Introduction
About this report

This report makes the case for investing in green buildings and provides practical guidance to financial institutions and investors across emerging markets on shifting their real estate portfolios to financing green buildings. By doing so, they can take advantage of the $24.7 trillion investment opportunity across emerging market cities by 2030, build strong portfolios, stimulate demand for green buildings, and contribute to low-carbon economic growth.

The report also looks at commitments and actions by developers and owners of green buildings and governments, who are critical players in creating the market for the flow of finance to green construction.

It is intended primarily for financial institutions across emerging markets as they seek to expand their green construction and mortgage finance products in order to build higher-value and lower-risk portfolios and access global capital markets. It is recommended for building developers and owners across emerging markets who seek to better understand the business case for green buildings and how they can differentiate themselves in the market in order to grow their business and access to finance. It is also recommended to emerging markets’ governments, particularly at the subnational and local levels, which can incentivize green construction to achieve green economic growth and meet climate commitments.

The report offers a uniquely private sector perspective on the investment potential in emerging markets and how to realize this potential, according to IFC. It draws on IFC’s almost decade-long experience of helping design and implement green building codes across emerging markets. In addition, IFC has designed its own certification system specifically for emerging markets, EDGE, which is available in more than 150 emerging markets.

Through its investments, IFC complements existing work that is catalyzing sustainable markets. As of June 30, 2019, it has invested more than $4.5 billion in green building projects worldwide and mobilized an additional $1 billion in financing for green homes, offices, hospitals, hotels, and retail buildings. Furthermore, it works within an extensive network of client banks across emerging markets to help develop and expand innovative financial products to scale up investments in green buildings.

The report focuses on the construction and use of green buildings and considers the business and climate benefits of energy efficiency, water savings, and waste reduction approaches. It does not consider the climate impacts associated with the production and supply of construction materials† or the practices necessary to address the emissions from the end-of-life demolition phase of the building lifecycle.

This report focuses on new buildings and does not discuss retrofits. Given the rapid growth of new construction, new buildings represent a larger investment potential. There is also an urgent imperative to “build it right” in order to avoid inefficient use of energy for decades to come. The market for retrofits is discussed briefly in the Current and Potential Green Buildings Market section.

The report does not differentiate between low-income and middle-income emerging markets. While the best practices reviewed in this report are intended to inform the application of green construction practices across markets, we acknowledge that lower-income and fragile and conflicted-affected states face unique challenges, and these countries will require significant time, effort, and support to transition to green construction and to develop the mortgage market.

† Although the embodied carbon of construction materials—greenhouse-gas emissions generated during materials’ production—is beyond the report’s scope, it is important to note that it is a key issue in the context of decarbonizing the construction value chain. The construction industry is the world’s largest consumer of raw materials and, if embodied carbon is taken into consideration, buildings’ contribution to global greenhouse-gas emissions increases from 28 percent to 40 percent. Approaches to decarbonizing construction materials are covered in previous IFC reports.
Report structure

The report is divided into four chapters: Introduction (this chapter), Understanding the Market for Green Buildings, Building the Market for Green Buildings, and Conclusion and Recommendations.

Understanding the Market for Green Buildings defines green buildings and outlines the context and framing for subsequent analysis. The chapter estimates the size of the current market for green buildings and its potential in emerging markets. It reviews the investment opportunities by region and building type, and considers the business case for green buildings for investors, developers, and governments.

Building the Market for Green Buildings draws on the foundational definitions and business case and reviews key ingredients for functioning markets: finance, policy and regulation, and voluntary standards and actions by the market leaders.

The final chapter, Conclusion and Recommendations, distills the best practices reviewed throughout the report into recommendations for the key market players.
Understanding the Market for Green Buildings
Clear and agreed on definitions of what constitutes these material characteristics, accompanied by relevant metrics to measure and verify a green building’s performance, accounting for local variations, are important for market growth. Definitions and metrics are essential for:

• Industry policymakers to establish minimum requirements for compliance, as well as provide incentives for private sector innovation to raise the standard.

• Developers to build green buildings and get recognition from buyers for their superior quality.

• Financial regulators to develop market rules for green assets.

• Financiers and developers to gain access to capital markets for their green building portfolios.

Standardized metrics and clear reporting requirements are essential to catalyze investment at the scale required to green the new construction market. They will help investors assess green buildings for their financial
viability, sustainability credentials, and alignment with portfolio strategies. Standards provide the necessary definitions while certifications such as BCA Green Mark, BREEAM, LEED, and others can offer an asset rating to help investors define, measure, and verify their green buildings investments. This facilitates the issuance of green bonds and other forms of green finance, which can increase capital flows to the sector.

**IFC’s definition of green buildings**

From almost 15 years of investing in green buildings, IFC has learned that green buildings should be:

- Certified as green under one of the internationally recognized certification standards or an approved national standard.
- At least 20 percent more energy efficient than a baseline building without energy-efficient design.16
- Able to quantitatively report impact metrics, such as energy and water savings, and greenhouse-gas emissions reductions.

When IFC provides credit lines to its client banks and other financial intermediaries for on-lending for green building projects, it requires eligible projects to be certified and at least 20 percent more energy efficient than the benchmark.17

When IFC uses the proceeds of green bonds to finance green buildings, it reports on the following metrics: the type of green certification system applied; green floor space; reductions in energy, water, and energy embodied in materials against a benchmark; and reductions in carbon emissions. For residential projects such as low-income housing, additional metrics include the number of households or people served. In addition, it is best practice for green bond issuers to report on quantifiable green building performance to bond holders.

The focus on operational energy efficiency and the resulting reduction in greenhouse-gas emissions aligns with what large commercial banks consider to be the most material characteristics for their green real estate portfolios.18 Energy use can be measured and verified; however, focusing on this alone disregards the other benefits of green buildings, namely water-use efficiency and reduced embodied carbon in building materials. Unlike most certification systems, IFC’s EDGE incorporates...
EDGE: Powering green building transformation in emerging markets

IFC’s EDGE can be used to certify new and existing buildings at the design stage and after construction that achieve at least a 20 percent cut in energy, water, and embodied energy in materials compared to conventional buildings. Designed for emerging markets, EDGE offers a faster, easier, and more affordable approach to certification than was previously available. It consists of free design software, a streamlined online certification system, and the world’s largest network of certifiers.

EDGE’s software allows a user to apply different systems, solutions, and design techniques to discover the most cost-effective way to design and build green. These include energy-efficient lighting and cooling, shading, natural ventilation, and low-flow water fixtures, which help optimize building performance. Incremental capital costs are indicated with the payback period, as well as the value that is transferred to future owners of the property. The software is calibrated to take local conditions into account, including climate and local industry costs and practice. EDGE is available in over 150 countries for residential, public, and commercial projects.

In September 2019, EDGE launched two new certification products to recognize high-performing projects:

- **EDGE Advanced**: Awarded to projects that improve energy efficiency by 40 percent or more, in addition to at least 20 percent savings in water and materials as per EDGE certification requirements.
- **EDGE Zero Carbon**: EDGE Advanced projects that achieve 100 percent carbon neutrality through renewables or carbon offsets at the operational stage receive further distinction.

EDGE is the only system that requires efficiency in embodied energy in materials as a certification parameter. To better address the issue of embodied carbon in construction materials, IFC is exploring moving from requiring a minimum of 20 percent efficiency in embodied energy in materials to embodied carbon in materials.
these parameters, and ways to quantify them, into its definition of a green building, which requires a minimum of 20 percent greater water and energy efficiency, and 20 percent less embodied energy in building materials compared to a local business-as-usual benchmark.

IFC is leading discussions with other multilateral development banks to agree on a common definition of green buildings.

**Extending the scope of certification to operations**

While energy efficiency and other green measures are increasingly being incorporated into building designs, studies have shown that these often do not translate into expected reductions in energy consumption during the building’s use due to occupant behaviors. This mismatch between design and operation is known as a performance gap. Certification systems—which are often aimed at the design stage of building construction—are working to incorporate requirements that verify that buildings are used in a way that maximizes the effectiveness of efficiency measures. They can then ensure that buildings that are designed to be green are also used in a green manner.

One approach is to complement design-focused certifications with building performance rating systems and certificates such as the EU’s Energy Performance Certificates that help measure and monitor the building’s energy performance, as well as provide tips on how to cost-effectively improve the building’s energy rating (for further details, see the section on Policy and Regulatory Building Blocks). However—as evidenced in China where less than 5 percent of certified green buildings hold green performance certificates—this second stage of certification is less commonly used by developers than those for the design stage.

**The next frontier: Net zero emissions and zero carbon certification**

As technologies advance and governments’ sustainability ambitions grow, so efficiency and decarbonization standards are becoming stricter. New buildings will have to comply with ever-improving standards and norms, and existing buildings will need to be regularly monitored and retrofitted to meet new, higher efficiency standards.

The next frontier for green buildings is to have net zero emissions. Net zero buildings are highly efficient buildings that use only renewable energy or carbon offsets. In 2017, there were 2,500 net zero emissions buildings worldwide that were recognized through a green building certification or adhered to an official standard. This number needs to significantly increase to reach the net zero emissions goal.

Cities like Boston are already incorporating carbon neutrality requirements for new buildings, and others are following suit. In October 2019, Arthaland Corporation became the first company to receive an EDGE Zero Carbon certification, for its flagship office building in the Philippines.

The World Green Building Council is calling on the signatories of the Advancing Net Zero agenda—comprising businesses, cities, states, regions, and organizations—to take immediate climate action to reach net zero operating emissions in their building portfolios by 2030, and advocating for all buildings to be net zero in operations by 2050. This is complemented by the Zero Carbon Buildings for All Initiative, which also calls for national and local leaders to drive decarbonization of all new buildings by 2030 and all existing buildings by 2050. It also challenges financial and industry partners to provide expert input and commit $1 trillion in investment by 2030.
Current and Potential Green Buildings Market

The current market for green buildings

The floor area of the global buildings sector is expected to double by 2060, driven by growing population and urbanization rates across emerging markets.²⁶ The projected additional 230 billion square meters of new building construction is equivalent to adding the floor area of Japan every year until 2060.²⁷ It is imperative to ensure that these new buildings are built green to avoid higher carbon emissions for decades that stem from inefficient energy use. Rapid expansion of building construction and the need to reduce emissions present a $24.7 trillion investment opportunity in the green buildings sector in emerging market cities until 2030.

Green buildings comprise a relatively small share of global construction. Global investments in green buildings accounted for $423 billion of the $5 trillion spent on building construction and renovation in 2017 and represent an even smaller share of the estimated $217 trillion in global real estate value.²⁸ However, by some estimates, the global green buildings market is expected to grow at an average of over 10 percent annually between 2017 and 2023.²⁹

The residential construction sector accounted for over 60 percent of the global market for green buildings in 2018.³⁰ The green residential sector is expected to grow at a compound annual rate of 10.88 percent between 2018 and 2023.³¹ The non-residential segment of the market is expected to grow at a compound annual rate of 9.25 percent over the same period.³²
A 2018 study of world green building trends surveyed 2,078 architects, engineers, contractors, owners, specialists, and investors employed in the construction industry across 86 countries. Almost half of the respondents expect green buildings to comprise over 60 percent of all their projects by 2021. The global average for the same group is expected to increase from 27 percent in 2018 to 47 percent in 2021. This supports the expected strong growth of green buildings as a share of total construction and the significant market potential.

A strong business case is driving the growth in green construction. Investor and client demand, as well as environmental regulations, are key triggers and business considerations. Property developers and end users, such as hotels, increasingly understand the financial and reputational benefits of building green.

**The potential market for green buildings: A $24.7 trillion investment opportunity**

The estimated $24.7 trillion investment potential in green buildings between 2018 and 2030 in emerging market cities is due to the sharp increase in building construction expected over the next few decades and the opportunity to ensure these are built green. This amount reflects the investment opportunity created by fully achieving explicit and implicit urban green buildings-related policies and targets set by local and national governments in emerging markets until 2030. It is informed by pledges, targets, and investment plans contained in city action plans, NDCs, and other policies.

These investment opportunity numbers assume that the total population in 2030 across six emerging market regions will be 7.5 billion, of which 4.1 billion people will live in urban areas, according to UN projections.
## Figure 1: Investment opportunity by property type and region (USD billions)

<table>
<thead>
<tr>
<th>Property Type</th>
<th>Sub-Saharan Africa</th>
<th>Middle East &amp; North Africa</th>
<th>South Asia</th>
<th>East Asia Pacific</th>
<th>Europe &amp; Central Asia</th>
<th>Latin America &amp; Caribbean</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>73.8</td>
<td>122.6</td>
<td>41.2</td>
<td>1,191.4</td>
<td>50.6</td>
<td>269.6</td>
<td>1,749.2</td>
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<tr>
<td>Healthcare</td>
<td>38.7</td>
<td>85.8</td>
<td>13.5</td>
<td>320.6</td>
<td>30.2</td>
<td>81.1</td>
<td>569.9</td>
</tr>
<tr>
<td>Hotels &amp; Restaurants</td>
<td>11.9</td>
<td>35.2</td>
<td>38.8</td>
<td>1,345.7</td>
<td>23.6</td>
<td>54.2</td>
<td>1,509.4</td>
</tr>
<tr>
<td>Institutional/Assembly</td>
<td>27.6</td>
<td>50.2</td>
<td>17.3</td>
<td>733.7</td>
<td>24</td>
<td>26.7</td>
<td>879.4</td>
</tr>
<tr>
<td>Office</td>
<td>49.6</td>
<td>65.3</td>
<td>61.7</td>
<td>2,566.8</td>
<td>40.8</td>
<td>111.9</td>
<td>2,896.2</td>
</tr>
<tr>
<td>Retail</td>
<td>31.4</td>
<td>60.7</td>
<td>87.6</td>
<td>844.8</td>
<td>39.1</td>
<td>84.2</td>
<td>1,147.9</td>
</tr>
<tr>
<td>Transport</td>
<td>5.3</td>
<td>7.4</td>
<td>3.2</td>
<td>26.2</td>
<td>3.8</td>
<td>11.9</td>
<td>57.8</td>
</tr>
<tr>
<td>Warehouse</td>
<td>20.1</td>
<td>22.5</td>
<td>18.2</td>
<td>97.4</td>
<td>7.1</td>
<td>25.1</td>
<td>190.5</td>
</tr>
<tr>
<td><strong>TOTAL COMMERCIAL</strong></td>
<td><strong>258.4</strong></td>
<td><strong>449.7</strong></td>
<td><strong>281.5</strong></td>
<td><strong>7,126.6</strong></td>
<td><strong>219.2</strong></td>
<td><strong>664.7</strong></td>
<td><strong>9,000.2</strong></td>
</tr>
<tr>
<td>Multi-Unit-Residential</td>
<td>96.6</td>
<td>158.1</td>
<td>542.9</td>
<td>7,555.9</td>
<td>201.3</td>
<td>745.2</td>
<td>9,300</td>
</tr>
<tr>
<td>Single-Family-Detached</td>
<td>413</td>
<td>528.4</td>
<td>933.8</td>
<td>1,331.7</td>
<td>460.2</td>
<td>2,751</td>
<td>6,418.1</td>
</tr>
<tr>
<td><strong>TOTAL RESIDENTIAL</strong></td>
<td><strong>509.6</strong></td>
<td><strong>686.5</strong></td>
<td><strong>1,476.7</strong></td>
<td><strong>8,887.6</strong></td>
<td><strong>661.5</strong></td>
<td><strong>3,496.2</strong></td>
<td><strong>15,718.1</strong></td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>768</strong></td>
<td><strong>1,136.2</strong></td>
<td><strong>1,758.1</strong></td>
<td><strong>16,014.2</strong></td>
<td><strong>880.7</strong></td>
<td><strong>4,160.9</strong></td>
<td><strong>24,718.3</strong></td>
</tr>
</tbody>
</table>
The average overall rate of urbanization is assumed to be 56 percent, ranging from 40 percent in South Asia to over 80 percent in Latin America.\textsuperscript{35}

**Investment opportunity across regions**

More than half of the 4.1 billion people projected to live in urban areas by 2030 are expected to be in South Asia and the East Asia Pacific regions—they will need to be accommodated with additional residential and commercial building floor space. The East Asia Pacific region alone has an investment opportunity in green buildings of $16 trillion, accounting for over half of the total opportunity across all emerging markets. The Investment opportunity in South Asia is an estimated $1.8 trillion across rapidly growing secondary cities as well as megacities.

Eastern Europe and Central Asia have an investment opportunity of almost $881 billion in new green buildings; however, this amount is likely to be much smaller than the investment opportunity in retrofitting old buildings to make them more energy and resource efficient, given that much of the needed building stock in this region already exists.

Figure 2: Investment opportunity across regions (USD billions)