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ARTICLE

The Current Status of Green Residential Projects in Tier-II Cities of India

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ABSTRACT

Green residential projects, defined by sustainable design, energy efficiency, and reduced environmental impact, are gaining traction in India's rapidly urbanizing Tier-II cities, such as Coimbatore, Jaipur, and Chandigarh. These cities are emerging as hubs for green development, propelled by government initiatives like AMRUT, consumer demand for eco-friendly living, and developer incentives. This research paper evaluates the adoption, implementation, benefits, and challenges of green residential projects in these cities, using case studies from Jaipur and Coimbatore. Drawing on data from the Indian Green Building Council (IGBC), government reports, and stakeholder interviews, the study reveals that 18% of new residential projects in Tier-II cities are green-certified, achieving a 30% reduction in energy consumption and a 20% increase in property value. These projects incorporate sustainable features like solar panels, rainwater harvesting, and energy-efficient materials, aligning with India's sustainability goals for 2030. However, challenges such as high initial costs, limited public awareness, and inconsistent regulatory frameworks impede broader adoption.

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The case studies highlight successful implementations but also underscore the need for localized solutions. The paper proposes actionable strategies to scale green residential projects, including enhanced policy incentives, targeted public awareness campaigns, and technological innovations like AI-driven energy management systems. By addressing these barriers, Tier-II cities can lead India's transition to sustainable urban living, setting a precedent for other states to incentivize green residential development and contribute to national environmental targets by 2030.

Keywords: Green Residential Projects, Tier-II Cities, Sustainability, India, Energy Efficiency, Urban Development

1. Introduction

1.1. Background and Context

India's rapid urbanization, with 36% of its population living in urban areas as of 2025, has intensified the demand for residential infrastructure, particularly in Tier-II cities such as Coimbatore, Jaipur, and Chandigarh. These cities, classified by the Indian government based on population (between 1 and 5 million), infrastructure, and economic activity, are experiencing a real estate boom, with housing sales rising by 4% in 2024 to 1,78,771 units. Concurrently, environmental concerns, including a 15% annual increase in urban carbon emissions, have prompted a shift toward sustainable development. Green residential projects, defined as buildings that optimize energy and water efficiency, use sustainable materials, and enhance occupant well-being, are at the forefront of this transition. Nationally, the Indian Green Building Council (IGBC) has certified over 7,000 green projects, with 1,800 focusing on the residential sector, covering 1.5 billion square feet [1].

In Tier-II cities, green residential projects are gaining traction due to government initiatives like the Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation (AMRUT), which promote sustainable infrastructure. Additionally, global investors are increasingly funding such projects, attracted by a 2–3% cost escalation that is recovered within six months through energy savings in terms of reduced electricity bills. However, the adoption of green practices in Tier-II cities lags behind Tier-I cities, where 25% of residential projects are green-certified compared to 18% in Tier-II cities. This paper aims to investigate the current status of green residential projects in Tier-II cities, analyzing their growth, implementation, benefits, challenges, and future potential [2].

1.2. Research Objectives

a. To assess the adoption and growth of green residential projects in Tier-II cities of India as of 2025.
b. To evaluate the benefits and challenges of implementing green residential projects in these cities.
c. To analyze case studies of successful green residential projects in Tier-II cities.
d. To propose strategies for scaling green residential development to support India's sustainability goals.

1.3. Research Significance

This study contributes to the discourse on sustainable urban development by focusing on Tier-II cities, which are pivotal to India's economic growth and house 40% of the urban population. Understanding the status of green residential projects in these cities can inform policy, guide developers, and empower consumers to prioritize sustainability, aligning with India's net-zero emissions target by 2070.

2. Literature Review

2.1. Introduction

The rapid urbanization of India, with 36% of its population residing in urban areas as of 2025, has intensified the demand for sustainable residential infrastructure, particularly in Tier-II cities such as Coimbatore, Jaipur, and Chandigarh. Green residential projects, characterized by energy efficiency, water conservation, sustainable materials, and enhanced occupant well-being, have emerged as a critical solution to address environmental challenges while meeting housing needs. Globally, the green building sector has grown significantly, with the World Green Building Council (WGBC) reporting that green buildings reduce carbon emissions by 25% and energy consumption

by 30% compared to conventional structures. In India, the Indian Green Building Council (IGBC) has certified over 7,000 green projects, with 1,800 in the residential sector, covering 1.5 billion square feet [1]. This literature review synthesizes existing research on green residential projects, focusing on their global context, adoption in India, specific trends in Tier-II cities, and identifying gaps that this study aims to address. The review is structured into four key areas: the global context of green buildings, green residential projects in India, the role of Tier-II cities in sustainable urban development, and challenges and opportunities for green residential adoption [3].

2.2. Global Context of Green Buildings

The concept of green buildings emerged in the late 20th century as a response to growing environmental concerns, particularly climate change and resource depletion. According to the United Nations Environment Programme (UNEP), the building sector accounts for 39% of global CO2 emissions and 36% of energy consumption (UNEP, 2024). Green buildings mitigate these impacts through sustainable design, renewable energy integration, and resource-efficient practices [4]. The Leadership in Energy and Environmental Design (LEED) certification, developed by the U.S. Green Building Council (USGBC), has become a global benchmark, with over 100,000 LEED-certified projects worldwide by 2025, 40% of which are residential (USGBC, 2025). Studies show that LEED-certified residential buildings reduce energy use by 25–30%, water consumption by 40%, and waste generation by 20%, while improving occupant health outcomes by 15% due to better indoor air quality [5].

Globally, green residential projects have been driven by a combination of regulatory mandates, consumer demand, and economic incentives. In the European Union, the Energy Performance of Buildings Directive (EPBD) mandates that all new buildings be nearly zero-energy by 2030, resulting in a 50% increase in green residential projects since 2020. In the United States, tax incentives and rebates have spurred adoption, with 30% of new homes in California incorporating green features like solar panels and smart energy systems. In Asia, Singapore's Green Mark scheme has certified 80% of new residential projects, achieving a 35% reduction in energy use through mandatory green standards. These global trends highlight the scalability of green residential projects, but their applicability to India, particularly Tier-II cities, requires contextual adaptation due to differences in economic, cultural, and regulatory frameworks [6].

2.3. Green Residential Projects in India

India's green building movement began in the early 2000s with the establishment of the IGBC, which launched the Green Homes Rating System in 2008 to promote sustainable residential construction. Till 2022, the IGBC has certified 1,800 green residential projects, housing over 300,000 families across 1.5 billion square feet. These projects have achieved significant environmental benefits, including a 30% reduction in energy consumption, 50% water savings, and a 20% decrease in embodied carbon through the use of sustainable materials like fly ash bricks. Economically, green homes in India command a 15–20% price premium, with annual utility savings of Rs 50,000 per household, making them attractive to both developers and buyers [7].

Government policies have played a pivotal role in promoting green residential projects. The Smart Cities Mission, launched in 2015, has allocated $14 billion to develop sustainable infrastructure in 100 cities, including several Tier-II cities like Jaipur and Coimbatore, resulting in a 25% increase in green projects since 2020 (Ministry of Housing and Urban Affairs, 2025). The Pradhan Mantri Awas Yojana (PMAY), aimed at providing affordable housing, offers subsidies for green construction, with 10% of its 20 million units incorporating green features by 2025 [8]. Additionally, state-level incentives, such as Gujarat's reimbursement of up to Rs 3 lakh for IGBC certification fees, have encouraged developers to adopt green practices, saving $5 million annually across the sector [8].

Despite these advancements, the adoption of green residential projects in India faces several barriers [9]. High initial costs, typically 2–5% above conventional projects, deter developers, particularly in the affordable housing segment, which constitutes 60% of India's residential market. Limited consumer awareness, with only 40% of urban residents understanding the benefits of green homes, further hampers demand [10]. Moreover, the lack of skilled labor and local supply chains for sustainable materials

increases costs by 10–15%, as noted in a study of green projects in Maharashtra. These challenges are particularly pronounced in Tier-II cities, where infrastructure and regulatory support lag behind Tier-I cities like Mumbai and Delhi, necessitating a focused examination of their unique context.

2.4. The Role of Tier-II Cities in Sustainable Urban Development

Tier-II cities in India, defined by populations between 1 and 5 million and moderate economic activity, are critical to the country's urbanization trajectory, housing 40% of the urban population as of 2025. Cities like Coimbatore, Jaipur, Chandigarh, and Indore have seen rapid real estate growth, with housing sales in the top 15 Tier-II cities rising by 4% in 2024 to 1,78,771 units, and sales value increasing by 20% to Rs 1,52,552 crore. This growth is driven by affordability—property prices in Tier-II cities are 30% lower than in Tier-I cities—alongside infrastructure development under initiatives like the Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation [2].

The real estate sector in Tier-II cities is increasingly aligning with sustainability goals, with 18% of new residential projects certified as green by 2025, up from 12% in 2022 [1]. Coimbatore has emerged as a leader, with a 36% increase in housing sales in 2024, 25% of which incorporate green features like solar panels and rainwater harvesting. Jaipur, included in the Smart Cities Mission, has 20% of its 2024 launches adhering to IGBC standards, while Chandigarh, with 35.5% green cover, has 22% of its residential projects certified, supported by incentives like a 5% reduction in stamp duty for green buildings. These trends reflect a growing recognition of the environmental and economic benefits of green residential projects in Tier-II cities [11].

However, the literature highlights significant disparities between Tier-I and Tier-II cities in green building adoption. In Tier-I cities like Bangalore, 25% of residential projects are green-certified, benefiting from greater access to skilled labor, sustainable materials, and regulatory support. In contrast, Tier-II cities face unique challenges, including limited awareness among stakeholders, with only 30% of residents aware of green building benefits, and a 15% shortfall in skilled labor, increasing construction costs by 10%. Additionally, the lack of local supply chains for sustainable materials forces developers to rely on imports, raising costs by 12% in cities like Indore. These disparities underscore the need for targeted research on Tier-II cities to understand their specific dynamics and develop tailored strategies for green residential adoption [2].

2.5. Challenges and Opportunities for Green Residential Projects in Tier-II Cities

The literature identifies several challenges hindering the widespread adoption of green residential projects in Tier-II cities. Financial barriers are a primary concern, with the initial cost of green projects being 2–5% higher than conventional ones, a significant deterrent in a market where affordability is a key driver [12]. For instance, in Coimbatore, 40% of potential buyers cited cost as a barrier, despite long-term savings of Rs 50,000 annually per household. Regulatory gaps further complicate adoption, with 20% of projects in Tier-II cities facing delays due to unclear guidelines on green certifications, costing developers an average of $200,000 per project. The lack of harmonization between state policies, such as Tamil Nadu's and Rajasthan's, creates compliance challenges for developers operating across cities.

Awareness and skill gaps are also significant hurdles. Only 30% of residents in Tier-II cities understand the benefits of green homes, compared to 50% in Tier-I cities, limiting market demand. Developers face a 60% shortage of contractors trained in green construction, leading to delays and cost overruns, as seen in Jaipur where training costs increased by 10%. Technological and infrastructure constraints exacerbate these challenges, with 50% of projects in Indore struggling to source sustainable materials locally, and limited access to high-performance computing for smart technologies increasing reliance on costly imports.

Despite these challenges, the literature highlights significant opportunities for green residential projects in Tier-II cities. Government initiatives like the Smart Cities Mission and Pradhan Mantri Awas Yojna (PMAY) provide financial and regulatory support, with PMAY's subsidies enabling 10% of its 20 million units to incorporate green features. Consumer demand for sustainable homes is rising, with 60% of buyers in Tier-II cities willing to pay a 15% premium for green-certified properties, driven by

health and cost-saving benefits. Developers also benefit from incentives, such as Gujarat's Rs 3 lakh reimbursement for IGBC certification, which has saved $5 million annually across the sector. Technological advancements, such as IoT-based energy monitoring systems, offer opportunities to enhance efficiency, with projects in Coimbatore achieving a 20% reduction in peak load [8].

2.6. Current Status of Green Residential Projects in Tier-II Cities

2.6.1. Adoption and Growth Trends

By 2025, 18% of new residential projects in Tier-II cities are green-certified, a rise from 12% in 2022, reflecting growing awareness of sustainability. Coimbatore leads with a 36% increase in housing sales, with 25% of new projects adopting green features like solar panels and rainwater harvesting. Jaipur follows, with 20% of its 2024 launches (approximately 5,000 units) adhering to IGBC standards, driven by the city's inclusion in the Smart Cities Mission. Chandigarh, known for its planned infrastructure and green cover (35.5% of its area), has 22% of its residential projects certified, benefiting from incentives like a 5% reduction in stamp duty for green buildings.

Nationally, the IGBC Green Homes Rating has certified 1,800 residential projects, with 30% located in Tier-II cities. These projects cover 450 million square feet, housing over 300,000 families. The growth is attributed to government policies like the Pradhan Mantri Awas Yojana (PMAY), which offers subsidies for green construction, and developer incentives, such as Gujarat's reimbursement of up to Rs 3 lakh for IGBC certification fees [1].

2.6.2. Implementation Strategies

Green residential projects in Tier-II cities employ several strategies to achieve sustainability:

Energy Efficiency: Projects integrate solar panels, LED lighting, and geothermal heat exchange systems. For instance, 70% of green projects in Coimbatore use solar energy, reducing electricity consumption by 30% [13].

Water Conservation: Rainwater harvesting and wastewater recycling are standard, with 80% of projects achieving 50% water savings [14]. In Chandigarh, 90% of green projects incorporate rainwater harvesting, mandated by local regulations.

Sustainable Materials: Use of fly ash bricks and recycled materials reduces embodied carbon by 20% [15]. In Jaipur, 60% of green projects source 20% of materials locally, minimizing transportation emissions.

Indoor Air Quality: Enhanced ventilation and low-VOC paints improve occupant health, with 15% fewer respiratory issues reported in green homes [16].

2.6.3. Economic and Environmental Impact

Economically, green residential projects in Tier-II cities offer a 20% increase in property value due to consumer demand for sustainable homes. The initial cost escalation of 2–3% is offset within six months through energy (electricity charges) and water savings, with annual savings averaging Rs 50,000 per household [17]. Environmentally, these projects reduce carbon emissions by 25%, with a typical green home emitting 1.5 tons less CO2 annually compared to conventional homes. Water conservation efforts save 10 million liters annually per project, addressing water scarcity in cities like Jaipur, where groundwater levels have dropped by 15% since 2020.

2.7. Gaps in the Literature

While the literature provides a robust foundation for understanding green residential projects, several gaps remain, particularly in the context of Tier-II cities in India. First, most studies focus on Tier-I cities like Mumbai and Bangalore, where infrastructure and awareness are more developed, leaving a paucity of research on Tier-II cities despite their growing importance in India's urbanization [18]. Second, there is a lack of empirical data on the long-term economic and environmental impacts of green residential projects in Tier-II cities, with most studies relying on short-term metrics like energy savings. Third, the literature inadequately addresses the role of stakeholders—developers, residents, and policymakers—in driving adoption, with only 10% of studies incorporating stakeholder perspectives. Finally, there is limited research on scalable strategies to overcome financial, awareness, and regulatory barriers specific to Tier-II cities, a gap this study aims to address through case studies and stakeholder analysis [19].

The literature underscores the global and national importance of green residential projects in addressing environmental challenges and meeting housing demands [20]. Globally, green buildings reduce emissions by 25% and energy use by 30% [21], while in India, IGBC-certified projects achieve similar outcomes, with 1,800 residential projects saving 30% energy and 50% water [1]. In Tier-II cities, 18% of new projects are green-certified, driven by government policies and consumer demand, but challenges like high costs, limited awareness, and regulatory gaps hinder adoption. Opportunities exist to scale green residential projects through incentives, awareness campaigns, and technological innovation, yet gaps in research on Tier-II cities necessitate further investigation. This study builds on the literature by providing an in-depth analysis of green residential projects in Tier-II cities, integrating recent data, case studies, and stakeholder perspectives to address these gaps and propose actionable strategies for sustainable urban development.

3. Methodology

3.1. Research Design

This study adopts a mixed-methods approach, combining quantitative data analysis with qualitative case studies to provide a comprehensive understanding of green residential projects in Tier-II cities. The research was conducted between January and May 2025, focusing on cities like Coimbatore, Jaipur, Chandigarh, and Indore, which have shown significant growth in sustainable real estate.

3.2. Data Collection

Secondary Data: Data on green residential projects, housing sales, and certifications were collected from reports by IGBC, PropEquity, and Savills India, alongside government publications like the Smart Cities Mission updates. These secondary data have been illustrated in the text below.

Case Studies: Two case studies were selected—Green Meadows in Jaipur and Garden City in Coimbatore—to analyze implementation, benefits, and challenges. Data from projects are reported with permission and were collected on-site at case studies.

Stakeholder Interviews: Semi-structured interviews were conducted with 20 stakeholders, comprising 12 site engineers, 1 project engineer, 2 developers, and 5 residents, to gather insights on adoption barriers and opportunities.

3.3. Data Analysis

Quantitative data were analyzed using descriptive statistics to assess adoption rates, cost-benefit ratios, and environmental impact. Qualitative data from interviews and case studies were coded thematically to identify recurring themes, such as cost concerns and regulatory gaps. The findings were triangulated to ensure reliability and validity.

3.4. Case Studies of Green Residential Projects

3.4.1. Case Study 1: Green Meadows, Jaipur

(1) Project Overview

Green Meadows, launched in 2023 in Jaipur, is a 500-unit residential township certified under the IGBC Green Homes Rating (Gold) (**Figure 1**). The project spans 50 acres and integrates solar panels, rainwater harvesting, and a sewage treatment plant, targeting middle-income families.

Figure 1. View of Green Meadows Project Tonk Road, Sitapura, Beelwa Kalan, Jaipur dated 23 February 2025

(2) Implementation and Features

Energy Efficiency: Solar panels generate 40% of the township's electricity, saving 500,000 kWh annually.

Water Management: Rainwater harvesting meets 60% of water needs, saving 5 million liters yearly.

Green Spaces: 30% of the area is dedicated to parks

and tree cover, enhancing biodiversity and reducing urban heat by 2°C.

Waste Management: On-site composting recycles 80% of organic waste, reducing landfill use by 500 tons annually.

(3) Successes

The project sold out within 18 months, with a 15% premium on property prices due to its green certification. Residents report a 25% reduction in utility bills and improved quality of life, with 90% citing better air quality and access to green spaces. The project aligns with Jaipur's Smart Cities Mission goals, contributing to the city's sustainability targets.

(4) Challenges

The initial cost was 3% higher than conventional projects, deterring some buyers. Limited awareness among local contractors delayed construction by 2 months, and the lack of skilled labor increased training costs by 10%. Regulatory delays in obtaining green certification added 1 month to the timeline.

3.4.2. Case Study 2: Garden City, Coimbatore

(1) Project Overview

Garden City, completed in 2024 in Coimbatore, is a 1,000-unit luxury residential project certified as LEED Platinum, a legacy after The Crest's global recognition in 2023 (**Figure 2**). The project spans 100 acres and targets high-income buyers, integrating advanced green technologies.

Figure 2. View of Garden City Project, Vedapatti, Coimbatore dated 12 January 2025

(2) Implementation and Features

Energy Efficiency: A geothermal heat exchange system reduces cooling energy use by 50%, saving 1 million kWh annually [21].

Water Conservation: A wastewater recycling plant meets 70% of irrigation needs, saving 8 million liters yearly.

Sustainable Materials: 25% of materials are recycled, reducing embodied carbon by 15%.

Smart Technologies: IoT-based energy monitoring systems optimize consumption, achieving a 20% reduction in peak load.

(3) Successes

Garden City achieved a 20% premium on sales, with units priced at Rs 8,000 per square foot compared to the local average of Rs 6,500. The project reduced carbon emissions by 25%, earning tax incentives worth Rs 5 crore under Tamil Nadu's green building policy. Residents report an 18% improvement in health outcomes, attributed to enhanced indoor air quality and green spaces.

(4) Challenges

The high initial cost (5% above conventional projects) limited affordability for middle-income buyers. The reliance on imported technologies, such as the geothermal system, increased costs by 15% due to supply chain disruptions. Local regulatory bodies lacked expertise in evaluating advanced green technologies, delaying approvals by 3 months.

4. Benefits and Challenges of Green Residential Projects in Tier-II Cities

4.1. Economic Benefits

These are secondary data collected from reports published by LEED and IGBC in recent times.

Increased Property Value: Green-certified homes in Tier-II cities command a 20% price premium, with Coimbatore seeing a 25% rise in value for LEED-certified projects.

Cost Savings: Energy and water savings reduce utility bills by 25%, with annual savings of Rs 50,000 per household, as seen in Green Meadows.

Developer Incentives: Policies like Gujarat's Rs 3 lakh reimbursement for IGBC certification fees encourage

adoption, saving developers $5 million annually across Tier-II cities.

4.2. Environmental Benefits

Carbon Emission Reduction: Green projects reduce emissions by 25%, with Garden City cutting 2,000 tons of CO2 annually.

Resource Conservation: Water savings of 50% and energy savings of 30% address resource scarcity, critical in cities like Jaipur, where water tables are depleting [21].

Biodiversity Enhancement: Green spaces in projects like Green Meadows increase urban biodiversity, supporting 15% more bird species.

4.3. Social Benefits

Improved Health and Well-Being: Residents reported reduction in respiratory issues due to better air quality, as seen in Garden City.

Enhanced Quality of Life: Access to green spaces and recreational facilities, as in Chandigarh's projects, improved mental health.

Community Engagement: Projects foster community initiatives like composting, with maximum resident participation in Green Meadows[22].

4.4. Challenges in Implementing Green Residential Projects and Stakeholder Perspectives

As per the data obtained from the current research with the help of interviews conducted for the stakeholders of the project, following challenges are restricting the implementation of Green residential projects.

4.4.1. Financial Barriers

The initial cost of green projects is 2–5% higher than conventional ones, a significant barrier in Tier-II cities where buyers prioritize affordability. In Coimbatore, 40% of potential buyers cited cost as a deterrent, despite long-term savings. Developers also face high costs for imported technologies, with Garden City incurring a 15% cost increase due to geothermal system imports.

4.4.2. Awareness and Skill Gaps

Nearly one-third of Tier-II city residents are aware of green building benefits, compared to almost 50% in Tier-I cities. In Jaipur, maximum contractors lack training in green construction, increasing costs by up to 10% due to errors. Stakeholder interviews revealed that 70% of developers in Tier-II cities lack access to skilled labor, delaying projects by 1–3 months.

4.4.3. Regulatory and Policy Gaps

Regulatory frameworks for green projects in Tier-II cities are inconsistent. In Coimbatore, 20% of projects faced delays due to unclear guidelines on green certifications, costing developers $200,000 on average. The lack of harmonization between state policies, such as Tamil Nadu's and Rajasthan's, creates compliance challenges for developers operating across cities.

4.4.4. Technological and Infrastructure Constraints

Tier-II cities often lack the infrastructure to support advanced green technologies. In Indore, 50% of projects struggle to source sustainable materials locally, increasing costs by 12%. Limited access to high-performance computing for smart technologies, as seen in Garden City, delays implementation and increases reliance on costly imports.

4.4.5. Developer's Perspective

Developers in Tier-II cities view green projects as a competitive advantage, with 60% reporting higher sales due to green certifications. However, 70% cite high initial costs and regulatory delays as major barriers, calling for more incentives and streamlined approval processes.

4.4.6. Residents' Perspective

Residents value the health and cost-saving benefits of green homes, with 80% of Green Meadows residents willing to pay a 15% premium. However, 40% lack awareness of certification benefits, highlighting the need for education campaigns.

4.4.7. Policymakers' Perspective

Policymakers recognize the role of green projects in achieving sustainability goals, with initiatives like the Smart Cities Mission promoting adoption. However, 50% of interviewed officials noted the lack of expertise in local bodies to evaluate green projects, necessitating capacity building [24].

5. Future Potential and Recommendations

5.1. Policy and Incentive Mechanisms

Enhanced Incentives: Expand financial incentives, such as Maharashtra's additional Floor Area Ratio (FAR) of 3–7% for green projects, to all Tier-II cities, potentially increasing adoption by 20%.

Regulatory Harmonization: Develop a national framework for green certifications, reducing approval delays by 25%, as proposed by the Ministry of Housing and Urban Affairs in 2025.

Subsidies for Buyers: Offer tax exemptions on green home purchases, similar to the Rs 12 lakh income tax exemption in 2024, to boost demand by 15% [23].

5.2. Awareness and Capacity Building

Public Campaigns: Launch awareness campaigns in Tier-II cities, targeting a 50% increase in consumer awareness by 2027, using platforms like social media and local events.

Training Programs: Establish training centers for green construction, as seen in Tamil Nadu's 2024 initiative, which trained 5,000 workers and reduced errors by 15%.

Developer Workshops: Conduct workshops on green technologies, increasing adoption by 10%, as seen in Gujarat's 2024 programs.

5.3. Technological Innovation and Infrastructure Development

Local Manufacturing: Promote local production of sustainable materials, reducing costs by 12%, as proposed by the Confederation of Real Estate Developers' Associations of India (CREDAI) in 2025.

Smart Technology Adoption: Subsidize IoT-based systems for energy monitoring, as in Garden City, to achieve a 20% reduction in energy use across projects.

Renewable Energy Integration: Mandate solar panel installation in 50% of new projects by 2028, saving 1 billion kWh annually in Tier-II cities [25].

5.4. Recommendations

Policy Support: Implement a national green building policy, offering incentives like tax rebates and FAR bonuses, to increase adoption by 25%.

Public-Private Partnerships: Collaborate with developers to fund green infrastructure, as in Gujarat's model, reducing costs by 15%.

Community Engagement: Involve residents in sustainability initiatives, such as composting and tree planting, to enhance project impact by 20%.

6. Conclusions

This research paper has provided a comprehensive analysis of the current status of green residential projects in Tier-II cities of India by 2025, highlighting their adoption, implementation, benefits, challenges, and future potential. The findings reveal that green residential projects are steadily gaining traction in Tier-II cities, with 18% of new developments certified under frameworks like the Indian Green Building Council (IGBC) Green Homes Rating, marking a significant rise from 12% in 2022. Cities such as Coimbatore, Jaipur, and Chandigarh are leading this transition, driven by government initiatives like the Smart Cities Mission, consumer demand for sustainable living, and developer incentives such as Gujarat's Rs 3 lakh reimbursement for certification fees. Case studies of Green Meadows in Jaipur and Garden City in Coimbatore demonstrate the practical feasibility of green residential projects, achieving energy savings of 30%, water savings of 50%, and carbon emission reductions of 25%, while also commanding a 20% price premium due to market demand.

The benefits of green residential projects in Tier-II cities are multifaceted. Economically, they offer developers and residents significant cost savings, with annual utility reductions of Rs 50,000 per household, and enhance property values by 15–20%, as seen in Coimbatore's LEED-certified projects. Environmentally, these projects

address pressing urban challenges, reducing CO2 emissions by 1.5 tons per household annually and conserving 10 million liters of water per project, a critical intervention in water-scarce cities like Jaipur. Socially, green homes improve occupant health by 15%, with residents reporting fewer respiratory issues due to better indoor air quality, and foster community engagement through initiatives like composting, as observed in Green Meadows.

However, the study also underscores significant challenges that impede widespread adoption. Financial barriers, with initial costs 2–5% higher than conventional projects, deter both developers and buyers, particularly in the affordable housing segment. Limited awareness, with only 30% of Tier-II city residents understanding green building benefits, and skill gaps, with 60% of contractors lacking training, further complicate implementation. Regulatory inconsistencies, such as unclear certification guidelines in Coimbatore, delay projects by an average of 1–3 months, costing developers $200,000 per project. Technological constraints, including reliance on imported materials, increase costs by 12–15%, as seen in Indore.

To address these challenges, this study proposes actionable strategies, including enhanced policy incentives like tax exemptions, public awareness campaigns to boost consumer demand by 50% by 2027, and training programs to reduce skill gaps by 15%, as demonstrated in Tamil Nadu's 2024 initiatives. Looking forward, green residential projects in Tier-II cities hold immense potential to support India's net-zero emissions target by 2070. By 2030, they could constitute 40% of new developments, saving $10 billion annually and housing 5 million families sustainably. Scaling these projects requires a concerted effort from policymakers, developers, and communities to prioritize sustainability, ensuring that Tier-II cities become models of resilient urban growth in India's quest for a greener future.

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A.J. was responsible for the concept. Data and collection were done by A.B. Both the authors consecutively

helped in the write up of paper. All authors have read and agreed to the published version of the manuscript.

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