced to create a nuanced understanding of personal and collective green liabilities. Cross-sectional research efforts are required to yield equitable utilities of environmental justice through GB provisions.

### **Energy Measurement**

“Baseline energy performance” refers to the total energy consumption of a building based on its geographical location. The assessing criteria of such performance include existing technologies, construction method and building materials.<sup>125</sup> Very few studies are available on the baseline energy performance of buildings and the climatic zone in Bangladesh. Besides, the energy audit mechanism and enforcement are very weak. In the absence of centralized database and a monitoring system for energy performance, the actual impact of GB cannot be perceived. Cross-energy measurement between conventional and renewable sources creates complexities in total

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<sup>124</sup> Silvia Gobbi, Valentina Puglisi, and Andrea Ciaramella, “A Rating System for Integrating Building Performance Tools in Developing Countries,” *Energy Procedia* 96 (2016):333-344 <https://doi.org/10.1016/j.egypro.2016.09.156>

<sup>125</sup> UNEP SBCI Sustainable Buildings and Construction Initiative, *Background Paper for Sustainable Buildings and Construction for India: Policies, Practices and Performance* (2012), [https://www.teriin.org/eventdocs/files/sus\\_bldg\\_paper\\_1342567768.pdf](https://www.teriin.org/eventdocs/files/sus_bldg_paper_1342567768.pdf)

energy management. Therefore, strict rules of energy measurement will be pragmatic for the existing and future buildings.

### **Finance of the Green Project**

Financial incentives encourage sustainable building behaviour in the production cycle. However, the absence of green loan margin, green bond and sustainable investment practices is creating a negative stimulus. Fluctuating government incentives also discourage investors. It attaches uncertain risks to their investment. Due to the absence of regional green building certification in Bangladesh, most prospective green projects tend towards Western green certifications, which increases cost. There should be sustainability in the financing and investment cycles for GB.

### **Bureaucratic Non-Efficiency**

Construction bureaucracy in Bangladesh is very complex in nature. Relevant authorities have overlapping responsibilities, which creates unnecessary confusion among stakeholders. In addition, existing corrupt practices in approving and granting construction sanctions are another probable barrier. Resource constraints for public officers regarding sustainability create another layer of challenge. A transparent and accountable bureaucracy equipped with knowledge of GB provisions and its effectiveness will accelerate the green practices. A comprehensive top-tier revision is necessary to integrate the principle of green governance.

### **Future Directive**

#### ***Energy Saving Building Code***

Various climatic properties and socio-economic realities in Bangladesh necessitate a distinct green code. The code should aim to address the challenges of urban areas, the marine environment, and natural disasters. Metro cities like Dhaka require excessive electricity consumption. The rapid urbanization increases energy demand. Planning for urban and rural energy efficiency may solve the problem. Local and cultural building design can be revisited to appraise energy efficiency. Effective collaboration between new and old green designs should find its scope in green code. The jurisdiction of local government can be enhanced to enact area-specific green building codes.

### ***Effective Coordination among Development Authorities***

To accelerate the implementation process of GB, the government can consider a phased approach by reviewing municipalities and their capacity in close coordination with the concerned authorities. The cities with growing construction activity should be identified. Specific obligation of “sustainability inspection” should be brought within the jurisdiction of development authorities. Provisions for the “sustainability sanction” can be enumerated in the Building Construction Act, 1952. The new and existing buildings should prepare a “sustainability plan” in line with GB principles.

### ***Reduction of usage of Non-renewable Energy***

A legal framework of passive, active and hybrid systems can be introduced to reduce the consumption of non-renewable energy. A decarbonized building policy should be crafted to set long-term and short-term “carbon emission reduction” goals. Research on GB should be incentivized to escalate the production of “renewable energy”. Adaptation of renewable energy in design, construction, and building management enhances decarbonization on a large scale.

### ***Inclusion of AI and Modern Technology in Building Design***

Using simulation tools and relevant software is crucial for tracking the total energy consumption by buildings. Standard green measures adoption can only be possible if there is the availability of buildings’ inner energy data. In this regard, “Artificial Intelligence” (AI) can be synchronized to organize relevant building sustainability data. As design is considered the first step of the building cycle, more automation tools of sustainable design will save time and energy. Moreover, the existing building design software should be upgraded to include sufficient sustainability data.

### ***Policy Incentives***

The role of the Government in activating and regularizing policy incentives can boost the growth potential of the GB market. GB-centered public and private housing can be subsidized to attract investors and developers. Qualitative control of money supply by the central bank through fixing a quota for GB can mobilize the existing market to the green transition. Eco-friendly financial system is a key catalyst for implementing energy-efficient principles. “Green banking policy”

can be a viable option for sustainable investment. To gain issue-based support and the sustainable profit dimension of green business, a wide range of discussion and research initiatives should be projected at the national level. Moreover, existing tax benefits and rebates may be reformed to drive sustainable economic behaviour among stakeholders.

### ***National Green Building Rating System***

Like India, Sri Lanka and Pakistan, Bangladesh should adopt its own green building rating system. The rating system should assess tropical conditions, energy resources and scarcity, construction materials, and other regional GB challenges. The Western rating system has its own limitations in South Asia. A transparent, innovative and accessible GB certification system will decrease the reliance on certification systems of developed countries. More national certifications of GB in South Asia increase the stake of developing countries in the global discourse of environmental justice.

### ***Sustainable Demolition Principles***

The demolition rules of building should be fortified with sustainability. If the demolition process produces environmental harm and consumes more energy, it will not satisfy the whole scheme of GB. The future building monitoring authority should enhance its mechanism to regulate demolition activities. High maintenance of GB should not result in haphazard demolition. A coordination between construction and demolition rules should be activated in developing GB principles. Protecting several human rights in the demolition process is another aspect of GB functionality. Therefore, the human rights dimension should be incorporated in the process of GB regulation.

### ***Building Monitoring Authority***

A specific “enforcing agency” can play a paramount role in the GB mechanism. In this regard, a “building monitoring cell” can be established under the Department of Public Works. The monitoring cell should include expertise on design, construction, law, policy and development. An effective building monitoring authority requires transparency, proper budgetary allocation and collaboration between building research institutions. Moreover, various sub-cells within the building monitoring authority can be created based on “building types and occupancy”. The

prevention of building malpractices requires some behavioural change. Sustainable building practices can be enforced by introducing short-term and long-term penal provisions.

### ***Annual Building Compliance Report***

The provision of an “annual building compliance report” should be incorporated to map the necessary green directions. A coordinated system of technology, compliance and enforcement is essential to establish sustainable building practices. Although there is a mandate in BNBC to establish the “Bangladesh Building Regulatory Authority” (BBRA), no initiative has been taken. Moreover, BNBC 2020 is silent about how sustainability criteria will be analyzed or monitored by BBRA. If there are provisions for new and existing buildings to submit an annual compliance report to BBRA, more eco-conscious building performance may be expected.

### ***Energy Audit***

An energy performance benchmark should be determined for every type of building. The infrastructures at a high consumption rate can be listed as “black”. A “carbon score” can be launched to facilitate a national energy audit. A National Energy audit on buildings should be completed at the local, regional, and central levels. The audit report will contain information regarding black listed buildings. Moreover, the black listed buildings can be considered as “category B” for future investment. Collaboration with bank and non-bank financial institutions in this regard may be taken on a pilot basis.

### ***Green Building Pedagogy in Curricula***

Educating future generations through sustainability provisions in architecture, civil engineering, and law is vital for adopting green building provisions. Universities can initiate local green projects to assess the feasibility and various impacts of GB on the community. Moreover, green policies will be better formulated if there is strong legal advocacy. Special training and workshops can be conducted to increase GB awareness in public and private universities. Regional challenges cannot be processed and addressed if there is only superficial discourse of GB. Existing GB imperatives presuppose numerous region-based development studies.

## **Conclusion**

Green Building provisions have been recognized and are being implemented in Europe and many Western countries. However, the different dimensions of GB, including energy efficiency, are becoming de-westernized in Asia. The popular green certification programs developed by the West are being replaced by regional criteria in South Asian countries, including India, Pakistan and Sri Lanka. Energy efficiency not only serves the objectives of environmental justice but also enhances the gross economic return. Sustainable trading among countries is crucial for restoring peaceful climatic conditions around the world.

Bangladesh comprehends the importance of integrating energy-efficient construction practices. Bangladesh has incorporated sustainability provisions under BNBC, in an attempt to introduce a national green building certification program and emphasized passive principles of energy efficiency. These initiatives reflect the effort of stakeholders to mitigate climate change through the built environment.

However, mere policy-level measures are insufficient to mandate GB provisions. Enacting new legislation for GB is not the only solution. Sustainable mindsets should be nurtured from the very beginning. Different preventive mechanisms should be installed through proper education and training on energy efficiency. Moreover, energy-efficient building technology should be developed to measure the gross energy impact. With a high ambition of zero carbon, decarbonization should be launched with a very local effort.