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Green Buildings and Sustainability: A Review of Economic and Environmental Impacts

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Abstract
A key tactic in combating climate change, energy efficiency, and sustainable resource use is the use of green buildings. Green buildings, which are distinguished by increased water and energy efficiency, less environmental impact, and higher occupant comfort and health, provide substantial advantages at both the individual and metropolitan levels. These include greater transaction and occupancy rates, reduced operating expenses, higher property prices, and wider societal benefits including market expansion and employment creation. Despite these advantages, green buildings are still not widely adopted, especially in the residential sector. Research has emphasized the significance of comprehending consumer behavior, showing that, regardless of cultural or geographical variations, economic, environmental, and socio psychological aspects have a significant impact on the intention to invest in residential green buildings. Additionally, it has been demonstrated that sustainability characteristics in real estate development have a major impact on property values, which is why industry participants and governments must include these elements in their strategy. Evidence also points to a complicated dynamic in commercial real estate markets, where the rise of green buildings may have an impact on property values and rental rates. This analysis highlights the economic and environmental dynamics of green buildings by combining the results of other studies, and it offers a basis for promoting sustainable real estate development and policy-making globally.

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Introduction

Buildings have a major impact on greenhouse gas emissions and energy usage worldwide. Building construction and operation activities were responsible for 39% of CO_2 emissions and 36% of worldwide energy consumption in 2017 alone, according to the United Nations Environment Program and the International Energy Agency [1]. Building demand is expected to expand in tandem with the world's population growth, leading to a greater dependence on non-renewable energy sources and worsening environmental effects. Green buildings, which minimize carbon emissions, conserve resources, and use less energy, have become a crucial tactic to attain sustainability in response to these issues [2]. A green building is any structure whose design, construction, and operation are intended to improve the well-being of its residents and the community at large while minimizing adverse environmental effects. Green buildings are ones that enhance quality of life and protect natural resources, according to groups like the World Green Building Council [3]. The phrases high-performance buildings, sustainable buildings, and sustainable architecture are frequently used to describe these types of structures. Although the ecological and social advantages of green buildings are widely known, less is known about their economic effects. However, since projects are frequently only feasible when they show positive economic returns, cost-benefit studies are crucial in the uptake of green buildings [4].

Environmentally speaking, green buildings are thought to be crucial in tackling issues like resource depletion, energy inefficiency, and climate change. Nevertheless, the acceptance of green buildings, especially in residential markets, is still far from ideal despite thirty years of attempts to promote green building standards like LEED and BREEAM [5]. According to research, this disparity is caused by inadequate demand rather than supply-side limitations. A more effective way to boost the adoption of green buildings has been suggested to be to strengthen demand-side incentives, such as subsidies, public awareness campaigns, and environmental education [6].

The connection between green buildings and property value has attracted a lot of interest in the real estate industry. Sustainability features and energy efficiency ratings are two examples of characteristics that affect property value, which is the price that buyers and sellers agree upon depending on market dynamics [7]. According to studies, green buildings are more in demand in both the residential and commercial markets and frequently fetch higher transaction and rental values. For instance, in places like the US, it has been demonstrated that green certifications like LEED and BREEAM can result in rental premiums of up to 6% and sale price premiums of up to 16%. The economic benefits of green certifications, however, may decrease when the supply of green-certified houses rises because of market saturation known as green gentrification [8]. An example of how market dynamics and sustainability measures interact is the commercial real estate industry. For example, London has seen a notable increase in green buildings due to private sector initiatives like the Better Buildings Partnership and legislative frameworks like the EU Energy Performance and Buildings Directive [9]. As a result of these initiatives, energy-efficient buildings are becoming more common, which lowers carbon emissions and improves urban sustainability. The financial effects of adopting green buildings are still unclear, though, especially when these certifications start to become the standard rather than the exception in the market [10].

With an emphasis on market impact, adoption, and potential obstacles to further adoption, this article reviews the environmental, economic, and social aspects of green buildings. This review emphasizes the significance of addressing market dynamics and demand-side issues in order to encourage the adoption of green buildings and support sustainable development by combining the results of international studies.

The Evolution and Role of Green Buildings

Global Context of Green Buildings

In the global endeavor to tackle urgent environmental issues such as resource depletion, energy inefficiency, and climate change, green buildings have emerged as a key component. Building operations and construction account for around 39% of CO_2 emissions and 36% of worldwide energy consumption each year, according to the International Energy Agency and UNEP. The construction industry is facing rising demand due to the fast urban population growth, underscoring the need for sustainable building standards [11].

In line with international sustainability objectives like the Paris Agreement and the Sustainable Development Goals (SDGs) of the UN, green buildings seek to lessen their negative effects on the environment through resource-efficient design, construction, and operation. They are an essential tactic for cutting back on energy use, preserving resources, and lessening the negative effects of urban growth on the environment [12].

Table 1:

Aspect	Description	Key Findings	References
Energy Efficiency	Green buildings incorporate design strategies to reduce energy consumption through optimized HVAC systems, lighting, insulation, and renewable energy sources.	Green buildings generally perform better than conventional buildings in terms of energy use. Energy-efficient designs can lead to significant reductions in operational costs and carbon emissions.	[13]
Material Selection	Utilization of sustainable materials that minimize environmental impact, promote resource conservation, and enhance building performance.	Green building materials have lower embodied energy and contribute positively to sustainability goals. The adoption of green materials is crucial for reducing the ecological footprint.	[14]
Water Conservation	Strategies include rainwater harvesting, greywater recycling, efficient fixtures, and landscaping practices to minimize water usage.	Water-saving technologies can significantly reduce water consumption in green buildings. Effective water management reduces strain on local resources.	[15]
Indoor Air Quality	Focus on improving ventilation, using low-VOC materials, and maintaining healthy indoor environments.	While green buildings may enhance energy efficiency, they do not always guarantee better indoor air quality (IAQ). There are opportunities to improve IAQ within green building programs.	[16]
Waste Management	Emphasis on reducing construction waste, promoting recycling, and adopting circular economy principles.	Multi-criteria optimization models can propose environmentally benign construction waste management strategies. Waste reduction is critical for achieving sustainability.	[17]
Certification	Various rating systems like LEED, IGBC, BREEAM evaluate and certify buildings based on their sustainability performance.	Certification tools provide standardized metrics for assessing green building performance. Different rating systems have varying strengths and weaknesses.	[18]
Social Impacts	Consideration of occupant health, comfort, productivity, and community well-being.	Green buildings aim to improve occupant satisfaction and health, though there is variability in outcomes. Social benefits are integral to the success of green building initiatives.	[19]
Economic Viability	Analysis of cost-benefit ratios, including initial investment, operational savings, and long-term financial returns.	Economic viability plays a pivotal role in stimulating the adoption of green buildings. Cost-benefit analyses highlight the financial advantages of sustainable architecture.	[20]
Environmental Impact	Assessment of the overall environmental footprint, including greenhouse gas emissions, resource depletion, and pollution.	Life cycle assessments reveal the environmental impacts of different building materials and practices. Green buildings aim to mitigate these impacts.	[21]

Key Concepts and Definitions

Green buildings with alternative concepts such as sustainable buildings, or high-performance buildings, are distinguished by attributes that lower greenhouse gas emissions, improve indoor environmental quality, and increase energy and water efficiency. Key features include the use of non-toxic materials, water-saving techniques, renewable energy sources, and designs that maximize natural light and ventilation. Internationally renowned certification programs that set standards for sustainable building design and operation include BREEAM (Building Research Establishment Environmental Assessment Method) and LEED [22].

Green Building Adoption: Trends and Challenges

Globally, the use of green buildings has increased significantly, with Asia-Pacific, North America, and Europe setting the pace. As an illustration of the possibilities for urban sustainability, the commercial real estate market in London has incorporated energy-efficient designs into famous buildings like Bishopsgate Tower and The Shard [23]. Adoption is hindered by high upfront expenditures, especially in residential markets. Limitations on the Demand Side: In many areas, consumers are still not very aware of or inclined to invest in green-certified properties. The increasing number of green-certified buildings in commercial sectors has lowered the price premiums that were previously attached to certifications like LEED or BREEAM [24].

Benefits of Green Buildings

Green buildings can mitigate the effects of urban heat islands, conserve natural resources, and lower carbon emissions. These characteristics help energy transition initiatives and are in line with global climate goals [25]. Due to lower energy and water usage, increased property prices, and better rental rates, green buildings provide long-term cost benefits. In the United States, for instance, LEED-certified office buildings have demonstrated up to 6% rental premiums and up to 16% sale price premiums [26].

Improved indoor air quality, enhanced natural lighting, and better thermal comfort in green buildings contribute to occupants' health and productivity, making them highly desirable for residential and commercial use. The promotion of green buildings has been greatly aided by both private-sector initiatives and government restrictions [27, 28]. Laws like the UK's Carbon Reduction Commitment and the EU Energy Performance and Buildings Directive have encouraged the construction of green buildings and enforced energy efficiency standards. Initiatives such as LEED and BREEAM motivate developers to embrace sustainable practices by offering quantifiable frameworks for evaluating environmental performance [29].

Impact of Green Building Certifications

The rental and transaction values of certified homes are greatly increased by green construction certifications, such as BREEAM. When compared to non-certified properties, certified buildings command higher rental rates, with premiums ranging from 19.7% to 28%. With an increase of 18% to 24% in sales price per net square meter, certified structures also show a significant premium in transaction prices [30]. Clusters with higher concentrations of certified buildings, however, showed a competitive effect. As certified building density increases, transaction premiums drop by 4.7%, while the marginal green premium for rental rates drops by about 1.6% for every additional certified structure. These results point to a saturation impact in markets for green-certified properties that are quite competitive [31].

Factors Influencing Green Building Value

The most important factor affecting property values is green certifications. Because of their perceived quality and environmental efficiency, green-certified buildings routinely fetch greater rental and transaction fees. Property values are significantly impacted by building age, size, and architectural excellence. Rents and sales prices are higher for newer buildings and those with greener features or greater energy efficiency. Property values are also raised by larger properties, those with contemporary facilities, those close to transportation hubs, and those with better indoor environmental quality [32]. The availability of certified buildings in the area is vital. Property values rise in neighborhoods with a greater number of green-certified buildings. The marginal value of new certifications, however, decreases as certified building density rises, indicating a competitive market effect. Compared to private investors, institutional investors and real estate companies are more willing to pay premiums for certified properties. This illustrates how investing strategies are increasingly in line with sustainability objectives [33].

Secondary Influencing Factors

To a lesser degree, elements like eco-labeling, government procurement regulations, business social responsibility, and green consumerism also affect property values. High impact factors include building size, age, quality, and green certifications. Transportation accessibility, community dynamics, and energy-saving features are factors that have a moderate impact [34]. Green space, maintenance expenses, and corporate social responsibility are low impact factors. The hedonic benefits of certified buildings are noteworthy, according to regression analysis. Important factors including rental size, lease duration, and rehabilitation status work in concert with certification to improve financial results. Further confirming the impact of green certifications, the presence of contract elements and neighborhood regulations accounts for 60–62% of the difference in rental rates and 22% of the variation in transaction prices [35].

Limitations in Current Data

It is difficult to separate the benefits of certification from inherent building quality when there are no established quality control procedures in place, especially in the European and UK markets. Without strong quality measurements, it is challenging to evaluate the independent impact of certification because certified properties are frequently stand-ins for improved building standards.

Green Building Features

The most important element that greatly raised the value of green buildings was green building certification. Being certified by respectable organizations is a sign of distinction and approval of excellence. According to surveys, the "certification" attribute appears most frequently, underscoring its significance as a major factor influencing rental prices for certified green buildings [36]. Value enhancement is greatly influenced by the distinctive qualities of green buildings, such as living walls, green roofs, and solar

photovoltaics. According to a research, homes with photovoltaic systems are worth more, and a researcher found that flats with green roofs rented for 16.2% more. Additionally, green roofs reduce stormwater runoff, which raises the value of buildings [37].

Demographic Location

Property value, including that of green buildings, is still significantly influenced by demographic location. Being close to amenities like rail stations or well-known locations increases demand and property values. High occupancy rates and high sales prices are guaranteed by a strategically placed certified green building [38].

Indoor Environmental Quality

The value of a building is influenced by indoor environmental quality (IEQ), which increases occupant satisfaction and productivity. Increased IEQ in green buildings attracts businesses to invest in these workspaces, which raises rental or purchase prices. For example, according to one research, hotels with green certification report a 6.5% higher room premium and a 19% lower complaint rate [39].

Energy Savings

By lowering power bills, energy savings can help pay the upfront expenses of installation. According to a study, a $1 annual reduction in electricity expenses can result in a $20.73 rise in market value. According to studies, green buildings can save up to 60% on energy and water costs, increase in market value by 10%, and increase rental rates by 5% to 10%. Green, energy-efficient buildings are more expensive to rent, which raises the value of real estate. Green office buildings in Malaysia draw in real estate investors and boost market demand since they have reduced running expenses (RM0.164 per square foot) and higher rental rates [40].

Material Costs

Advanced materials used in green building construction often result in higher construction costs, which in turn raise property values. The increased value of a five-star Green Star-rated building in Australia resulted in a 3-5% increase in construction costs. Energy Star certification and other eco-labeling have a big impact on the value of green buildings [41]. Commercial buildings that possess these certifications can command sales premiums of up to 16% and lease for about 3% more per square foot. Greater value is correlated with higher green building certification levels. Research has shown that tenants are prepared to pay more for buildings that have more certifications, such LEED, BREEAM, and Green Star. The value of green buildings is influenced by geographic neighborhoods. The percentage rise in green building rent or value is always higher in smaller markets or less expensive areas [26].

Quality of Construction and Material Use

The use of eco-friendly materials and expert construction greatly impacts the value of green buildings. While well-crafted green buildings see increased value, poorly constructed ones do not achieve high market value. The growth of green consumerism drives the need for green buildings. According to an investigation, people are willing to pay more for environmentally friendly housing since they value green lifestyles more and more [14]. Green buildings are becoming more and more valued due to their social and environmental advantages. Investment in green developments is encouraged by heightened environmental consciousness. One of the main factors driving the need for green buildings is corporate social responsibility, or CSR. In order to support their CSR objectives and increase property value, businesses give priority to green spaces [42].

Government Procurement Policies

Green buildings become more economical and valuable as a result of government initiatives like green tax breaks and subsidies. Demand is also stimulated by tax advantages for owners of green properties. Green building initiatives cost more since they take more time and money to complete. Nonetheless, these expenses add to the project's total worth. The value of green buildings is not significantly impacted by the risks and profits of developers [43]. Research indicates that homebuyers pay a higher price premium than developers do, which guarantees profitability. The value of green buildings is not much impacted by building size. Larger buildings may fetch higher rents, but their effect on the value per square foot is minimal. Demand for green buildings varies by industry, with the energy and financial industries exhibiting the highest demand. However, overall value is not significantly impacted by this factor [44]. Environmental concerns and other consumer factors that drive the purchase of green homes affect demand but have little bearing on price.

High Level of Satisfaction

Property values are not immediately impacted by owner satisfaction with green buildings, which stems from energy efficiency and long-term advantages. Although they have no direct impact on building costs, environmentally friendly materials can raise maintenance costs [22]. Long-term social and environmental advantages of green spaces enhance the standard of living for locals. They have little effect on the value of green buildings, though. Market competition and green gentrification can negatively impact green building prices. Increased supply may lead to market saturation and reduced premiums [45].

Conclusion

This review combined knowledge from previous research to offer a complete analysis of the elements affecting the value of green buildings. The results highlight that the most important factor influencing value is green building certification, which attests to the facility's sustainability, excellence, and status. Improved IEQ, green roofs, and solar photovoltaics are just a few of the features that greatly raise the appeal and market value of real estate. Furthermore, by resulting in higher rental rates and market premiums, energy efficiency not only lowers operating costs but also increases the financial appeal of green buildings.

Because demand and occupancy rates are strongly impacted by proximity to important amenities and significant regions, demographic location has emerged as a crucial driver. Likewise, government regulations, CSR programs, and eco-labeling all contribute significantly to the increased appeal of green assets. The long-term advantages, such as energy savings and societal acceptance brought about by green consumption, exceed the initial deterrents of higher building and maintenance costs. The study also emphasizes how crucial government actions are to supporting the green building sector, including tax breaks, subsidies, and more stringent energy-efficiency laws. It was observed that

industry-specific demands, market competitiveness, and green gentrification all had complex effects, underscoring the necessity of well-rounded development strategies.

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The author declares that they have no conflict of interest.

References
1. Gobinath P, *et al*. Life cycle energy and greenhouse gas emissions of a traditional and a smart HVAC control system for Australian office buildings. Journal of Building Engineering. 2024;82:108295. https://doi.org/10.1016/j.jobe.2023.108295.
2. Alam MM, *et al*. Macroeconomic determinants of non-renewable and renewable energy consumption in India: The roles of international trade, innovative technologies, financial globalization, carbon emissions, financial development, and urbanization. Energy. 2024;308:132939. https://doi.org/10.1016/j.energy.2023.132939.
3. Pan Y, *et al*. Deep reinforcement learning for multi-objective optimization in BIM-based green building design. Automation in Construction. 2024;166:105598. https://doi.org/10.1016/j.autcon.2023.105598.
4. Borhani A, *et al*. An ontological analysis for comparison of the concepts of sustainable building and intelligent building. Journal of Construction Engineering and Management. 2024;150(4):04024014. https://doi.org/10.1061/(ASCE)CO.1943-7862.0002483.
5. Liu B, Pan X. Green finance, energy transition, and natural resources of real estate sector: Driving eco-sustainability and sustainable economic growth. Economic Change and Restructuring. 2024;57(2):65. https://doi.org/10.1007/s10644-023-09397-4.
6. Li C, Guo Y, Wang L. Can social organizations help the public actively carry out ecological environment supervision? Environment, Development and Sustainability. 2024;26(5):12061-12107. https://doi.org/10.1007/s10668-023-03501-7.
7. Sun Q, *et al*. The impact of housing prices and land financing on economic growth: Evidence from Chinese 277 cities at the prefecture level and above. PLOS ONE. 2024;19(4):e0302631. https://doi.org/10.1371/journal.pone.0302631.
8. Tekouabou SC, *et al*. AI-based on machine learning methods for urban real estate prediction: A systematic survey. Archives of Computational Methods in Engineering. 2024;31(2):1079-1095. https://doi.org/10.1007/s11831-023-09827-9.
9. Walacik M, Chmielewska A. Energy performance in residential buildings as a property market efficiency driver. Energies. 2024;17(10):2310. https://doi.org/10.3390/en17102310.
10. Adebayo TS, Ullah S. Towards a sustainable future: The role of energy efficiency, renewable energy, and urbanization in limiting CO2 emissions in Sweden. Sustainable Development. 2024;32(1):244-259. https://doi.org/10.1002/sd.2487.
11. Almusaed A, *et al*. Assessing the impact of recycled building materials on environmental sustainability and energy efficiency: A comprehensive framework for reducing greenhouse gas emissions. Buildings. 2024;14(6):1566. https://doi.org/10.3390/buildings14061566.
12. Bashir MT, *et al*. Evaluating the implementation of green building materials in the construction sector of developing nations. Journal of Human, Earth, and Future. 2024;5(3):528-542. https://doi.org/10.28991/HEF-2024-05-03-02.
13. Shahee A, *et al*. Reducing the energy consumption of buildings by implementing insulation scenarios and using renewable energies. Energy Informatics. 2024;7(1):18. https://doi.org/10.1186/s42162-024-00059-2.
14. Yahia AKM, *et al*. Sustainable materials selection in building design and construction. International Journal of Science and Engineering. 2024;1(04):106-119. https://doi.org/10.1007/s11645-023-00016-9.
15. Thebuwena ACHJ, Samarakoon SSM, Ratnayake RC. On the necessity for improving water efficiency in commercial buildings: A green design approach in hot humid climates. Water. 2024;16(17):2396. https://doi.org/10.3390/w16172396.
16. Jayeoba S, Awojobi E. Maintaining optimal indoor air quality: Pollutants removal and proper ventilation in mixed-use complexes. African Journal of Environmental Sciences and Renewable Energy. 2024;16(1):60-70.
17. Wijewansha AS, *et al*. Implementation of circular economy principles during pre-construction stage: The case of Sri Lanka. Built Environment Project and Asset Management. 2021;11(4):750-766. https://doi.org/10.1108/BEPAM-05-2020-0066.
18. Mostafa M, Ahmmed M, Karim O. A possibility of adopting Bangladesh's first-ever proposed green building rating system BEEER (Building Energy Efficiency & Environment Rating) in green building industry and highlights a comparison among different types of green building rating systems. Environmental Technology & Innovation. 2024. (Details missing; please provide more information for completion).
19. Muianga EAD, *et al*. Housing transformations and their impacts on the well-being of dwellers. Ambiente Construído. 2022;22:255-274. https://doi.org/10.1590/s1678-86212022000300651.
20. Ćetković J, *et al*. Financial and economic investment evaluation of wastewater treatment plant. Water. 2022;14(1):122. https://doi.org/10.3390/w14010122.
21. Saleem J, *et al*. Assessing the environmental footprint of recycled plastic pellets: A life-cycle assessment perspective. Environmental Technology & Innovation. 2023;32:103289. https://doi.org/10.1016/j.eti.2023.103289.
22. Bungau CC, *et al*. Green buildings as a necessity for sustainable environment development: Dilemmas and

challenges. Sustainability. 2022;14(20):13121. https://doi.org/10.3390/su142013121.
23. Zreik M. The regional comprehensive economic partnership (RCEP) for the Asia–Pacific region and world. Journal of Economic and Administrative Sciences. 2024;40(1):57-75. https://doi.org/10.1108/jeas-05-2023-0079.
24. Mathew TC, Nagaraja Pandian S. Unveiling the shadows: A qualitative exploration of barriers to rooftop solar photovoltaic adoption in residential sectors. Clean Energy. 2024;8(5):218-228. https://doi.org/10.1093/ce/zxad010.
25. Irfeey AMM, *et al*. Sustainable mitigation strategies for urban heat island effects in urban areas. Sustainability. 2023;15(14):10767. https://doi.org/10.3390/su151410767.
26. Jayakody TACH, Vaz A. Impact of green building certification on the rent of commercial properties: A review. Journal of Informatics and Web Engineering. 2023;2(2):8-28.
27. Jia L-R, *et al*. Interaction between thermal comfort, indoor air quality and ventilation energy consumption of educational buildings: A comprehensive review. Buildings. 2021;11(12):591. https://doi.org/10.3390/buildings11120591.
28. Khaliq H, *et al*. Fostering sustainability consciousness: The role of green buildings in the United Kingdom. Open Access Library Journal. 2024;11(10):1-15. https://doi.org/10.4236/oalib.1109105.
29. Akin I, Akin M. Promoting sustainable practices through green investments in the United Kingdom real estate industry. Sustainable Development. 2024. (Details missing; please provide more information for completion).
30. Marques A, Januário JF, Cruz CO. Sustainability certifications in real estate: Value and perception. Buildings. 2024;14(12):3823. https://doi.org/10.3390/buildings14123823.
31. Duca JV, Muellbauer J, Murphy A. What drives house price cycles? International experience and policy issues. Journal of Economic Literature. 2021;59(3):773-864. https://doi.org/10.1257/jel.20201444.
32. Łątka JF, *et al*. Properties of paper-based products as a building material in architecture–An interdisciplinary review. Journal of Building Engineering. 2022;50:104135. https://doi.org/10.1016/j.jobe.2022.104135.
33. Kim DH, Irakoze A. Identifying market segment for the assessment of a price premium for green certified housing: A cluster analysis approach. Sustainability. 2022;15(1):507. https://doi.org/10.3390/su15010507.
34. Plakantonaki S, *et al*. A review of sustainability standards and ecolabeling in the textile industry. Sustainability. 2023;15(15):11589. https://doi.org/10.3390/su151511589.
35. Chung J, *et al*. Road to net zero: Greenness of Leadership in Energy and Environmental Design and California Green Building Standards Code in the multifamily sector. Real Estate Economics. 2025;53(1):164-203. https://doi.org/10.1111/1540-6229.12345.
36. Leiringer R, *et al*. In search of sustainable construction: The role of building environmental assessment methods as policies enforcing green building. Construction Management and Economics. 2022;40(2):104-122. https://doi.org/10.1080/01446193.2022.2087432.
37. Nasr Y, *et al*. Comprehensive assessment of the impact of green roofs and walls on building energy performance: A scientific review. Energies. 2024;17(20):5160. https://doi.org/10.3390/en17205160.
38. Schwartz EK, Krarti M. Review of adoption status of sustainable energy technologies in the US residential building sector. Energies. 2022;15(6):2027. https://doi.org/10.3390/en15062027.
39. Roumi S, *et al*. Weighting of indoor environment quality parameters for occupant satisfaction and energy efficiency. Building and Environment. 2023;228:109898. https://doi.org/10.1016/j.buildenv.2023.109898.
40. Tsai I-C. Value capitalization effects of green buildings: A new insight through time trends and differences in various price levels. Building and Environment. 2022;224:109577. https://doi.org/10.1016/j.buildenv.2022.109577.
41. Louzi N, *et al*. Psychological health and environmental effect of using green recycled amassed concrete on construction. Journal for ReAttach Therapy and Developmental Diversities. 2022;5(2s):163-175.
42. Hafez FS, *et al*. Energy efficiency in sustainable buildings: A systematic review with taxonomy, challenges, motivations, methodological aspects, recommendations, and pathways for future research. Energy Strategy Reviews. 2023;45:101013. https://doi.org/10.1016/j.esr.2023.101013.
43. He W, *et al*. Green finance support for development of green buildings in China: Effect, mechanism, and policy implications. Energy Policy. 2022;165:112973. https://doi.org/10.1016/j.enpol.2022.112973.
44. Sheng D, Cheng H, Yin M. Housing developers' heterogeneous decision-making under negative shock after the high-growth era: Evidence from the Chinese real estate economy. Mathematics. 2024;12(12):1798. https://doi.org/10.3390/math12121798.
45. Semeraro T, *et al*. Planning of urban green spaces: An ecological perspective on human benefits. Land. 2021;10(2):105. https://doi.org/10.3390/land10020105.