



## Green Building Services

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### ***Abstract***

Green building services include construction, architecture, engineering, and related activities aimed at creating sustainable structures using environmentally responsible processes and materials. While the concept of building a structure to complement its surrounding environment is not new, there has been a sharp increase in the demand for green buildings and green retrofits in recent years. This trend can be linked to several factors, including a growing interest in cutting the costs associated with operating a structure, government regulations and incentives, and environmental concerns, among others. Available evidence suggests that U.S. exports and overseas sales of green building services are currently small. However, U.S. firms are internationally competitive, and growth in world markets offers substantial opportunities to green building firms that aim to provide their services abroad. This paper provides an overview of the U.S. and global markets for green building services; discusses factors that affect supply and demand for sustainable structures; examines trade in green building services as a component of overall trade in construction, architectural, and engineering services; and considers the outlook for the green building industry.

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## THE GREEN BUILDING SERVICES MARKET

The green building services market is a component of the overall construction and design industries, distinguished by relatively more sustainable processes and project outcomes.<sup>2</sup> Structures built using green building techniques frequently incorporate water and energy efficiency, sustainable building materials, and other elements to lessen the structure's negative impacts on the building's inhabitants and the surrounding environment.<sup>3</sup> Green and traditional building projects are largely similar in terms of project structure and the types of professionals and firms that provide services. Both green and traditional projects involve construction firms, design firms, engineers, and subcontractors that contribute to the creation or refurbishment of a structure. The few differences between such projects stem from the way in which service providers interact, and from the certification process for green buildings. Projects in the green building industry typically involve a relatively high level of cooperation between contractors, designers, and engineers early in the project cycle. Early collaboration makes it easier for team members to develop a process and approach that will meet the project's green targets,<sup>4</sup> and increases the cost competitiveness of green building strategies in comparison to traditional approaches.<sup>5</sup> Further, green projects often involve the participation of "commissioning agents," who test building systems to ensure that they meet project goals and, in some cases, certification standards. Commissioning first evolved into a distinct project role in the United States, but this approach is increasingly being used in overseas projects. Like designers and contractors, commissioning agents are often incorporated into a project in its early stages.<sup>6</sup>

Official data sources do not distinguish green building activity from other work in the construction, architecture, and related industries. However, industry estimates suggest that green building services account for a large and growing share of the overall building industry. A recent McGraw-Hill Construction report estimated that among its survey respondents—which included architects, consultants, contractors, engineers, and property owners from 62 countries—green building accounted for an average of 38 percent of building activity in 2012, with 94 percent of firms reporting that they are engaged in some amount of green activity. This suggests an increase over 2009, when 67 percent of respondents claimed some involvement in green building.<sup>7</sup> Among those countries for which the 2012 report provided specific results,<sup>8</sup> green building accounted for more than half of all project activity, on average, in Singapore (66

<sup>2</sup> Industry representative, phone interview, July 8, 2013.

<sup>3</sup> For more information, see Jacob Kriss, "What is Green Building?" U.S. Green Building Council article, August 6, 2014, <http://www.usgbc.org/articles/what-green-building>, and "Green Building," The Dictionary of Sustainable Management, <http://www.sustainabilitydictionary.com/green-building/>.

<sup>4</sup> Industry representatives, phone interviews, July-September 2013.

<sup>5</sup> Industry representative, email message staff, October 20, 2013.

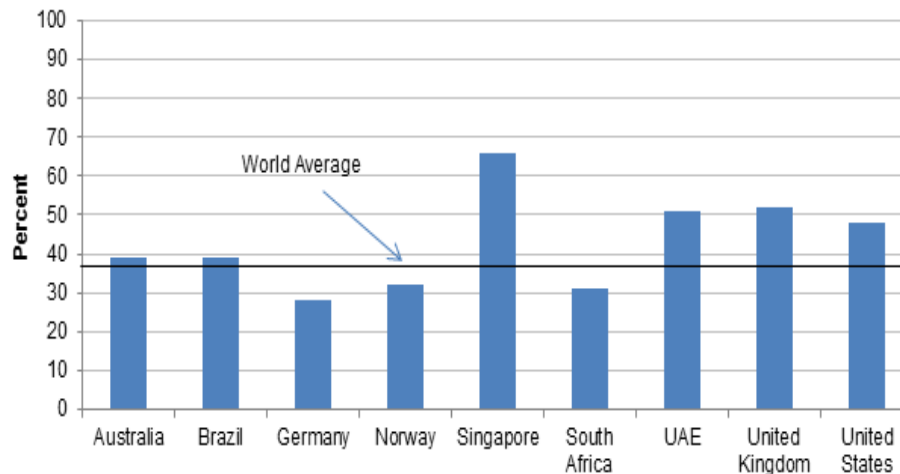
<sup>6</sup> Industry representatives, phone interviews, July 8, 2013, and September 2013.

<sup>7</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 5, 10.

<sup>8</sup> There were nine countries for which the number of survey responses was large enough to produce discrete results: Australia, Brazil, Germany, Norway, Singapore, South Africa, the United Arab Emirates, the United Kingdom, and the United States.

percent), the United Kingdom (52 percent), and the United Arab Emirates (UAE) (51 percent) (figure 1).<sup>9</sup> The significant and growing global interest in green building services is also evidenced by the large number of countries with green building councils.<sup>10</sup>

**FIGURE 1** Green Building as a Share of Total Building Activity in Selected Markets<sup>11</sup>



Source: McGraw-Hill Construction, *World Green Building Trends*, 2013, 10.

Green building services also account for a large and growing share of the U.S. construction and design market, reportedly representing 48 percent of the value of total U.S. project activity in 2012.<sup>12</sup> IBISWorld estimates that revenues in the U.S. green construction industry rose at an average annual rate of almost 27 percent to \$87.1 billion between 2006 and 2011.<sup>13</sup> More recent data published by *Engineering News-Record* indicates that revenues earned by the leading 100 U.S. green contracting firms reached \$50.0 billion following an 11.9 percent increase during

<sup>9</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10.

<sup>10</sup> As of December 2013, the membership of the World Green Building Council (WGBC) included 94 national councils from all regions of the world. WGBC webpage, <http://www.worldgbc.org/worldgbc/members> (accessed December 6, 2013).

<sup>11</sup> Includes projects “certified under any recognized global green rating system or built to qualify for certification.” McGraw-Hill Construction, *World Green Building Trends*, 2013, 5.

<sup>12</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10. This 48 percent includes only those projects that are built according to the specifications of an official green building standard. Industry representative, telephone interview, October 27, 2014.

<sup>13</sup> Ripley, “Green and Sustainable Building Construction,” 2011, 3. The credit crisis that led to the recent economic downturn depressed the value of real estate and thus lowered demand in the overall construction market. The green building sector fared relatively better than the traditional building market, as buyers and renters could be more discriminating and as available funding tended to be directed toward green construction projects. As a result, the U.S. green building industry posted strong growth even as total construction revenues decreased significantly. Ripley, “Green and Sustainable Building Construction,” 2011, 6; industry representative, telephone interview, September 16, 2013.

2012–13, while those of the leading 100 U.S. green designers reached \$4.7 billion following 13.3 percent growth.<sup>14</sup>

The green building industry is characterized by low market concentration—providers include a small number of large contracting firms, and a very large number of subcontractors. In fact, more than 80 percent of U.S. green construction firms have less than 20 employees. Due to high labor intensity in the green building industry, large firms increasingly employ subcontractors as a means of minimizing their permanent staff while retaining the ability to pursue large contracts.<sup>15</sup> This relatively heavy reliance on labor—with wages accounting for over 60 percent of industry spending in 2011—is reportedly due to the significant contribution of skilled tradespeople and project managers to value added in the green building industry.<sup>16</sup>

Top providers of green contracting services in the U.S. market include the Turner Construction Company (owned by German firm Hochtief), Clark Construction Group, and Hensel Phelps, while top green designers include Gensler, URS Corp., and AECOM.<sup>17</sup> Among firms based outside of the United States, large providers of green building services include Skanska (Sweden), Balfour Beatty (UK), and Thiess (Australia).

## FACTORS AFFECTING SUPPLY AND DEMAND

As a component of the overall construction and design industry, supply and demand in the green building industry is derived from many of the same factors that influence traditional markets.<sup>18</sup> For example, interest rates and investment by government and private interests in non-residential buildings are important determinants of demand for all building services.<sup>19</sup> At the same time, there are several factors that—due to the attributes of sustainable construction—shape supply and demand for green buildings in particular. This section identifies and discusses several of these factors.

### Supply

Construction and design firms are increasingly motivated to supply green building services, largely due to substantial and growing consumer demand for sustainable structures. In fact, while the ability to provide green building services was once a distinguishing firm characteristic,

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<sup>14</sup> Tulacz, “The Top 100 Green Buildings Contractors,” August 11/18, 2014, 2; Tulacz, “The Top 100 Green Design Firms,” August 11/18, 2014, 2.

<sup>15</sup> Ripley, “Green and Sustainable Building Construction,” 2011, 20.

<sup>16</sup> Ripley, “Green and Sustainable Building Construction,” 2011, 20, 26.

<sup>17</sup> Tulacz, “The Top 100 Green Buildings Contractors,” August 11/18, 2014, 5; Tulacz, “The Top 100 Green Design Firms,” August 11/18, 2014, 5.

<sup>18</sup> Industry representative, phone interview, July 8, 2013.

<sup>19</sup> Ripley, “Green and Sustainable Building Construction,” 2011, 4–5.

it has become common<sup>20</sup> as firms increasingly develop green capacity in anticipation of green building becoming the norm in the near future.<sup>21</sup> Firms may also choose to supply green building services to improve their own processes, as green building practices have been linked to higher operating efficiencies.<sup>22</sup>

Competition in the green building services market has increased as growing demand has led a large number of contractors to develop green building capacity.<sup>23</sup> Early market entry and experience enhance a business' competitiveness in this market. Firms that are familiar with the green building standards prevalent in a certain country or region (such as LEED in the United States, BREEAM in the United Kingdom, and Green Star in Australia, New Zealand, and South Africa) may have an advantage in those markets as well.<sup>24</sup> Effective corporate management that supports green building activities, and a propensity toward innovation, may also benefit firms' competitiveness.<sup>25</sup>

Workers may be attracted to the green building services sector by the relatively large number of jobs in the industry, greater opportunities for career advancement, and better job security. In addition, jobs in green building services are highly similar to those in architecture, engineering, and construction overall, and as a result, industry professionals generally indicate that they can transition to green jobs with little retraining.<sup>26</sup> Although not required, professionals that endeavor to supply green building services may choose to increase their marketability by seeking accreditation under one of several building certification systems. In addition to administering a system for the certification of green structures known as Leadership in Energy and Environmental Design (LEED), the U.S. Green Building Council (USGBC) grants several types of accreditations under its LEED program. These include LEED AP (accredited professional) certification for professionals that provide green building services;<sup>27</sup> LEED Green Associate certification for lawyers, real estate agents, and other professionals who may find it useful to be distinguished for their familiarity with green building; and LEED Fellow recognition for professionals who have made outstanding contributions to the green building industry.<sup>28</sup> The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), Green

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<sup>20</sup> Tulacz, "The Top 100 Green Contractors," September 17, 2012, 4; Ripley, "Green and Sustainable Building Construction," 2011, 21.

<sup>21</sup> Industry representative, email message, October 20, 2013.

<sup>22</sup> Tulacz, "The Top 100 Green Contractors," September 17, 2012, 4.

<sup>23</sup> Tulacz, "The Top 100 Green Contractors," September 17, 2012, 4; Ripley, "Green and Sustainable Building Construction," 2011, 21.

<sup>24</sup> Industry representatives, phone interviews, September 16, 2013.

<sup>25</sup> Industry representatives, phone interviews, September 16, 2013, and November 26, 2013.

<sup>26</sup> McGraw-Hill Construction, *Construction Industry Workforce Shortages*, 2013, 61, 62.

<sup>27</sup> LEED AP certification is granted to professionals in five specialties: building design and construction, operation and maintenance, interior design and construction, homes, and neighborhood development. For more information, see the USGBC website, <http://www.usgbc.org/leed/credentials/leed-ap/overview>.

<sup>28</sup> USGBC website, <http://www.usgbc.org/leed/credentials> (accessed May 7, 2013).

Globes, and several other organizations in the United States and abroad also offer certifications to professionals that engage in green building projects.<sup>29</sup>

## Demand

A wide variety of factors may influence the decision to incorporate sustainability into a building's construction and design. Among these, factors that have a positive financial effect on builders, owners, or tenants reportedly have the greatest impact on demand for green building services.<sup>30</sup> *Engineering News Record* reports that clients are increasingly concerned with the expected return on green building investments, leading to a growing need for designers to explain how clients might recover the somewhat higher costs of green construction through building performance.<sup>31</sup>

There are several ways in which green building may impact a firm's bottom line. Green buildings incorporate elements designed to conserve water or reduce energy use, and thus lower owners' and tenants' utility bills.<sup>32</sup> Green buildings reportedly generate higher rental income, command higher sales prices, and have lower vacancy rates than conventional buildings, all of which raise asset values.<sup>33</sup> In addition, firms reportedly find it difficult to secure financing for new construction that is not being built to achieve green certification.<sup>34</sup> Although the economic recession of 2008–09 led some consumers to scrutinize green building options more closely due to expected higher upfront costs,<sup>35</sup> contractors and design firms indicate that the recession actually boosted green building demand by increasing some businesses' interest in lowering costs by improving buildings' energy efficiency and sustainability.<sup>36</sup>

Other factors may also influence a developer to pursue green building options. For example, green office space may reflect favorably on a firm's corporate image—approximately 30 percent of the firms responding to the McGraw-Hill survey indicated that “branding/public relations” has a significant effect on demand for green building.<sup>37</sup> In addition, stable climate control, natu-

<sup>29</sup> ASHRAE, “Certification” (accessed May 7, 2013); Green Building Initiative, “Green Building Programs” (accessed May 7, 2013).

<sup>30</sup> In a 2012 survey conducted by McGraw-Hill Construction, industry participants indicated that financial drivers such as “client demand,” “market demand,” and “lower operating costs” have the most substantial impact on demand for green buildings. McGraw-Hill Construction, *World Green Building Trends*, 2013, 15.

<sup>31</sup> Tulacz, “The Top 100 Green Design Firms,” July 2, 2012, 2-3.

<sup>32</sup> At least one study asserts that these cost savings are typically larger than the premiums associated with green construction and design. World Green Building Council, “The Business Case for Green Building,” 2013, 9.

<sup>33</sup> World Green Building Council, “The Business Case for Green Building,” 2013, 36; industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>34</sup> Johnson, “Experts Say Green Construction Will ‘Change the Face of Commercial Real Estate.’” May 8, 2012.

<sup>35</sup> Tulacz, “The Top 100 Green Design Firms,” July 2, 2012, 2, 3.

<sup>36</sup> Tulacz, “The Top 100 Green Contractors,” September 17, 2012, 2.

<sup>37</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 15; industry representative, phone interview, September 16, 2013.

ral lighting, and other workspace amenities may increase the comfort of employees,<sup>38</sup> bolstering worker morale and productivity.<sup>39</sup> One report estimates that improved lighting and ventilation systems raise productivity by 23 and 11 percent, respectively.<sup>40</sup>

Economic factors such as these have the strongest impact on demand for the green construction and design of hotels, offices, and other commercial buildings, as this market segment is particularly concerned with corporate image and with the rents they can charge for their properties.<sup>41</sup> According to one industry representative, concerns about firm reputation and property value have made green building the standard in the market for the highest-quality real estate.<sup>42</sup>

Environmental and health concerns are another factor shaping the demand for green building services.<sup>43</sup> While some environmental benefits, such as water and energy efficiency, lower the cost of operating a building, such improvements are also desirable because they reduce indoor and outdoor air pollution and conserve resources.<sup>44</sup> One industry representative indicates that younger consumers are particularly interested in sustainability, and are willing to pay the higher costs associated with green structures in order to protect the environment.<sup>45</sup> Certain regions (such as the Pacific Northwest) and market segments (such as schools) are also highly motivated by the environmental and health benefits of green building.<sup>46</sup>

Ratings systems for green structures, which offer a way of gauging a building's environmental performance, may increase demand for green building services by raising expectations. While some industry observers have questioned whether certified buildings are actually "greener" than uncertified structures,<sup>47</sup> several industry representatives report that LEED and other ratings systems have increased consumer awareness of building performance, encouraging them

<sup>38</sup> Johnson, "Experts Say Green Construction Will 'Change the Face of Commercial Real Estate.'" 2012.

<sup>39</sup> Cusick, "Green Buildings." July 27, 2012.

<sup>40</sup> World Green Building Council, *The Business Case for Green Building*, 2013, 67.

<sup>41</sup> Industry representatives, phone interviews, August 21, 2013, and September 16, 2013.

<sup>42</sup> Industry representative, phone interview, September 16, 2013.

<sup>43</sup> In the 2008 McGraw-Hill Construction survey, 42 percent of participants identified "doing the right thing" as the one of the top motivations for choosing green building options, a higher share than for any other factor included in the survey. By contrast, this factor ranked fifth in the 2012 survey, having been cited by only 26 percent of survey respondents as a top driver of demand. McGraw-Hill Construction, *World Green Building Trends, 2013*, 15.

<sup>44</sup> McGraw-Hill Construction, *World Green Building Trends, 2013*, 18; Tulacz, "The Top 100 Green Contractors," September 17, 2012, 2.

<sup>45</sup> Tulacz, "The Top 100 Green Contractors," September 17, 2012, 2.

<sup>46</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>47</sup> See, for example, Christopher Schnaars and Hannah Morgan, "In U.S. Building Industry, Is It Too Easy to be Green?," *USA Today*, June 13, 2013, <http://www.usatoday.com/story/news/nation/2012/10/24/green-building-leed-certification/1650517/>; and Sam Roudman, "Bank of America's Toxic Tower: New York's 'Greenest' Skyscraper (sic) Is Actually its Biggest Energy Hog," *New Republic*, July 28, 2013, <http://www.newrepublic.com/article/113942/bank-america-tower-and-leed-ratings-racket>.

to select green options. Additionally, the widespread acceptance of these systems has reportedly raised sustainable building standards in certain markets.<sup>48</sup>

Government market interventions also spur demand for green building services. In the United States, incentives such as tax credits are employed by federal, state, and local governments to promote green building, and governments are increasingly encouraging green building by incorporating green standards into building codes.<sup>49</sup> For example, the federal government currently offers tax incentives for the installation of certain types of energy generation capacity (e.g., solar panels) in new or existing homes. Until recently, the federal government also offered tax incentives for installing energy-efficient HVAC systems, roofs, doors, windows, insulation, water heaters, and biomass stoves in existing homes; and for commercial buildings that are built or refurbished to save a certain amount of the energy costs of lighting, ventilation, heating, water heating, and cooling.<sup>50</sup>

In 2012, California adopted new building standards (effective January 1, 2014) that require builders to install solar-ready roofs, high-efficiency windows, lighting controls that can respond to occupant demand, and whole-house fans, among other improvements. The new rules are expected to create as many as 3,500 jobs in the construction sector. As a result of the change, new residential and nonresidential structures will respectively be 25 and 30 percent more energy-efficient than structures built under the old standards.<sup>51</sup> In addition, two states (California and Washington) and three cities (Austin, Texas; New York City; and Washington, DC) currently require online disclosure of energy use by commercial buildings, and similar regulation is under consideration in 10 additional states.<sup>52</sup> Such requirements may motivate owners to improve building performance through green retrofitting.<sup>53</sup> Additionally, the government is itself an important consumer of green building services, with government offices representing 10 percent of the U.S. market for green contracting and 11 percent of the U.S. market for green design in 2013.<sup>54</sup>

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<sup>48</sup> Industry representative, phone interview, September 16, 2013; industry representative, email message, October 20, 2013.

<sup>49</sup> Industry representative, phone interview, July 8, 2013; Ripley, "Green and Sustainable Building Construction," December 2011, 14.

<sup>50</sup> EPA, "Federal Tax Credits for Consumer Energy Efficiency" (accessed June 29, 2015); Tax Incentives Assistance Project, "Business Tax incentives." (accessed May 6, 2013).

<sup>51</sup> California Energy Commission, "Energy Commission Approves More Efficient Buildings for California's Future." May 31, 2012.

<sup>52</sup> Johnson, "Experts Say Green Construction Will 'Change the Face of Commercial Real Estate.'" May 8, 2012.

<sup>53</sup> World Green Building Council, "The Business Case for Green Building," 2013, 96.

<sup>54</sup> Tulacz, "The Top 100 Green Buildings Contractors," August 11/18, 2014, 2; Tulacz, "The Top 100 Green Design Firms," August 11/18, 2014, 2. By comparison, U.S. Census Bureau data suggests that at a seasonally adjusted annual rate, public office construction accounted for about 18 percent of total U.S. office construction in December 2013. U.S. Census Bureau, "March 2014 Construction," May 1, 2014.



While a growing focus on economic factors has lessened the relative importance of government intervention as a driver of U.S. green building demand in recent years, it remains a leading factor in certain overseas markets.<sup>55</sup> For instance, government measures are seen as a particularly important driver of green building demand in the UAE, where green structures accounted for more than half of building projects in 2012.<sup>56</sup> Among other regulations, Abu Dhabi requires that government and nongovernment buildings, villas, and communities meet particular environmental standards, while Dubai imposed mandatory green standards on government buildings beginning in 2011 and on all buildings beginning on March 1, 2014.<sup>57</sup>

Several other foreign governments also maintain policies that encourage green building. For instance, Tokyo has imposed a cap-and-trade program<sup>58</sup> on more than 1,300 of the city's large buildings, which has encouraged building owners to reduce emissions. Buildings that meet certain sustainability standards in Hong Kong and Singapore may be built slightly larger than would otherwise be permitted.<sup>59</sup> In Canada, borrowers that finance energy-efficient homes through the Canada Mortgage and Housing Corporation (CMHC) may receive refunds on their mortgage insurance, as well as refunds on premiums for extended amortization periods.<sup>60</sup> Further, Australia maintains mandatory energy efficiency standards for newly built commercial and residential structures.<sup>61</sup>

## CROSS-BORDER TRADE AND AFFILIATE TRANSACTIONS

While data specific to trade in green building services are not available, data on overall construction trade, together with industry estimates of the extent of green building activity, suggest that cross-border activity in green construction is small. The World Trade Organization (WTO) estimates that construction accounted for 2.3 percent, or \$105 billion, of global commercial services exports in 2012.<sup>62</sup> Considering that the McGraw-Hill Construction survey estimates that

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<sup>55</sup> Industry representatives, phone interviews, September 16, 2013.

<sup>56</sup> McGraw-Hill Construction, *World Green Building Trends, 2013*, 16, 32.

<sup>57</sup> Emirates Green Building Council, "Green Building Legislation and Guidelines," (accessed June 21, 2013); gulfnews.com, "Dubai to Have Mandatory Green Building Rules," March 14, 2013; Government of Dubai, "User Guide: Green Buildings," January 2014.

<sup>58</sup> Under a cap-and-trade program, emissions are limited or capped by issuing permits to businesses, allowing them to emit a certain amount of pollutants. Businesses are then permitted to buy and sell (or trade) these permits based on their expected needs. For more information, see <http://www.businessdictionary.com/definition/cap-and-trade.html>.

<sup>59</sup> World Green Building Council, "The Business Case for Green Building," 2013, 96–97.

<sup>60</sup> CMHC, "CMHC Green Home," (accessed June 21, 2013).

<sup>61</sup> Green Building Council Australia, "Regulations and Standards," December 9, 2011; industry representative, phone interview, September 16, 2013.

<sup>62</sup> WTO, *International Trade Statistics 2014*, 2014, 121, 133.

green building accounted for 38 percent of global construction projects in 2012,<sup>63</sup> it is unlikely that the cross-border provision of green construction services account for more than 1 percent of global exports of services.

Data from the U.S. Department of Commerce's Bureau of Economic Analysis (BEA) indicate that the construction industry's share of U.S. services exports is also small: construction accounted for only 0.5 percent, or \$3.2 billion, of total U.S. services exports in 2012.<sup>64</sup> As green building accounted for an estimated 48 percent of U.S. construction projects in 2012,<sup>65</sup> it is unlikely that the cross-border provision of green construction services represented more than 0.3 percent of global or U.S. exports of services. BEA data on architectural and engineering services<sup>66</sup> suggests a similar situation. U.S. exports of such services accounted for only 1.9 percent, or \$12.7 billion, of total U.S. services exports in 2012 suggesting that the green design segment of this industry accounts for a very small share of U.S. services exports.<sup>67</sup>

Like cross-border trade, sales of green building services to foreign customers through overseas affiliates located in the consumer's home market are likely minimal. Data on global affiliate transactions are not available, but BEA data indicate that construction and architectural, engineering, and related services firms respectively accounted for 0.06 percent and 2.8 percent of total sales of services by foreign affiliates of U.S. firms in 2012. During the same year, these two categories made up 0.3 percent and 1.5 percent of total purchases of services from foreign-owned affiliates in the United States. Assuming that sustainable structures account for no more than half of the activity in these industries, sales and purchases of green building services accounted for no more than 1.4 percent of U.S. affiliate sales or purchases.<sup>68</sup>

Although existing evidence suggests that the extent of cross-border activity in the green building services market is low, experts state that the green building industry is becoming increasingly globalized,<sup>69</sup> with particular market segments leading this trend. Trade and investment are common in the green design segment of the industry—foreign design firms reportedly have provided services in the Middle East, Asia (most notably China), and other regions, and the

<sup>63</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10.

<sup>64</sup> USDOC, BEA, *Survey of Current Business*, 94, no. 10, October, 2014, [http://www.bea.gov/scb/pdf/2014/10%20October/1014\\_international\\_services.pdf](http://www.bea.gov/scb/pdf/2014/10%20October/1014_international_services.pdf), 1, 2. Construction trade also accounted for a small share—\$3.3 billion, or 0.7 percent—of U.S. private services imports in 2012. The WTO does not publish industry-specific data on imports.

<sup>65</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10.

<sup>66</sup> The WTO does not publish discrete data on global trade in architectural or engineering services.

<sup>67</sup> USDOC, BEA, *Survey of Current Business* 94, no. 10, October, 2014, [http://www.bea.gov/scb/pdf/2014/10%20October/1014\\_international\\_services.pdf](http://www.bea.gov/scb/pdf/2014/10%20October/1014_international_services.pdf), 1, 2. Trade in architectural and engineering services also accounted for a small share—\$4.8 billion, or 1.1 percent—of U.S. private services imports in 2012. The WTO does not publish industry-specific data on imports.

<sup>68</sup> USDOC, BEA, *Survey of Current Business* 94, no. 10, October 2014, [http://www.bea.gov/scb/pdf/2014/10%20October/1014\\_international\\_services.pdf](http://www.bea.gov/scb/pdf/2014/10%20October/1014_international_services.pdf), 21, 23.

<sup>69</sup> Industry representative, phone interview, July 8, 2013; Ripley, "Green and Sustainable Building Construction," December 2011, 22.

financial downturn of 2008–09 provided an impetus for such firms to seek work overseas.<sup>70</sup> Firms often provide green building services to overseas customers to promote their green products in new markets, or to enhance traditional service offerings in markets in which they already participate.<sup>71</sup> In terms of project type, construction for the hospitality, medical, and sports industries provides significant overseas opportunities for providers of green building services.<sup>72</sup> By contrast, the cross-border provision of construction/contracting services is not common, as local firms dominate this market segment.<sup>73</sup> Some firms provide green certification services overseas, particularly in instances where firms pursue certification under widely recognized international standards such as LEED (box 1). However, cross-border trade in this market segment remains low, as domestic firms with a better knowledge of local certification systems have a competitive advantage in this market segment.<sup>74</sup>

### **Box 1—Certification Standards and Firm Competitiveness**

While local customers tend to prefer the certification standards that have been developed in their own markets, familiarity with standards that have a global reputation may benefit firms from certain countries. For example, industry sources indicate that U.S. firms are internationally competitive due, in part, to their familiarity with the U.S.-based LEED certification system. LEED is reportedly the world's leading green building standard,<sup>75</sup> and because LEED is well known and highly supportable in overseas markets,<sup>76</sup> multinational firms that want to boost their global reputation or to construct all of their facilities around the world to a single standard often choose LEED.<sup>77</sup> In fact, USGBC estimates that overseas markets accounted for about 44 percent of structures being built to LEED standards, by square footage, in January 2015.<sup>78</sup> Similarly, British firms may benefit from familiarity with the UK-based BREEAM standard, which is used throughout Europe and in certain Asian markets.<sup>79</sup> One industry representative suggests that providers of green building services may benefit from an understanding of any green certification standard, as many standards share a large number of common characteristics.<sup>80</sup>

<sup>70</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>71</sup> Industry representative, phone interview, September 16, 2013.

<sup>72</sup> Industry representative, phone interview, July 8, 2013.

<sup>73</sup> Industry representatives, phone interviews, September 16, 2013, and November 26, 2013.

<sup>74</sup> Son, "Eco and Green Certification Providers in the US," July 2013, 20.

<sup>75</sup> Industry representative, phone interview, August 21, 2013.

<sup>76</sup> Industry representatives, phone interviews, July 8, 2013, August 21, 2013, and September 16, 2013.

<sup>77</sup> Industry representatives, phone interviews, September 16, 2013 and November 26, 2013.

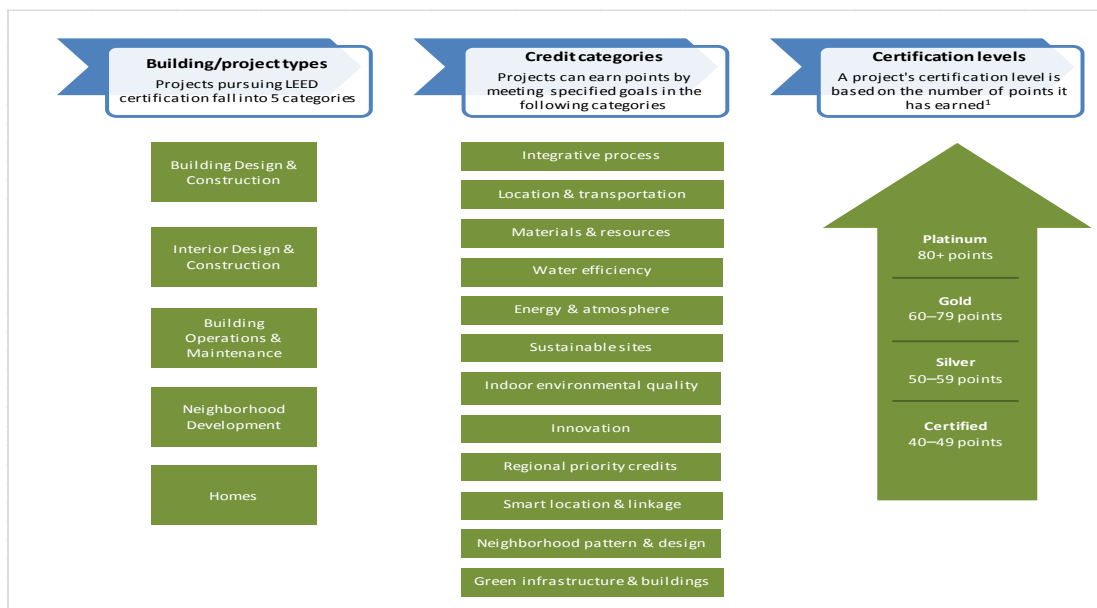
<sup>78</sup> USGBC, "Green Building Facts," February 23, 2015, industry representative, phone interview, August 21, 2013.

<sup>79</sup> Industry representative, phone interview, September 16, 2013.

<sup>80</sup> Industry representative, phone interview, September 16, 2013. Another industry expert interviewed on the same day agreed that most existing green building certification systems are highly similar, as they are largely based on BREEAM—the world's first certification standard for green buildings. Japan's system is a notable exception as it is significantly different from other green building standards. Industry representative, phone interview, September 16, 2013.

Existing data do not provide any information pinpointing top export and import markets for green building services; however, there is evidence that U.S. and European firms provide some services in overseas markets. Turner Construction Company—the top green contracting firm in the United States<sup>81</sup>—has contributed to green projects in Canada, Costa Rica, France, India, Mexico, and Vietnam, though the projects account for only a small share of the firm’s green building portfolio.<sup>82</sup> Swedish firm Skanska has also completed several green projects outside of its home country. These include, among others, a commercial building in Arlington, Virginia, that has been certified to the LEED Platinum standard, and the renovation of Skanska’s leased office space on the 32nd floor of the Empire State building, for which the company hopes to secure certification at the LEED Platinum level (figure 2).<sup>83</sup> As discussed above, the cross-border provision of green building services is slightly more common in the design segment of the industry,<sup>84</sup> and each of the top 10 U.S. providers of green design services maintains offices in several foreign markets.

**Figure 2** LEED Categories and Certification Levels



<sup>1</sup> The number of points needed for certification at a certain level differs for certain types of non-commercial projects.

**Source:** Based on information found at the U.S. Green Building Council (USGBC) website, <http://www.usgbc.org/LEED/> (accessed July 7, 2015).

<sup>81</sup> As indicated above, The Turner Group is owned by German firm Hochtief.

<sup>82</sup> Turner Construction Company website, <http://www.turnerconstruction.com/experience/projects/green-building> (accessed November 25, 2013).

<sup>83</sup> USA Skanska website, <http://www.usa.skanska.com/Markets/Green-building/> (accessed November 25, 2013).

<sup>84</sup> Industry representative, phone interview, August 21, 2013.

Markets throughout the world offer substantial and growing opportunities to green building services firms that aim to provide their services abroad. Outside the United States, Canada leads the world in LEED project registrations.<sup>85</sup> Top markets in Europe include the United Kingdom (where green retrofits account for a significant market share), Germany, and Norway.<sup>86</sup> Industry experts report that Asia is home to several large and growing green building markets, including China, India, Japan, Singapore, and Thailand.<sup>87</sup> China, a particularly large market, is dominated by new construction (rather than retrofits) (box 2).<sup>88</sup> In the Middle East, political and market instability complicate business, but a tendency to opt for green construction and a growing acceptance of LEED have created a strong market for green building services firms.<sup>89</sup> Top markets in the Middle East include Qatar and the UAE.<sup>90</sup> Industry experts also identify a number of growing green building markets in Latin America, including Argentina, Brazil, Chile, Colombia, Mexico, and Peru.<sup>91</sup> In Brazil—the region’s strongest market—the share of firms that can attribute at least 60 percent of their business to green projects is expected to grow rapidly, from 24 percent in 2012 to 50 percent in 2015. Green building markets in Australia and South Africa are also expected to experience rapid growth in the near term.<sup>92</sup>

### Box 2—China’s Green Building Market

Industry experts indicate that demand for green building services in China is growing rapidly. However, green building continues to account for a small share of China’s overall construction market, and future growth may be inhibited by several factors that are inherent in the country’s building industry.

Although data on the size of the Chinese green building market are not available, the increasing number of Chinese construction projects that are seeking green certification suggests that the market is growing. The number of LEED-certified structures in China has increased from one in 2005 to almost 200 in 2011, while the number of structures certified under China’s Three Star program grew from 10 to 83 during 2008–10.<sup>93</sup> It is estimated, however, that such projects accounted for no more than 1 percent of the country’s newly constructed floor space in 2009, and that they continued to account for a small share of China’s construction market in 2012.<sup>94</sup>

China’s green building market is largely composed of projects for multinational firms that aim to uphold a company-wide environmental standard or present a “green” corporate image; government buildings and

<sup>85</sup> Industry representative, phone interview, July 8, 2013.

<sup>86</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013; McGraw-Hill Construction, *World Green Building Trends*, 2013, 11.

<sup>87</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>88</sup> Industry representatives, phone interviews, September 16, 2013.

<sup>89</sup> Industry representatives, phone interviews, August 21, 2013, and September 16, 2013.

<sup>90</sup> Industry representative, phone interview, July 8, 2013.

<sup>91</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>92</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 5.

<sup>93</sup> Nelson, “China’s Green Building Future,” April 1, 2012.

<sup>94</sup> China Greentech Initiative, *The China Greentech Report 2009*, September 2009, 176–77; China Greentech Initiative, *The China Greentech Report 2012*, April 2012, 110.

government-funded projects; and resorts and hotels.<sup>95</sup> LEED accounts for the largest share of buildings that have received green certification in China, and China reportedly ranks as the world's third-largest LEED market. An increasing number of structures are being certified under China's own Three Star program, which was introduced in 2006. A few Chinese buildings have also been certified under BREEAM, Japan's Comprehensive Assessment System for Built Environment Efficiency (CASBEE), and other international standards.<sup>96</sup>

Goals identified in China's 12th Five-Year Plan, along with government incentives—such as a provision allowing green developers to build structures 1 percent larger than would otherwise be permitted on a certain parcel of land—may promote growth in China's green building sector.<sup>97</sup> As in other markets, energy savings and the desire to promote a positive brand image also motivate property owners to opt for green buildings.<sup>98</sup> At the same time, a number of factors have discouraged a more widespread uptake of green building in China. Chinese developers' focus on up-front project costs—which are often higher for green building projects—together with the unavailability of reliable data on green building performance makes it difficult to generate interest in, and financing for, such projects.<sup>99</sup> Chinese architects and engineers are generally not strong proponents of green building, as due to the absence of sustainability issues from conventional instruction, they often do not see the value of such structures.<sup>100</sup> Engineering and architectural tasks are typically handled separately in Chinese building projects, an approach that contrasts sharply with the early coordination that U.S. professionals have used to ensure that green buildings meet sustainability goals.<sup>101</sup> Moreover, inefficiencies in the distribution of government subsidies for green buildings, and the frequent issuance of subsidies only after a building's completion, further discourage the development of sustainable structures.<sup>102</sup>

Despite these obstacles, U.S. industry representatives identify China as one of the top foreign markets for green building services.<sup>103</sup> Although data on trade and investment in China's green building industry are not available, it is unlikely that foreign firms are significant providers of green construction services there, as regional and local companies typically dominate domestic construction markets.<sup>104</sup> By contrast,

<sup>95</sup> Industry representative, phone interview, July 8, 2013; Nelson, "China's Green Building Future," April 1, 2012; Li and Currie, "Green Buildings in China," September 2011.

<sup>96</sup> Li and Currie, "Green Buildings in China," September 2011; Crea, "USGBC's Ongoing Compact with China," July 11, 2013; Nelson, "China's Green Building Future," April 1, 2012.

<sup>97</sup> China Greentech Initiative, *The China Greentech Report 2012*, April 2012, 108; China Greentech Initiative, *The China Greentech Report 2013*, June 2013, 91.

<sup>98</sup> Li and Currie, "Green Buildings in China," September 2011.

<sup>99</sup> Li and Currie, "Green Buildings in China," September 2011; China Greentech Initiative, *The China Greentech Report 2013*, June 2013, 92; Nelson, "China's Green Building Future," April 1, 2012.

<sup>100</sup> Li and Currie, "Green Buildings in China," September 2011; China Greentech Initiative, *The China Greentech Report 2013*, June 2013, 92.

<sup>101</sup> China Greentech Initiative, *The China Greentech Report 2013*, June 2013, 92; and industry representatives, phone interviews, July-September 2013.

<sup>102</sup> China Greentech Initiative, *The China Greentech Report 2013*, June 2013, 92.

<sup>103</sup> Industry representatives, phone interviews, July 8, 2013, and September 16, 2013.

<sup>104</sup> Industry representatives, phone interviews, August 21, 2013 and September 16, 2013.

industry experts report that there is significant opportunity for U.S. firms in the architecture and design segment of China's green building market.<sup>105</sup>

As green building services are essentially construction, architectural, and engineering services employed in the creation of a sustainable structure, providers in this field face the same barriers as suppliers of traditional construction and design services. The WTO reports that its members maintain a variety of measures that impact the cross-border provision of construction services. These include, among others, restrictions on the cross-border movement of workers; measures that complicate or block the recognition of credentials obtained in overseas markets; investment barriers (such as measures affecting the form or extent of foreign investment); restrictions on foreign participation in government procurements; subsidies directed to local providers; lack of regulatory transparency; and non-competitive practices. In addition, construction firms may be affected by taxes, import duties, product standards, and other measures that affect their ability to move materials and equipment overseas.<sup>106</sup> Like other professional services, the cross-border provision of architectural and engineering services is affected by measures that are intended to ensure consumer protection and service quality. These measures include, for example, provisions affecting the recognition of foreign architects' professional credentials or requiring them to work with local partners. However, barriers to the provision of all professional services have decreased since the mid-1990s, and measures affecting the foreign provision of architectural and engineering services are generally not as restrictive as in other professional service sectors.<sup>107</sup>

Countries maintain few, if any, restrictions that specifically apply to the foreign provision of green building services.<sup>108</sup> However, industry representatives report that certain market conditions often hinder their ability to supply services overseas. Green building services suppliers are sometimes disadvantaged by customer preference for local providers, due either to local firms' greater experience with local certification systems and market conditions, or to a desire to support the local economy.<sup>109</sup> Adapting green building processes to new environments can be difficult, and local firms may benefit from a good knowledge of local climate and geologic conditions and familiarity with domestic certification systems.<sup>110</sup> A lack of local expertise and resources can also inhibit the provision of green building services. For example, green building services suppliers may not be able to source sustainable technologies and materials locally in some markets, and certain countries lack facilities for testing a project's or product's compliance with certification standards.<sup>111</sup> In some markets, such as China, demand is low, as many

<sup>105</sup> Industry representatives, phone interviews, August 21, 2013 and September 16, 2013.

<sup>106</sup> WTO "Construction and Related Engineering Services," September 18, 2009, 25-6.

<sup>107</sup> WTO "Architectural Services," September 17, 2009, 7.

<sup>108</sup> One industry representative specifically reports that regulatory barriers do not have a substantial impact on the provision of green building services. Industry representative, phone interview, July 8, 2013.

<sup>109</sup> Industry representative, phone interview, September 16, 2013.

<sup>110</sup> Industry representatives, phone interviews, September 16, 2013.

<sup>111</sup> Industry representatives, phone interviews, July 8, 2013, and November 26, 2013.

consumers are reportedly unfamiliar with the advantages of green building.<sup>112</sup> Further, weak contract or regulatory environments may undermine the provision of green building services.<sup>113</sup>

## OUTLOOK

As a component of the construction and design industry, the green building industry is—and will continue to be—subject to the cyclical trends that are typical of the overall industry.<sup>114</sup> However, industry sources largely agree that demand for green building services will grow rapidly in the near future due to a projected increase in overall construction demand, as well as a continued increase in the share of building activity that is “green.”<sup>115</sup> IBISWorld estimated in 2011 that the U.S. green construction market would grow by approximately 23 percent per year during 2011–16.<sup>116</sup> Globally, McGraw-Hill Construction speculated in 2013 that the share of firms able to attribute at least 60 percent of their activity to green building projects would increase from 28 percent in 2012 to 51 percent in 2015.<sup>117</sup> Factors that are expected to contribute to growth in the green share of the construction market include innovation, a fuller understanding of building performance, increased demand for sustainable and energy-efficient products, and rising concern for the environment.<sup>118</sup> Both the construction of new commercial buildings and the renovation of existing structures are expected to contribute to the rising demand for green building services,<sup>119</sup> with green retrofitting driving green building markets in the United States and certain European countries, and new building driving growth in other countries.<sup>120</sup> While cross-border trade and investment in the green building industry is likely still small, industry sources expect such activity to increase as the value of incorporating sustainability into structures becomes more widely understood and as global demand for green building services continues to rise.<sup>121</sup>

Industry experts mention a few factors to keep in mind when considering the outlook for the green building industry. First, one industry expert suggests that forecasts predicting rapid

<sup>112</sup> Industry representative, phone interview, November 26, 2013.

<sup>113</sup> Industry representatives, phone interviews, July 8, 2013, and November 26, 2013. For example, in the Chinese market, firms that provide services incidental to LEED certification may face difficulties finding work, as some local firms have reportedly found ways to supply inauthentic or inferior certification services cheaply. Industry representative, phone interview, November 26, 2013.

<sup>114</sup> Industry representative, phone interview, August 21, 2013.

<sup>115</sup> Ripley, “Green and Sustainable Building Construction,” December 2011, 8.

<sup>116</sup> Ripley, “Green and Sustainable Building Construction,” December 2011, 4.

<sup>117</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10–11, 12.

<sup>118</sup> Industry representative, phone interview, July 8, 2013; Ripley, “Green and Sustainable Building Construction,” December 2011, 8.

<sup>119</sup> McGraw-Hill Construction, *World Green Building Trends*, 2013, 10–11, 12.

<sup>120</sup> Industry representative, phone interview, August 21, 2013.

<sup>121</sup> Industry representative, phone interview, July 8, 2013; Ripley, “Green and Sustainable Building Construction,” December 2011, 22.



growth in the green building industry should be considered against the definitions of “green building” that are used to formulate these estimates. In addition, according to this expert, it should be remembered that growth in green building services does not necessarily add to total construction activity, as green building is merely an alternate method of approaching a construction project.<sup>122</sup> Another industry expert wonders how the end of the recession will affect growth in green building services, and whether firms will aim to construct progressively greener structures.<sup>123</sup> A third expert suggests that green building growth may be limited if certification standards are not harmonized.<sup>124</sup> While these factors may impact the rate at which the industry grows, experts generally agree that the provision of green building services will continue to expand in the future.

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<sup>122</sup> Industry representative, phone interview, September 16, 2013.

<sup>123</sup> Industry representative, phone interview, September 16, 2013.

<sup>124</sup> Industry representative, phone interview, November 28, 2013.

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