1 Green Building 101

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I. WHAT IS GREEN BUILDING?

A. Common Descriptions

"Green building" is many things to many people. It can be described as a movement, encompassing a core set of environmentally conscious principles. It is the practice of transforming and innovating standard design and construction practices to reduce the negative impacts of built environments. It is an effort to improve sustainability and incorporate environmentally friendly construction methods and materials. It is a system of practices aimed at reducing greenhouse gases and the environmental footprint created by building construction, operation, and maintenance. It is also an effort to improve the mental and physical health of building occupants by ensuring cleaner indoor air, reducing harmful chemicals, and improving daylight systems.

According to the Environmental Protection Agency (EPA), green building is the practice of "creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life cycle from siting to design, construction, operation, maintenance, renovation and deconstruction."[1] The U.S. Green Building Council (USGBC) defines green building as the practice of design and construction to employ strategies "aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO_2 emissions reduction, improved indoor sustainability quality, and stewardship of resources and sensitivity to their impacts."[2] The U.S. General Services Administration defines "sustainable" design as that which "seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are

1. U.S. Envtl. Prot. Agency, Basic Information, http://www.epa.gov/greenbuilding/pubs/about.htm#1.

2. U.S. Green Bldg. Council, What LEED Is, https://www.usgbc.org/FAQConsolidation/FAQ_Detail.aspx?Id=Q501400000009vBfAAI.

to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments."[3]

Green building essentially evolved from the sustainability movement that began in the late 1960s and 1970s as a result of the U.S. energy crisis. At the time, the U.S. government sought to reduce the country's dependence on foreign oil imports and to mitigate environmental impacts from energy production and usage.[4] New federal agencies emerged from this shift in policy, including the Department of Energy and the EPA.

In the 1990s, the American Institute of Architects (AIA) formed the Committee on the Environment, which was in part funded by the EPA and focused on energy efficiency and sustainable design. In addition, the EPA created the Energy Star program, which was "designed to identify and promote energy-efficient products to reduce greenhouse gas emissions."[5] Federal laws like the National Energy Act of 1978 and the subsequent Energy Policy Act of 1992 established commercial and residential minimum codes for energy efficiency. Numerous other federal, state, and local initiatives and legislation have followed.

The USGBC was created in 1993. It focuses on promoting, educating, and advocating for green design and construction practices for buildings and communities. In 2000, the USGBC released the first version of the Leadership in Energy and Environmental Design (LEED) green building certification system. LEED and several other ratings systems described later in this chapter provide guidelines to help make built environments part of a sustainable future.

The term "green building" applies to just about any built structure, such as an office building, a home, an apartment building, a school, an airport, or a courthouse; the list goes on. Further, the term pertains not only to the materials used in the built structure (such as bamboo flooring or recycled pipes) but also to the building's design, operation, location, energy sources, appliances or utilities, source of materials, and impact on those who occupy it. For these reasons, the environmental impact and sustainability of a building are commonly examined through a "life-cycle assessment" that considers everything that goes into the building and everything that results from its existence.

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3. U.S. Gen. Servs. Admin., Sustainable Design, http://www.gsa.gov/portal/content/104462.

4. William J. McConnell & Stephen A. Hess, *Assessing Liability for Green Building Failures, Part I: The History, Development, and Status of Green Building Codes*, 6(2) J. Am. Coll. Constr. Laws. 2 (July, 2012).

5. *See generally* Energy Star, History, http://www.energystar.gov/index.cfm?c=about.ab_history. The program initially focused on office equipment products and residential heating and cooling equipment. The Energy Star label now appears on office equipment, major appliances, lighting, and home electronics, and the program also covers new homes and commercial and industrial buildings.

B. Green Building Goals

The goals of green construction are diverse, and they usually vary from project to project. Generally, the goal is to reduce a building's carbon footprint, but there are numerous methods to accomplish that goal, such as by converting a brownfield into a viable construction site, providing charging stations for electric automobiles, seeking to reduce the heat island effect through sustainable landscaping and minimal hardscapes, choosing a location accessible by public transportation to reduce vehicle miles traveled, or improving indoor air quality. A project may aim to incorporate more local materials in a job. A developer may seek tax incentives, better financing, or expedited permitting. The goal may be to achieve a specific green building certification ranking or designation, which not only incorporates by definition green construction methods and/or materials but also potentially increases the desirability, marketability, and value of a building.

Of course, the issues of green building goals and money often intersect. As with any project, green or otherwise, budgetary issues may dictate the design of a project. But it is not just the cost of the materials, appliances, or other features that should be considered in a project budget analysis. Green buildings can save money when the lifespan of the building and operations costs are considered. Often the primary or secondary goal in a project is to reduce the finished product's demand for resources, such as power and water. Reduced demand for resources, for example, can create significant savings which are realized over time.

Green construction's various goals often require the construction team to collaborate early and often. Many decisions associated with green building are made early on in the project, even before a site is selected or the building concept is created. Traditional construction projects often employ a linear approach that moves from one step to the next. The USGBC, one of the leaders in the national green building movement, emphasizes the need for those involved in the project, such as owners, architects, engineers, contractors, building occupants, and maintenance personnel, among others, to meet as early as possible to identify the goals they wish to achieve and to coordinate on the design, methods and budget necessary to meet green building goals. This is often referred to as the "integrated process."

Identifying goals early in a project is an important step in the green building process, because failing to do so may lead to improper expectations, difficulties in execution, and potentially legal disputes.

C. International Markets

The green wave of construction is not limited to the United States. Climate change, indoor air quality, and demands for natural and

other energy resources are global concerns. In 2006, China, which is expected to become the largest energy consumer in the world by 2035,[6] implemented the Three Star system, believed to be the first national code promoting the energy-efficient design and renovation of commercial buildings.[7] Many Chinese buildings have also sought and received LEED certification.[8] Whereas LEED certification can be obtained upon project completion, China's Three Star rating is made one year after the building is occupied, so that its actual performance can be assessed.

India's Green Building Council launched its first green rating system, the Green Homes Rating System, in 2008. It is tailored to address the country's most important national issues, which include water conservation, handling of consumer waste, and energy conservation.[9] Brazil started its nongovernmental Green Building Council in 2007, which has adopted the LEED rating system.[10] Other international green building standards include the British-based Building Research Establishment's Environmental Assessment Method (BREEAM) system, which is used in more than 50 countries,[11] and the Germany-based Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB), which has also been applied in many countries, including Russia and China.[12]

Organizations like the World Green Building Council (WorldGBC) help strengthen and promote green building initiatives in countries around the world. Currently, nearly 100 countries have established or plan to establish green construction councils that are members of the organization.[13] The WorldGBC supports the growth of green building councils by providing them with tools and strategies to become stronger in their own countries.[14] The United Nations Environment Programme has created a Sustainable Building and Climate Initiative to promote sustainable building policies and practices around the

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6. *China Focuses on Energy Efficient Buildings*, 29 Constr. Contracts L. Rep. 191 (July 8, 2005). China is projected to use 70 percent more electricity than the United States by 2035.

7. *Id.* The Three Star green building rating system is officially known in China as the Evaluation Standard for Green Buildings. Bren School Sino-American Working Group, Green Building in the U.S. and China: Bridging the Energy Performance Gap 16 (2012), http://www.bren.ucsb.edu/research/2012Group_Projects/documents/nanjing_report.pdf.

8. *China Focuses on Energy Efficient Buildings*, *supra* note 6.

9. *India Strives to Become Greener*, 34 Constr. Contracts L. Rep. 60 (Mar. 26, 2010); *see also* Indian Green Bldg. Council, IBGC Homes Green Rating System, Version 2.0 (Apr. 2012), http://igbc.in/site/igbc/testigbc.jsp?desc=115708&event=115679.

10. *See* Green Bldg. Council of Brazil, http://www.gbcbrasil.org.br/en/?p=world&M=11&O=1.

11. *See* BREEAM, BREEAM in Numbers, http://www.breeam.org/page.jsp?id=559. BREEAM stands for Building Research Establishment Environmental Assessment Method.

12. *See* DGNB Sys., http://www.dgnb-system.de/en/.

13. *See* World Green Bldg. Council, Member List, http://www.worldgbc.org/worldgbc/members/.

14. *See* World Green Bldg. Council, About WorldGBC, http://www.worldgbc.org/worldgbc/about/.

globe. Even the World Cup soccer tournament is going green. Under the "Green Goal Initiative," the Federation Internationale de Football Association (FIFA) now considers a potential host country's efforts to reduce carbon emissions through green building standards in its selection process.[15]

II. GREEN BUILDING STATISTICS

A. Environmental

The old adage says statistics do not lie. Another old adage says anything can be proved with statistics. In spite of this divergence of opinion on the validity of statistics, numerous studies and statistics reflect the environmental, economical, and health-related impacts of buildings and how green design and construction can significantly reduce these impacts.

First, consider these staggering statistics from the EPA.[16] As of 2009, buildings in the United States account for nearly 40 percent of the country's total energy consumption and constitute nearly 40 percent of the country's carbon dioxide emissions. In fact, U.S. buildings by themselves emit more greenhouse gases than any other country in the world except China.[17] Buildings use about 72 percent of total U.S. electricity consumption. The average household spends at least $2,000 a year on energy bills, more than half of which goes to heating and cooling.

The EPA also found that indoor levels of pollutants may be two to five times higher, and occasionally more than 100 times higher, than outdoor levels. In the mid-1990s, one in every five schools had unsatisfactory indoor air quality. On average, Americans spend about 90 percent or more of their time indoors and are commonly exposed to those elevated pollutant levels. The significant contributors to indoor air pollution include building materials, cleaning products, and heating, ventilation, and air conditioning systems.

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15. Allison A. Kotula, *A Win-Win Scenario: Using the Gold Standard to Improve the World Cup's Green Goal Initiative*, 36 Wm. & Mary Envtl. L. & Pol'y Rev. 565, 567 (2012) (citing Press Release, United Nations Env't Programme, FIFA 2010 Green Goal: Major Initiative to Green the FIFA World Cup Kicks Off, (June 8, 2010), http://www.unep.org/ecosystemmanagement/News/PressRelease/tabid/426/language/en-US/Default.aspx?DocumentID=628&ArticleID=6611&Lang=en).

16. U.S. EPA, Buildings and Their Impact on the Environment: A Statistical Summary (rev. Apr. 22, 2009), http://www.epa.gov/greenbuilding/pubs/gbstats.pdf.

17. J. Cullen Howe, *Overview of Green Buildings*, 41 Envtl. L. Rep. News & Analysis 10,043, 10,045 (2011).

Garbage also remains a significant problem. Americans throw away enough paper and plastic cups and utensils every year to circle the equator 300 times.[18] Over 7 billion pounds of PVC are thrown away in the United States each year; less than 1 percent of that is recycled. Building-related construction and demolition debris totals about 160 million tons per year, which is nearly 26 percent of total nonindustrial waste generation in the United States.[19]

The country's, and the world's, potable water is becoming scarce. Close to 30 percent of the water used in the United States is used for landscaping. Building occupants use 13 percent of the total water used in the United States each day. Buildings, and the U.S. transportation system that gets workers to work, require impermeable surfaces that create runoff, which brings pollutants into surface waters.

Green building practices can help tackle these and other health and sustainability problems. A building's energy consumption can be reduced by installing energy-efficient appliances, using solar panels, incorporating more natural lighting, or equipping the building to generate its own energy. Indoor air quality can be improved by installing operable windows, using high-efficiency air filters, or even just using low-emitting materials and cleaning products. Waste can be reduced by making it easier for building occupants to recycle; water can be saved by using nonpotable water for toilets and including water meters to identify leaks or other water problems. These types of issues are generally what green designers and professionals, and green ratings systems, focus on.

B. Economical

While green design and construction can reduce or eliminate the negative environmental and health impacts of built environments, for years, many owners and construction industry professionals were reluctant to incorporate green practices. The general perception was that building green cost too much "green," which either took too long to recoup or could not be recouped at all. Today, studies contradict that notion, and completed projects demonstrate green buildings that are economically beneficial.

A comprehensive study concluded there is "no significant difference in average costs for green buildings as compared to non-green

18. Clean Air Council, Waste and Recycling Facts, http://www.cleanair.org/Waste/wasteFacts.html (citing A. Wills, *Recycling To-Go Plastics*, EARTH911, June 21, 2010, http://earth911.com/news/2010/06/21/recycling-to-go-plastics/).

19. *See* U.S. EPA, *supra* note 16.

buildings."[20] However, that report also found that building costs generally drive choices on green construction projects. In that respect, some decisions may be penny wise but ultimately pound foolish. In other words, while the initial costs of a green project may in some instances be greater than a comparable nongreen project, the reduced operations and maintenance costs over the life of the building may eclipse those initial savings. For instance, a study on green roofs with regard to a 21,000-square-foot building found that although the green roof cost nearly $130,000 more to install than a conventional roof, over its lifetime the green roof would save about $200,000, mostly from reduced energy costs.[21] The General Services Administration (GSA) found that 22 green buildings selected from its national portfolio outperformed national averages for similar nongreen buildings.[22] The GSA buildings at issue used 25 percent less energy as well as less water, and had 27 percent higher occupant satisfaction with the buildings.

Building green may also help many participants in the construction industry stay in the black. According to one report, the value of green building was about $10 billion in 2005.[23] It then shot up to approximately $78 billion in 2011.[24] By 2016, it is expected to reach $204 billion to $248 billion.[25] The same study estimates that green building will be in 55 percent of all commercial and institutional construction by 2016, and between 29 percent to 38 percent of the residential market.[26]

From 2000 to 2008, there were more than 2 million workers in the green construction industry.[27] That number was projected to rise to well over 3 million workers between 2009 and 2013, and that is not including employees of suppliers of green building materials and products.[28]

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20. Lisa Fay Matthiessen & Peter Morris, Davis Langdon Inc., Cost of Green Revisited: Reexamining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption (2007), *available at* http://www.usgbc.org/sites/default/files/leed-cost-of-green.pdf.

21. C. Clark, P. Adriaens & F.B. Talbot, *Green Roof Valuation: A Probabilistic Economic Analysis of Environmental Benefits*, 42(6) Envtl. Sci. & Tech 2155 (2008).

22. U.S. Gen. Servs. Admin., Green Building Performance (August, 2011), http://www.gsa.gov/graphics/pbs/Green_Building_Performance.pdf

23. Robert A. Murray, McGraw-Hill Constr., 2013 Dodge Construction Outlook, Midyear Update (Oct. 2012), *available at* http://trilogy-solutions.com/site/assets/files/1057/dodge_2013_construction_outlook.pdf.

24. *Id.*

25. *Id.*

26. *Id.*

27. U.S. Green Bldg. Council, Green Jobs Study 3 (2009), http://www.usgbc.org/ShowFile.aspx?DocumentID=6435.

28. Drew Liming, U.S. Bureau of Labor Statistics, Careers in Green Construction (June 2011), http://www.bls.gov/green/construction/construction.pdf; *see also* U.S. Green Bldg. Council, *supra* note 27.

III. GREEN CONSTRUCTION AND CERTIFICATION

A. Categories of Green Construction

Any building, new or old, big or small, commercial or residential, can be "greened." To evaluate how a specific type of building can achieve a sustainable objective, the focus must be on the function of the building itself. In other words, understanding a building's primary purpose and usage will dictate how best to achieve sustainable objectives.

Consider a residential home. As the primary purpose of a residential home is to be lived in, a home's greatest environmental challenge lies with energy and water consumption. For existing homes, homeowners can green their residence by purchasing products and fixtures that are efficient and conserve energy (like Energy Star products). For new construction, a home may be greened by designing and constructing the home with low-flow plumbing, energy-efficient windows, solar roofing panels, insulation, and green building products.

Now consider commercial office space. Because of all the computers and other electrical devices and equipment many companies require for business operations, office space consumes an enormous amount of electricity. Sustainable objectives for commercial office space, therefore, often focus on ways to reduce energy consumption. Green solutions for commercial office space include using renewable energy sources such as solar panels or miniature wind turbines on the roof, which can create energy independence (or at least reduce energy bills).

Healthcare facilities, like commercial office space, also use a significant amount of electricity and can benefit from sustainable objectives of lowering (or offsetting) energy usage. In addition, healthcare facilities also create an extraordinary amount of waste (both medical and nonmedical). To reduce its production of waste, greening objectives for healthcare facilities include purchasing medical products and equipment that are safe to reuse, implementing recycling programs, and installing high-efficiency waste disposal systems that support rapid decomposition of nontoxic organic waste.

Other building types that provide opportunities to implement green construction practices include retail stores and schools. For retail stores, sustainable objectives may emphasize efficiency in lighting solutions and consumption, such as retrofitting new lighting systems that utilize new technology without sacrificing performance. For schools, the primary objective of green construction is the health and well-being of students and staff. Even though asbestos is no longer used as insulation, a key part of greening a school necessitates ensuring that the learning environment remains toxin free. Green

construction for schools also takes into account the functional design of schools, producing, for example, plentiful open green space for recreation, plentiful glazing for daylighting, and better interior insulation practices to lower reverberation and increase acoustical performance.

The impact of green construction goes beyond specific building types. Community planning initiatives are a growing trend within the sustainability movement, concentrating on the built environment of urban communities in an effort to green not only the buildings, but also the infrastructure and the communities as a whole. There are countless forms of green community planning, from dedicated park space to bike paths to accessible public transportation, all of which can contribute to a more sustainable community. In essence, green community planning brings together the various ways buildings, infrastructure, and communities can be greened.

To support these green objectives, regardless of the type or function of the building, numerous organizations have created rating and certifications systems to acknowledge a building as green. These organizations are found both internationally as well as within the United States, and all of them have created their own unique guidelines to promote green construction practices. While these third-party green certification and rating systems are generally not mandated by the government, governmental entities are beginning to embrace the green construction movement.

B. LEED

USGBC is a preeminent organization in the promotion of sustainable design, construction, and operation of buildings, in large part due to its development of the LEED green building rating and certification system. LEED encourages green building, green community planning, and other sustainable practices through distinct rating systems that offer comprehensive benchmarks and performance criteria for different types of buildings including new construction, homes, retail, and schools. LEED was launched in 2000 and is currently administered by the Green Building Certification Institute (GBCI), a third-party organization created by USGBC to administer certification and accreditation programs related to green building.

To become a LEED-certified building, the building must attain a specified number of points in a wide range of sustainable criteria, including water efficiency, energy performance, and indoor environmental quality. Depending on the number of points achieved, the GBCI will designate a building as Certified, Silver, Gold, or Platinum (the highest achievement level). LEED has been successfully implemented throughout the United States, is mandated by many

jurisdictions at all levels of government, and has expanded internationally to well over 100 countries.[29]

C. Green Globes

The Green Building Initiative (GBI) is another organization committed to sustainable construction for residential and commercial buildings.[30] In 2004, GBI developed a green certification system known as Green Globes. Like LEED, the Green Globes rating system is based upon meeting certain sustainable objectives; an applicant can achieve up to four "globes" depending on points awarded during the assessment process.

D. The Living Building Challenge

The Living Building Challenge describes itself as the "built environment's most rigorous and ambitious performance standard" for sustainable construction practices for buildings.[31] The Living Building Challenge's certification program sets rigid requirements on building performance in the areas of site, water, energy, health, materials, equity, and beauty. The certification process is not based on the theoretical (or desired) potential of a building; rather, the certification process considers how a building actually performs based on operational data for at least 12 consecutive months. If an applicant can meet the requirements of the program, a building is deemed "Living." The requirements are so stringent that only five projects have achieved "Living" status in the United States.[32]

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29. U.S. Green Bldg. Council, LEED, http://new.usgbc.org/leed.

30. Green Bldg. Initiative, Green Building Programs, http://www.thegbi.org/green-globes/.

31. Int'l Living Future Inst., About, http://living-future.org/ilfi/about-international-living-future-institute. The five projects and their locations are the Bechtel Environmental Classroom (Northampton, MA); the Bertschi Living Building Science Wing (Seattle, WA); the Hawaii Preparatory Academy Energy Lab (Kamuela, HI); the Omega Center for Sustainable Living (Rhinebeck, NY); and the Tyson Living Learning Center (Eureka, MO).

32. Lauren Said-Morehouse, *"World's Greenest Buildings" Get Seal of Approval*, CNN.com, June 28, 2012, http://www.cnn.com/2012/06/21/world/living-building-challenge.

E. BREEAM

Started in the United Kingdom, the Building Research Establishment[33] created BREEAM, one of the first international rating and certification standards for sustainable buildings, in 1990. BREEAM has grown in scope to cover many different building types and sustainability requirements and has expanded its reach throughout Europe (to include Germany, the Netherlands, Norway, Spain, and Sweden). The sustainable requirements and benchmarks for certification are similar to LEED standards, with levels ranging from zero to six.

F. CASBEE

In 2001, the Japan Sustainable Building Consortium[34] designed the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) certification system as a rating system for sustainable buildings. CASBEE is a joint governmental effort with support from nongovernmental entities (such as industrial organizations and academia). It is based on BREEAM concepts, but tailored to meet the needs of Japan and Japanese buildings. CASBEE assesses four areas: predesign, new construction, existing building, and renovation. Comprehensive assessments are ranked at five levels: Class C (poor), Class B–, Class B+, Class A, and Class S (excellent).[35]

G. International Green Construction Code

A discussion of certification programs would not be complete without mention of a noncertification program—a model building code for green construction. In 2012, the International Code Council released a model code titled International Green Construction Code (IgCC). The IgCC works in conjunction with other model codes (such as the International Energy Conservation Code) to promote minimum green standards for all buildings. Specifically, the IgCC requires reducing the carbon footprint via reductions in energy usage and water usage, and also seeks to ensure health and safety of building occupants through a detailed commissioning process. In addition, the IgCC includes land use regulations that address issues such as greenfield preservations. While the IgCC is only a model code (and thus not mandated by

33. The Building Research Establishment traces its roots to 1921. It was a governmental agency of the United Kingdom, but was privatized in 1997.

34. Established by the Japanese Ministry of Land, Infrastructure, Transportation, and Tourism.

35. CASBEE, http://www.ibec.or.jp/CASBEE/english/methodE.htm.

law), a few states, such as Rhode Island,[36] Maryland,[37] Florida,[38] and Oregon,[39] have adopted the provisions within the IgCC.

IV. GREEN BUILDING MANDATES AND INCENTIVES

While green construction has become more prevalent in recent years, it is still a long way from becoming mainstream construction practice. Perhaps the biggest obstacle to the full-fledged adoption of sustainable construction practices is the misperception that the initial, or up-front, costs of going green are more expensive than traditional construction options. To overcome these costs concerns, and in an effort to continue to support sustainable construction practices, governments at all levels across the country have enacted legislation, regulation, and other public policy that either (1) mandate internally or to the public at large specified sustainable objectives to be achieved or (2) provide economic incentives to the public to build green.

A. Green Building Laws

Government mandates for green construction practices usually apply to buildings owned by the government itself. For example, the federal government, through executive orders, mandates that its agencies build green. Because the federal government is the largest landowner in the United States, two recent executive orders have greatly contributed to the green building movement. The first, Executive Order 13,423, was passed in January 2007 by President George W. Bush and mandated that new construction and major renovations of federal agency buildings comply with sustainable objectives, which are closely aligned with LEED.[40] The second, Executive Order 13,514, was passed in October 2009 by President Barack Obama for the purpose of establishing "an integrated strategy towards sustainability in

36. R.I. Gen. Laws Ann. §§ 37-24-4 *et seq.*

37. Md. Pub. Safety § 12-201.

38. *See* Fla. Stat. Ann. § 255.2575.

39. Or. Admin. R. 918-465-0030.

40. Exec. Order No. 13,423, 72 Fed. Reg. 3919 (Jan. 24, 2007).This executive order finds its origins in "Federal Leadership in High Performance and Sustainable Buildings," a memorandum of understanding voluntarily entered into by 19 federal agencies on January 24, 2006. *See* U.S. EPA, Federal Sustainable Buildings Memorandum of Understanding, http://www.epa.gov/oaintrnt/projects/buildings_mou.htm.

the Federal Government."[41] Executive Order 13,514 also sets numerous goals for federal agencies, including increasing water use efficiency and management in federal buildings and implementing high-performance, sustainable building design, construction, operation, management, and maintenance.[42]

Government mandates are implemented at the state level as well. For example, in Maryland, all state buildings larger than 7,500 square feet are required to achieve at least a LEED Silver or equivalent rating.[43] In Connecticut, certain state-funded new construction projects are required to achieve LEED certification.[44] And Minnesota's sustainable building guidelines require that all new buildings receiving state funding adhere to the sustainable building objectives.[45]

In addition to internal mandates, some governments also require private buildings to follow sustainable construction practices. The first mandatory statewide green building code, adopted in 2010, was the California Green Buildings Standards Code (known as the CALGreen Code).[46] The CALGreen Code established mandatory environmental requirements for all new construction (which can be augmented by local jurisdictions) and makes sustainable building the new industry standard in the state. In Washington, D.C., the Green Building Act of 2006, which created green building mandates for public buildings, was extended in 2012 to require new private, nonresidential projects of greater than 50,000 square feet to meet certain green standards.[47]

B. Green Building Incentives

The other governmental approach to promoting green construction practices is not by mandating them with the proverbial stick but by incentivizing them with the proverbial carrot.[48]

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41. Exec. Order No. 13,514, 74 Fed. Reg. 52,117 (Oct. 25. 2009).
42. Exec. Order No. 13,514, § 2.
43. Md. Code Ann., State Fin. & Proc. § 3-602.1.
44. Conn. Pub. Acts 07-242.
45. Minn. Stat. Ann. § 16B.325.
46. Cal. Code Regs. tit. 24, pt. 11.
47. D.C. Code §§ 6-1451.01 *et seq.*
48. There is a plethora of resources available to the green construction lawyer to locate federal, state, and local green building laws, incentives, and funding programs to any particular geographic region. One of the best resources available is the Database of State Incentives for Renewables & Efficiency (DSIRE) website (http://www.dsireusa.org). Another great resource is the Environmental Protection Agency's list of funding opportunities available at the national, state, and local levels for green building. U.S. EPA, Green Building: Funding Opportunities, http://www.epa.gov/greenbuilding/tools/funding.htm.

1. Tax Credits

Tax credits are one of the most popular types of incentive provided by the government to promote green construction. For example, a commercial enterprise that incorporates renewable energy production in its buildings, like solar or geothermal, can receive federal tax credits to offset its taxes owed.[49] Federal tax credits are also available for consumers purchasing energy-efficient products that are identified by the Energy Star program.[50]

In addition to federal tax credits, state governments also use tax credits to promote green building initiatives. For instance, the Green Building Tax Credit in New York, first passed in 2001, is one of the earliest green building incentive programs and provides tax credits to owners and tenants of buildings that meet state-specific green standards (similar to LEED).[51] The Sustainable Buildings Tax Credit in New Mexico offers personal and corporate tax credits for commercial and residential buildings based upon obtained LEED certification levels.[52]

2. Tax Deductions

Tax deductions, reducing the amount of taxable income, are also provided by the government to incentivize green building. The federal government, for instance, offers green tax deductions for commercial buildings that can demonstrate a certain level of energy efficiency.[53] At the state level, green tax deductions are also prevalent. In Texas, for example, a franchisee can obtain a tax deduction for investments in renewable energy sources.[54] Missouri enacted a statute in 2008 to provide an income tax deduction for homeowners who complete a certified home energy audit and associated energy efficiency improvements.[55]

3. Financing

One of the most common ways that the government promotes green building initiatives is to offer affordable financing options to reduce the cost of sustainable improvements. Green financing incentives are predominately in the form of lower interest rates offered at the local level. For example, in Pennsylvania, Keystone Home Energy Loan

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49. 26 U.S.C. § 48.

50. 26 U.S.C. § 25C (I.R.C. § 1121). The Energy Star Program, codified at 42 U.S.C. § 6294a, is a joint effort between the Department of Energy and the Environmental Protection Agency that was established in 1994 to "promote energy-efficient products and buildings."

51. N.Y. Tax Law § 19 (2008).

52. N.M. Stat. § 7-2-18.19 (2009).

53. Energy Policy Act of 2005, Pub. L. No. 109-58, Aug. 8, 2005, 119 Stat. 594.

54. Tex. Tax Code Ann. § 171.107.

55. Mo. Rev. Stat. § 143.121(8).

Program offers low-rate loans to help make energy-efficient home improvements more affordable.[56] The Alaska Housing Finance Corporation[57] offers interest rate reductions to consumers who purchase new or existing homes that achieve exemplary energy ratings under the Energy Star program, and offers rebates up to $10,000 for qualified energy-efficient improvements.[58] Connecticut is spearheading green financing through its Clean Energy Finance and Investment Authority (CEFI).[59] The CEFI invests capital and offers financial incentives and financing to homeowners and companies who support Connecticut's clean energy goals.[60]

4. Permitting

Local government can facilitate green building by making the permitting process for green buildings cheaper and easier. The administrative hurdles required for new construction can range from a minor nuisance to a significant deterrent. An expedited permitting process can help prevent construction delays and associated increased project costs, at minimal financial cost to the government. The Gainesville Green Building Program in Florida, for example, combines a fast-track permit process and a 25 percent reduction in permitting fees to private contractors who adhere to the LEED certification standards.[61] In North Carolina, Catawba County provides rebates for permit fees to make the construction of green residential homes and commercial buildings more affordable.[62] And the City of Santa Monica, California, offers expedited plan review for projects pursuing LEED certification.[63]

5. Grants

Grants are the simplest, and in many ways the most effective, incentive available for green building. Due to the generally limited availability of funding, however, grants are also one of the least common

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56. Keystone Home Energy Loan Program, http://www.keystonehelp.com/info/financing-programs.

57. Established by the State of Alaska; codified at Alaska Stat. Ann. §§ 18.56.020 *et seq.*

58. The Alaska Housing Finance Corporation created the Alaska Building Energy Efficiency Standard (BEES) to promote green construction practices. *See* Alaska Hous. Fin. Corp., Save Energy, http://www.ahfc.us/efficiency/energy-programs/new-home-rebate.

59. Conn. Pub. Acts 11-80 (An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future).

60. *See* Clean Energy Fin. & Inv. Auth., http://www.ctcleanenergy.com.

61. City of Gainesville, Fla., Green Building, http://www.cityofgainesville.org/GOVERNMENT/CityDepartmentsAM/BuildingInspectionDepartment/GreenBuilding/tabid/241/Default.aspx.

62. Catawba Cnty., N.C., Green Building Incentives, http://www.catawbacountync.gov/ue/green_building.asp.

63. U.S. Dep't of Energy, DSIRE, California, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA136F.

types of green incentives. But green grants do exist. In Illinois, for example, the School Construction Law was amended in 2007 to issue grants for construction projects at schools that either complied with LEED for Schools (or another comparable rating system) or met standards established by the Green Building Advisory Committee of the Illinois Capital Development Board (the construction management agency for the state).[64] In King County, Washington, grants are offered for buildings that meet a strict list of green criteria.[65]

V. THE GREEN CONSTRUCTION LAWYER

This chapter has introduced the concepts fundamental to understanding what sustainable construction for buildings is, the benefits of "going green," who and what organizations are promoting green, what rating systems are being used to evaluate green projects, and what laws and regulations are mandating or incentivizing green development. It is from these basic concepts that the green construction lawyer builds upon to identify the unique issues, risks, and potential liabilities associated with a green project.

For example, during the precontract phase of a green construction project, the green construction lawyer can help reduce the risks and uncertainties of the client and all project participants by making sure that the right project-delivery method is utilized to achieve the owner's green objectives and budget, while at the same time setting the parameters for the proper allocation of risk among the project team. During the contracting phase of a green project, the green construction lawyer must then consider whether to use a form green construction agreement (such as the AIA Sustainable Documents or the ConsensusDOCS 310) or whether to draft a tailor-made agreement. In addition, the contract phase will also require the green construction lawyer to specifically and clearly define the sustainable objectives in the contract documents, to spell out the coordination of responsibilities among the project team, to adequately define the standard of care for the design professionals, and to consider the implications of warranties and guarantees provided by contractors or designers. The contract documents will also need to address such issues as risk of loss of tax credits or deductions, liquidated damages, and what types of consequential damages (e.g., diminution of value due to lowered public perception or demand) arise out of a building not meeting a certain level of a third-party certification.

64. Ill. Pub. Acts 095-0416.
65. King Cnty., Wash., Green Tools, http://your.kingcounty.gov/solidwaste/greenbuilding.

From a risk management perspective, the green construction lawyer needs to be savvy in green insurance law to optimize coverage for "green claims," and to make certain that all project participants are adequately insured. For contractors, the green construction lawyer understands how green projects affect a contractor's performance bond or payment bond requirements. Likewise, for sureties, the green construction lawyer addresses what risks and obligations a surety is taking on when bonding a green project. During the construction phase, the green construction lawyer must also consider such issues as green project cost overruns, risk of loss when a green specified product fails (or delays a project), indemnification for property damage to a green building, and how to deal with building performance failures on a green project.

Finally, the green construction lawyer must have a solid understanding of green litigation: what forums hear these disputes in, what types of claims have been (or will be) asserted, and how best to protect clients from the expense and exposure of a trial for a (allegedly) failed green project. The rest of this book addresses these and other related issues in more detail.