Introduction

For green building to accelerate globally, building industry professionals require the latest data and trends to inform their decisions. We are adding to the body of knowledge with The World Green Building Trends 2016 Study. Focused on global green building trends, the report features the results of more than 1,000 survey participants from 69 countries and includes 13 country-specific profiles, as compared to nine in 2013.

The World Green Building Trends 2016 SmartMarket Report, presented by Dodge Data & Analytics and United Technologies Corporation, provides new world green building trends data to support green building development. By expanding the scope of the World Green Building Trends SmartMarket Report, published in 2013, this study demonstrates that green building continues to influence construction in both developed and developing economies.

A key takeaway from the study is that global green building continues to double every three years. Emerging economies like Brazil, India, Saudi Arabia and South Africa will be engines of green growth in the next three years, with development varying from twofold to sixfold over current green building levels. The results also reveal that expansion will continue in developed countries like the US, Germany and the UK. Across all regions, many respondents forecasted that more than 60% of their projects will be green by 2018.

Since economic forces are the most important drivers for many of the countries surveyed in this report, it is crucial to demonstrate the positive financial and business impacts of building green. The study found that green buildings offer significant operational cost savings compared with traditional buildings. To this effect, respondents expect a 14% savings in operational costs over five-year savings for new green buildings and 13% savings in operational costs over five years for green retrofit and renovation projects. Building owners also report that green buildings—whether new or renovated—command a 7% increase in asset value over traditional buildings.

Overall, the survey data indicates that the global commitment to green building is transforming the built environment. Special thanks to Saint-Gobain and the U.S. Green Building Council (USGBC) and to all of the organizations who participated in this recent survey, encouraged survey participation and financially supported it.
The World Green Building Trends 2016 Smartmarket Report features results from survey respondents from the following 69 countries, with statistically significant results on the highlighted 13 countries. To download the full report, go to http://analyticsstore.construction.com/.
Executive Summary

Green building is already widely adopted globally, with strong growth expected in most countries, but most particularly in the developing world.

The findings reveal that green building is a global trend, with nearly universal importance placed on energy conservation. However, as the previous study from 2012 also demonstrated, the priorities and obstacles need to be understood on a country-by-country basis to truly succeed as a sustainable business in the global marketplace.

Developing Markets Expect Greatest Green Growth

The percentage of firms expecting to have more than 60% of their projects certified green is anticipated to more than double from 18% currently to 37% by 2018. This is a similar pattern to the growth in activity expected in 2012, although the greater share of respondents from developing markets and a shift from a majority to a minority of green building council member participants yields lower levels of activity than was reported in 2012.

As the chart at bottom demonstrates, the anticipated growth is largely driven by countries that still have developing green markets. Mature markets in the US and Europe (including Germany, Poland and the UK) report moderate levels of growth. In contrast, respondents from Mexico, Brazil, Colombia, Saudi Arabia, South Africa, China and India report much more dramatic growth in the percentage of their projects that they expect to certify as green.

Top Triggers for Green Building

While client demand has consistently been an important trigger in the studies conducted in 2008 and 2012, it takes a significant leap in 2015 as one of the top triggers driving future green activity, from 35% in 2012 to 40% in 2015. Clearly, recognition by owners of the benefits of green is critical to sustaining green market growth globally.

Percentage of Respondents Whose Firms Have Done More Than 60% Green Projects

(2015 and Expected 2018)

Dodge Data & Analytics, 2016
Environmental regulations also experienced an uptick in the percentage who selected it as a top trigger, driven by a high level of response from a few regions, including India, Singapore and the UK.

However, as the top social and environmental reasons for building green demonstrate, priorities for building green vary widely by region. For example, while encouraging sustainable business practices is an important reason for building green in most countries, it carries little weight in Saudi Arabia, where increasing worker productivity is a critical factor. Similarly, energy conservation is nearly universally an important environmental reason for building green, but in some countries, such as Brazil, Colombia, Saudi Arabia, Australia and China, protecting natural resources is considered a priority by nearly as many respondents.

Obstacles Vary by Country
Higher first costs is one of the top three obstacles in 11 out of the 13 countries featured in the study. It is particularly prominent in the Americas, especially in the US and Colombia.

Lack of public awareness and lack of political support/incentives are top obstacles in many developing green markets, including Brazil, Colombia, India and Poland. In more established markets like Australia and the UK, the perception that green is for high-end projects is a more prominent obstacle than in less established markets.

Strong Benefits for Building Green Reported Globally, Based on Increased Measurement of Green Building Impacts
Three quarters (75%) of respondents are tracking metrics on the benefits of their green buildings, a 12 percentage point jump over those doing so in 2012. The higher degree of measurement reaffirms the strong benefits noted in 2012, which are largely equaled or surpassed in the current study.

The table at right demonstrates the benefits experienced globally. While there are some differences by country, for the most part, the reporting of these benefits is very consistent across the globe. Perhaps the most notable difference by country is in terms of payback periods for the additional cost of building a new green building, where developing countries in the Americas (Mexico, Brazil and Colombia) report short payback periods of five years. For many commercial investors, this is a critical threshold that can help spur green development.
Green Building Activity and Trends in Singapore

Singapore is still in the midst of a robust increase in the level of green activity, with a high percentage of respondents reporting an expectation to build green projects in every building sector measured in the survey. While the mandate passed in 2012 is the clear driver, business benefits are emerging that encourage wider adoption.

**Robust and Growing Levels of Green Involvement in Singapore**

Nearly all respondents (97%) in Singapore have engaged in at least some green building, the highest level of green building involvement of all the countries included in the survey.

In addition, the growth in the level of green activity in Singapore by 2018 is expected to be robust. The highest level of growth in this country is expected among those doing more than 60% of their projects green, with a 15 percentage point gain from 23% currently to 38% by 2018. This is a higher percentage than that from any country included in the survey, other than South Africa and India. Clearly Singapore is an important, growing market for green product manufacturers and service providers.

These findings are strong compared with the other global findings in this study, but they do appear on the surface to be a step back from the 2012 findings, where 64% of respondents reported doing more than 60% of their projects green. However, 2012 was also the year in which Singapore launched a major government mandate for green. Three years of experience with living under the mandate have tempered the responses as knowledge about green building has grown in Singapore.

**SECTORS WITH EXPECTED GROWTH**

Singapore is poised to be a leader globally in four sectors for green building in the next three years.

- **Retrofits of Existing Buildings:** Singapore has the highest percentage of respondents (65%) among the countries included in the study who state that they will do green retrofits of existing buildings in the next three years.

- **New Commercial Construction (e.g., office, retail, hotel):** 53% of respondents from Singapore expect to do new green commercial construction projects in the next three years, above the global average of 46%. However, developing regions like Mexico, India and Colombia do exceed Singapore in the percentage of respondents expecting to do green work in this sector.

- **New Institutional Construction (e.g., schools, hospitals, public buildings):** 48% of respondents from Singapore expect to do new green institutional construction projects. This is the highest percentage of respondents from any country included in the study.

- **New High-Rise Residential:** Singapore also leads globally in this category with 48%, tied only with India.

In fact, Singapore exceeds global averages for all other categories,
including low-rise residential, commercial interiors and communities. There is a far more broad-based commitment to green evident in Singapore than in other global markets.

**Influence Factors for Future Green Building Activity**

**TRIGGERS**

Given the influence of the 2012 green mandate in Singapore, it is not surprising that environmental regulations are the top trigger by far, selected by 58%. This places Singapore with a small group of countries, including the UK and India, where regulations are clearly the driving force for adoption.

However, more market-based triggers, such as lower operating costs and market demands, are also very influential in Singapore and roughly equivalent with global averages.

**CHALLENGES**

The biggest challenge faced by the burgeoning green market in Singapore is the lack of trained green building professionals, selected by 43% as a top obstacle, at least nine percentage points above any other country in the study.

The second most important challenge, and the only other challenge selected by a notably higher percentage of respondents from Singapore than other countries, is the concern about affordability and perception that green is for high-end projects only, selected by 38%.

A much lower percentage of respondents from Singapore, on the other hand, are concerned that practices. It was selected by 64% of Singapore respondents, putting Singapore roughly on par with the UK, the US, Mexico and Colombia in terms of this driver.

While reducing energy use is the most important environmental reason for building green in most countries, it is more dominant in Singapore than in other countries. 84% of respondents selected this as the most important reason, with next highest factors, reducing water consumption and lowering greenhouse gas emissions, each a distant second at 31%.

**Business Benefits**

Nearly all (95%) of the respondents in Singapore use some metrics to actively track building performance. This finding is not surprising, given the fact that tracking metrics on the benefits of green is included in the government mandate.

Tracking these metrics has led to a refinement since the 2012 survey in the estimates for five-year operating cost savings for new green buildings. Respondents from Singapore are now slightly more conservative about the longer-term reductions.

However, overall, these respondents still report robust savings and can clearly make the business case for green building.

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### Top Triggers Driving Future Green Building Activity in Singapore

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Singapore</th>
<th>Global Respondents</th>
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<tbody>
<tr>
<td>Environmental Regulations</td>
<td>58%</td>
<td>23%</td>
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<tr>
<td>Lower Operating Costs</td>
<td>35%</td>
<td>22%</td>
</tr>
<tr>
<td>Market Demands</td>
<td>25%</td>
<td>23%</td>
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<tr>
<td>Client Demands</td>
<td>23%</td>
<td>28%</td>
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<tr>
<td>Right Thing to Do</td>
<td>40%</td>
<td>30%</td>
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### Expected Business Benefits of Green Building in Singapore

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<thead>
<tr>
<th></th>
<th>New Green Building</th>
<th>Green Retrofit</th>
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<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2015</td>
</tr>
<tr>
<td>Decreased Operating Costs Over One Year</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Decreased Operating Costs Over Five Years</td>
<td>16%</td>
<td>13%</td>
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<tr>
<td>Payback Time for Green Investments (Years)</td>
<td>7</td>
<td>8</td>
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ACKNOWLEDGEMENTS:

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