World Green Building Trends 2018: Europe
Introduction

Carrier, its parent company, United Technologies Corporation, and Dodge Data & Analytics (then known as McGraw Hill Construction) first began collaborating on this research program in 2008 because both companies believed green building was poised to transform construction on a global scale. This 2018 edition of the research demonstrates that their vision has been fulfilled, more than either could have imagined.

This report compares data from the latest study (2018) to previous ones in the series (2012 and 2015), analyzing the level of green activity, the benefits of building green, the triggers most likely to spur further green market growth and the challenges that may impede it.

One of the most encouraging trends is the increasing percentage of respondents who expect to do the majority of their projects (more than 60%) green in most of the 20 countries/regions included in this study. The global average for this group is expected to increase from 27% to 47% between 2018 and 2021, and in about half of the locations, the percentage who expect they will be doing the majority of their projects green by 2021 is expected to double. This trend analysis clearly demonstrates increasing global commitments to building green.

This year’s study also features a deep look into the importance of healthier buildings as an element of green building. Findings validate its importance globally, with particular strength in diverse markets like China, Colombia, India, Ireland and South Africa, as well as the US. This is an emerging priority that can be expected to gain increasing traction in future studies.

Consistent with previous studies, the top challenges and triggers vary strongly by market, and thus, each market is analyzed in regional/country sections. Some of these sections compare the 2018 responses to those from 2015, providing a unique vantage point into the priorities and drivers in some of the top green markets in the world.

Among the most compelling elements of the data are the strong business benefits reported for both new green buildings and green renovations/retrofits of existing buildings. The findings since 2012 have clearly demonstrated the value of investing in green. For example, there has been a steady growth since 2012 in the number of owners who see a 10% or greater increase in asset value for new green buildings compared with traditional ones.

We would like to thank Carrier for their partnership on this research since 2008. We also thank the other organizations whose support made this SmartMarket Report possible, including the American Institute of Architects, Autodesk and the US Green Building Council, as well as the efforts of the World Green Building Council in advising on the study and promoting participation among its members.

Chris Nelson
President, Commercial HVAC
Carrier

Chris Nelson leads the global commercial HVAC product and service portfolio for Carrier, part of UTC Climate, Controls & Security, a unit of United Technologies. He is responsible for driving continued product innovation with an unwavering focus on sustainability – from energy-efficient solutions that deliver comfortable, healthy and productive environments to green-certified manufacturing facilities, including the world’s first LEED-certified HVAC factory.

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Ph.D., LEED AP
Industry Insights Research Director
Dodge Data & Analytics

Donna Laquidara-Carr currently provides editorial direction, analysis and content to DD&A’s SmartMarket Reports. Prior to this position, she worked for nearly 20 years with DD&A’s Dodge division, where she gained detailed insight into the construction industry.
Green building activity continues to grow across the globe, with dramatic increases expected in 20 countries across five continents between now and 2021. The latest in a series of studies, the findings show great consistency in the benefits derived from green with previous studies in 2012 and 2015, but they also demonstrate the increasing influence of social factors like creating a sense of community, encouraging sustainable business practices and especially improving occupant health and well-being.

Green Building Activity Is Increasing, But Is Not Always Certified

For the first time, global respondents were asked two questions about their level of green activity: the percentage of their projects considered green using a definition provided in the survey, and the percentage of their projects that are or will be certified under a recognized green building system. (See the Methodology on page 75 for the definition provided for green building.)

The chart at right reveals the total share of green projects reported by all global participants in the study currently, and the expected share in three years. It demonstrates that green building activity will increase, and, even more important, it shows that most of the increase comes from a large percentage of respondents (47%) who believe that they will build the majority of their projects (more than 60%) green by 2021.

The findings also reveal that some respondents who do the majority of their projects green are not certifying all of those projects. More important, the gap among those doing the majority of their projects green and those who are actually seeking green certification on the majority of their projects is expected to grow between 2018 and 2021. This indicates that green activity is expected to exceed certification activity and may suggest that those experienced with green are using certification more strategically.

Growth in Green Driven by Ongoing Strong Business Benefits

The table at right shows the significant operating cost savings, short payback periods and asset value increases achieved from investments in new green buildings and green retrofit projects reported by respondents in the current study and the two previous ones in 2012 and 2015. The savings achieved, the payback periods and the increased asset values are strikingly consistent, despite changes in the number of respondents, in geographies and in global economic conditions over those years. These business benefits form the foundation that helps promote the growth of further green building activity.
Client Demands and Environmental Regulations Remain the Top Triggers for Building Green

The current findings, represented in the chart at right, closely echo those of the previous 2015 study. The top triggers demonstrate that the market is pulled by client demand and pushed by environmental regulations globally. However, the importance of these and other triggers vary significantly by country.

Creating Healthier Buildings Is a Priority for Green Building

Creating healthier buildings is also an important trigger for green building globally, especially in Brazil, China, India, South Africa and the US. In addition, improving occupant health ranks first among the social reasons for building green, and the percentage selecting it has jumped 5 points from the 2012 study.

Social Reasons for Building Green Gain in Importance Over Time

Consistent with the 2012 and 2015 studies, respondents in 2018 were asked to rank several social reasons for building green on a one to five scale, from not important to very important. The chart at right shows the percentage who consider several of the reasons provided to be important/very important.

In addition to demonstrating the importance of healthier buildings, the chart shows a general trend of ascribing increased importance to the social reasons for building green over time, especially increasing worker productivity, creating a sense of community and supporting the domestic economy.

Obstacles to Building Green

Respondents citing higher first costs as a top obstacle has dropped from 76% in 2012 to only 49% in 2018. However, despite the drop, it still remains the top barrier in 2018.

Three additional barriers are selected by roughly one third of the respondents: lack of political support or incentives, affordability (green is for high-end projects only) and lack of public awareness. The degree to which each of these barriers is influential varies a great deal by country, suggesting different strategies are needed to promote green globally.
Green Building Activity and Trends in Europe

The most notable aspect of the findings from Europe is the degree to which individual countries vary, from their levels of activity, to the reasons they build green to the savings they report experiencing from their green investments.

The data from six countries in Europe—Germany, Ireland, Norway, Poland, Spain and UK—are featured in the study, but 59 responses were also received from 17 other countries across Europe.

The level of green building council (GBC) participation also differs across the respondents. 40% of all European respondents work for companies that are GBC members, but well more than half of the respondents from Norway (73%), Spain (65%) and Ireland (61%) work for GBC member companies, which may influence the level of activity and awareness of green in these markets. In contrast, only 39% of respondents from Poland, 13% in the UK and 8% in Germany work for GBC member companies.

**Green Building Market Activity**

Levels of activity reported by the individual countries vary widely across Europe.

- Ireland has the highest percentage of those currently doing the majority (more than 60%) of their projects green at 40%.
- Spain has the highest percentage of high and moderate levels of green work, with 65% reporting that they do more than 30% of their projects green.
- Poland currently has the lowest level of green activity reported by survey respondents.

All of the European countries expect to see a higher level of green activity by 2021 than they have currently.

- In all but one country (Poland), the growth in green building comes largely in an increase in those who expect to do the majority of their projects green. Norway and Spain have the most dramatic increases in this category.
- Poland is still emerging in green activity. Even by 2021, the highest percentage expect to be doing a relatively low level of green (16% to 30%) of projects.

**SECTORS WITH EXPECTED GROWTH**

The top sectors across Europe for green buildings in the next three years are new commercial construction (48%), existing buildings/retrofits (38%) and low-rise residential (32%). There is some variation among the countries included in the study.

**Levels of Green Building Activity for Respondents in the UK, Ireland and Norway (2018 and 2021 Expected)**

<table>
<thead>
<tr>
<th>Sector</th>
<th>1% to 15% Green Projects</th>
<th>Exploring (No Green Involvement)</th>
<th>More Than 60% Green Projects</th>
<th>31% to 60% Green Projects</th>
<th>16% to 30% Green Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>19%</td>
<td>27%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>9%</td>
<td>14%</td>
<td>19%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ireland</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>7%</td>
<td>40%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>4%</td>
<td>26%</td>
<td>4%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td><strong>Norway</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>3%</td>
<td>30%</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>2%</td>
<td>20%</td>
<td>4%</td>
<td>13%</td>
<td></td>
</tr>
</tbody>
</table>
Nearly two thirds (61%) of Irish respondents anticipate doing green low-rise residential buildings in the next three years.

Ireland is also higher than the European average for new commercial construction and existing buildings/retrofits (both at 55%).

Germany is lower than the European average for new commercial construction (31%) and higher for low-rise residential (42%).

Almost three quarters (73%) of Norwegian respondents plan to do new green commercial construction projects.

With 45% who will be doing institutional projects, Norway also exceeds the other five countries included in the study and the overall European average (31%) for this sector.

Commercial construction is a focus for the Polish respondents, with 48% reporting that they expect to do a new green commercial project and 49% new commercial interiors in the next three years.

Over half of the Spanish respondents expect to do new green commercial projects (61%) and green existing building/retrofit projects (52%) in the next three years.

Low-rise residential projects top the list among the UK respondents, with 42% reporting they will be doing green projects in this sector.

Client demands are widely influential in Europe, with the greatest influence in Ireland, the UK, Germany and Norway. Even the countries least influenced are close to the global average for this trigger.

Environmental regulations are influential triggers in the UK, Ireland and Germany as well. The other three European countries in the study fall well below the global average for this trigger.

Market transformation is one of the most influential triggers in Poland. A higher percentage in Spain than the global average also favor this trigger.

Spain and Norway both exceed global averages for the percentage selecting higher building value.

Spain is influenced more than most by internal corporate commitments.

Almost one third of Norwegian respondents (32%) consider improved 10-year costs an influential trigger.

Levels of Green Building Activity for Respondents in Germany, Poland and Spain (2018 and 2021 Expected)

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Poland</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% to 15% Green Projects</td>
<td>29%</td>
<td>34%</td>
<td>16%</td>
</tr>
<tr>
<td>16% to 30% Green Projects</td>
<td>8%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>More Than 60% Green Projects</td>
<td>35%</td>
<td>15%</td>
<td>29%</td>
</tr>
<tr>
<td>Exploring (No Green Involvement)</td>
<td>4%</td>
<td>4%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Data: Europe

CONTINUED
CHALLENGES
The top challenges for all European respondents are higher (perceived or actual) first costs (48%), lack of market demand (33%) and lack of political support/incentives (32%). As with the triggers, though, there is wide variation by country.

- The second most important challenge in Ireland, selected by almost half of Irish respondents (41%), is the lack of trained/educated green building professionals. This is much higher than the European (17%) or global (22%) average.

- One third of German respondents select lack of market demand and affordability (green is for high-end projects only) as top challenges, the most for any of the challenges included in the study.

- Cost is a big concern in Norway, with the perception of higher first cost selected by more than half (55%) and affordability selected by 41%.

- Lack of public awareness is the top challenge in Poland, selected by 46%.

- In Spain, over 40% not only select higher first costs (49%), but also lack of political support/incentives (45%), lack of public awareness (42%) and lack of market demands (42%), suggesting a high level of concern about challenges in the market in general.

- Higher first costs and lack of market demand top the list of UK challenges, both with over 40% expressing concerns.

Social and Environmental Reasons for Building Green

SOCIAL REASONS
Three of the six social reasons for building green included in the study appear to resonate most with European respondents: improving occupant health and well-being, encouraging sustainable business practices and increasing worker productivity. The percentages below are the share of those who rated this social reason as important in a previous question, and then selected it as one of the two most important reasons to build green.

- Improving occupant health and well-being is selected as one of the two most important social reasons for building green by 60% of European respondents.

Top Triggers Driving Future Green Building Activity in the UK, Spain, Poland, Norway, Ireland and Germany

Dodge Data & Analytics, 2018

<table>
<thead>
<tr>
<th>Client Demands</th>
<th>Environmental Regulations</th>
<th>Market Demands</th>
<th>Right Thing to Do</th>
<th>Healthier Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK 60%</td>
<td>Green 71%</td>
<td>Green 34%</td>
<td>Green 46%</td>
<td>Green 26%</td>
</tr>
<tr>
<td>Spain 32%</td>
<td>Spain 26%</td>
<td>Spain 28%</td>
<td>Spain 21%</td>
<td>Spain 21%</td>
</tr>
<tr>
<td>Poland 28%</td>
<td>Poland 13%</td>
<td>Poland 12%</td>
<td>Poland 19%</td>
<td>Poland 19%</td>
</tr>
<tr>
<td>Norway 42%</td>
<td>Norway 19%</td>
<td>Norway 19%</td>
<td>Norway 35%</td>
<td>Norway 31%</td>
</tr>
<tr>
<td>Ireland 41%</td>
<td>Ireland 13%</td>
<td>Ireland 12%</td>
<td>Ireland 19%</td>
<td>Ireland 14%</td>
</tr>
<tr>
<td>Germany 42%</td>
<td>Germany 36%</td>
<td>Germany 25%</td>
<td>Germany 22%</td>
<td>Germany 16%</td>
</tr>
</tbody>
</table>
It is selected by the highest percentage of Irish (88%) and Spanish (71%) respondents.

The only one of the six European countries featured in this study where less than half selected this as a top social reason for building green is Poland (31%).

**Encouraging sustainable business practices is considered one of the top two social reasons by 58% of European respondents.**

- Over three quarters (77%) of respondents from Norway who consider this reason important ranked it in their top two.
- The only country in which it was selected by fewer than 50% is Germany (36%).

**Increasing worker productivity is selected as one of the top two social reasons for building green by 42% of European respondents.**

- There is a wider range of response for this reason than for the other two: It is highly ranked in the UK (50%) and Poland (47%), moderately ranked in Ireland (31%) and Germany (30%), and relatively low ranked in Norway and Spain (both 26%).

### Expected Business Benefits of Green Buildings in Europe

(Including Ireland, Germany, Norway, Poland, Spain, the UK and the Average of all European Countries in the Study)

<table>
<thead>
<tr>
<th></th>
<th>New Green Building</th>
<th>Green Retrofit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Europe</td>
<td>Ireland</td>
</tr>
<tr>
<td>Decreased Operating Costs Over One Year</td>
<td>7%</td>
<td>12%</td>
</tr>
<tr>
<td>Decreased Operating Costs Over Five Years</td>
<td>13%</td>
<td>22%</td>
</tr>
<tr>
<td>Payback Time for Green Investments (Years)</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL REASONS
Reducing energy consumption is the top priority for all European countries included in the study.

- It is rated as important by over 90% in Ireland, Germany, Norway and Spain, and 70% or more in Poland and the UK.
- It is selected among the top two environmental reasons for building green by the highest percentage of respondents for any reason from the six European countries included.

The other important environmental reasons for building green vary more by country.
- Lowering greenhouse gas emissions is one of the top reasons cited in Ireland, Norway and the UK.
- Protecting natural and material resources is a top reason in Germany and Poland.
- Improving indoor air quality is a top reason in Spain.

Business Benefits

NEW GREEN BUILDING
Ireland and Spain report the highest average operating cost savings from green buildings when compared with traditional ones for both a one-year and five-year time frame. (Please note that the five-year average median savings is a little high due to the number that selected 15% or more as their highest category.)

On the other hand, Germany, Norway and Poland are all quite conservative in their estimates of operating cost savings due to new green buildings.

Spanish respondents report the shortest payback periods for the investments they make in new green building. The UK reports the highest, but it is relatively consistent with the other four countries included, which are all slightly above the global average of seven years.

GREEN RETROFITS
Ireland, Germany and Spain expect the biggest percentage of operating cost savings due to their green retrofits within 12 months. However, only Ireland has notably larger expectations than average for the five-year operating cost savings.

Despite their optimism about the level of savings experienced, payback periods for Ireland are the longest of the six countries tracked, with the UK close behind.

Norway is by far the most conservative about the savings they see from green retrofits. However, their estimation of the payback period for their investments is pretty much on par with the European and global averages.
Methodology:

World Green Building Trends Research

The World Green Building Trends Study was conducted to achieve the following objectives: 1) identify triggers, obstacles and reasons for adopting green building in the domestic marketplace; 2) measure past, current and future levels of activity in green building; 3) identify important construction sectors for growth in green building; 4) measure the impact of green building practices on business operations; 5) profile the use of green building products and/or methods; and 6) uncover trends in the industry through comparison with relevant findings from the 2012 and 2015 Global Trends in Green Building Studies.

The study was conducted between April and June 2018. It was fielded using panel providers, email blasts and association broadcast to members, or by forwarding the link to other groups as follows: 1) multiple Green Building Councils across the world sent email invitations to their members; 2) several associations (AIA, ACE, CIOB, IMEI and USGBC) sent the survey link to members; and 3) the survey was sent to a Dodge Data & Analytics database of industry professionals.

Study Participants

2,078 architects, engineers, contractors, owners, specialists/consultants and investors responded to the survey. All respondents were required to be employed construction professionals and to have non-building projects account for no more than 50% of their office’s revenue.

The distribution of respondent is as follows:

- Architect/Design Firm: 25%
- Contractor/Builder: 23%
- Specialist/Consultant: 21%
- Owner/Developer: 18%
- Engineering Firm: 12%
- Investor: 1%

Respondents were located in 86 countries, listed on page 76. Sufficient responses were provided for statistically significant analysis to be conducted for 19 countries, also listed on page 76.

Countries Featured

The percentage of respondents by the countries featured in report are as follows, along with the percentage of respondents from that country who are members of a green building council (GBC):

- Australia: 5% of total; 63% GBC respondents
- Brazil: 2% of total; 12% GBC
- Canada: 3% of total; 68% GBC
- China Mainland: 2% of total; 14% GBC
- China Hong Kong: 2% of total; 46% GBC
- Colombia: 6% of total; 32% GBC
- Germany: 2% of total; 8% GBC
- India: 19% of total; 51% GBC
- Ireland: 1% of total; 61% GBC
- Mexico: 3% of total; 20% GBC
- Norway: 4% of total; 73% GBC
- Poland: 3% of total; 39% GBC
- Saudi Arabia: 2% of total; 8% GBC
- Singapore: 3% to total; 28% GBC
- South Africa: 4% of total; 52% GBC
- Spain: 1% of total; 65% GBC
- UAE: 2% of total; 48% GBC
- UK: 4% of total; 13% GBC
- US: 16% of total; 53% GBC
- Vietnam: 3% of total; 39% GBC

Benchmark of Accuracy

The total sample size of 2,078 benchmarks at a high degree of accuracy: 95% confidence interval with a margin of error of 2%.

Definition of Green Building

Respondents were asked about their company’s level of green activity in two ways: by the share of green certified projects out of their overall work, and by the share of total green projects. For the determination of what qualified as a green building, the following definition was provided:

At a minimum, for a building project to be considered green, it must include the following:

- Efficient use of energy, water and other resources
- Pollution and waste reduction measures, and the enabling of reuse and recycling
- Good indoor environmental air quality
- Consideration of the environment in design, construction and operation

In addition, green building projects include as many of the following as possible:

- Use of renewable energy, such as solar energy
- Use of materials that are non-toxic, ethical and sustainable
- Consideration of the quality of life of occupants in design, construction and operation
- A design that enables adaptation to a changing environment
The results in this report are drawn from survey respondents from the following 86 countries, with statistically significant results on the highlighted 19 countries. See region/country-specific results on pages 46–74.
Resources

Organizations and websites that can help you get smarter about global green building trends.

ACKNOWLEDGEMENTS:

The authors wish to thank Carrier, and its parent company United Technologies Corporation, whose vision and commitment have been essential to this research series since 2008.

We also thank our premier partners, the AIA and Autodesk, and our contributing partner, USGBC, without whose partnership and funding this report would not have been possible.

In addition, we thank World GBC for their active role as a research partner in helping the study be a success. We also appreciate the efforts of the GBCs globally who shared the survey with their members.

We also thank our other research partners, ACE, CIOB and IMEI, for their efforts to broaden the reach of our survey and variety of responses.

Finally, we thank all the individuals and organizations who contributed their experiences, data and images for publication in the case studies, along with those who agreed to provide their insights in our feature articles.

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www.ace-cae.eu

The Chartered Institute of Building:
www.ciob.org


Other Resources
ASHRAE: www.ashrae.org
Building Owners and Managers Association International (BOMA): www.boma.org
C40 Cities: www.c40.org
The Global ESG Benchmark for Real Assets Requirements (GRESB): https://gresb.com
International WELL Building Institute: www.wellcertified.com

mindful MATERIALS Collaborative: www.mindfulmaterials.com

National Institute of Building Sciences: www.nibs.org


Resilient Design Institute: www.resilientdesign.org

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