Green Building AND THE Construction Lawyer

A PRACTICAL GUIDE TO TRANSACTIONAL AND LITIGATION ISSUES

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14 A Scientific Look at LEED, Green Globes, and Energy Star

Kevin Garrison and Julia Holden-Davis

I. OVERVIEW OF RATING SYSTEMS AND BASIS

A. LEED

LEED is an acronym for Leadership in Energy and Environmental Design, which is a green building certification program developed by the U.S. Green Building Council (USGBC). According to the USGBC, LEED is the most widely used green building program around the planet with 1.5 million square feet of building space being certified each day in 135 countries.[1] The LEED rating system is constantly evolving through the use of a collaborative evaluation and revision process. There are several different types of rating systems based on specific projects, but generally the major credit categories include sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.

B. Green Globes

The Green Globes rating systems reviews seven areas: (1) project management (inclusive of environmental purchasing, commissioning, and emergency response), (2) site, (3) energy, (4) water, (5) resources (including building materials and solid waste), (6) emissions, effluents, and other impacts, and (7) indoor environment.[2] Green Globes relies on the U.S. Environmental Protection Agency's (EPA's) Energy

1. U.S. Green Bldg. Council, About USGBC, http://www.usgbc.org/about (last viewed Oct. 30, 2013).

2. *Hearing before the H. Comm. on Science, Space, and Technology, Subcomm. on Investigations and Oversight*, 112th Cong. 8–10 (May 8, 2012) (testimony of Ward Hubbell, President, Green Building Initiative) [hereinafter Hubbell testimony].

Star program to measure energy efficiency. Of the Green Globes 1,000-point system, 380 points are weighted to energy.[3] The project seeking Green Globes certification must be projected to perform in the top 25 percent of buildings nationwide to get those points.[4]

The Green Globes rating system analyzes construction materials using a peer-reviewed life-cycle assessment focused on five areas of analysis: (1) embodied energy, (2) global warming potential, (3) impacts on land, (4) impacts on air, and (5) impacts on water.[5]

Green Globes also publishes the Federal Guiding Principles. Per Executive Order 13,514 (2009), 15 percent of existing federal agency buildings (those above 5,000 gross square feet) are to meet these principles by fiscal year 2015, with progress toward 100 percent compliance.[6] The five principles are:

1. Employ Integrated Assessment, Operation, and Management Principles
2. Optimize Energy Performance
3. Protect and Conserve Water
4. Enhance Indoor Environmental Quality
5. Reduce Environmental Impact of Materials[7]

Green Globes provides assessment tools to determine compliance, as well as a third-party assessment process.[8]

C. Energy Star

EPA scores buildings on a 1–100 energy performance scale; to achieve Energy Star certification, a building must earn a 75 or higher on the scale. That constitutes a representation that the particular facility performs better than at least 75 percent of similar facilities at a national level, after adjustment through the application of the performance scale to account for regional and other differences.[9]

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3. ECD Energy & Env't Canada Ltd., Green Globes Design for New Buildings and Retrofits: Rating System and Program Summary 4 (Point System) (Dec. 2004), http://www.greenglobes.com/design/green_globes_design_summary.pdf [hereinafter Green Globes Rating System].
4. Hubbell testimony, *supra* note 2, at 2.
5. *Id.* at 2.
6. Exec. Order 13,514, § 2(g) (2009).
7. Green Bldg. Initiative, Overview of Guiding Principles & GBI's Compliance Assessment Program, http://www.thegbi.org/guiding-principles-compliance/.
8. *Id.*
9. Energy Star, Energy Star Certification for Your Building, http://www.energystar.gov/index.cfm?c=business.bus_bldgs.

II. IDENTIFICATION OF SCIENTIFIC AND ENERGY-SPECIFIC PROMISES

A. Green Globes

To achieve the Green Globes rating, a building must be projected to perform in the top 25 percent of buildings nationwide. Green Globes relies in large part on the U.S. Department of Energy's Commercial Buildings Energy Consumption survey as the basis for much of its energy-related data. Green Globes reviews energy based upon total consumption (energy performance) and reduced energy demand. Reduced energy demand in turn considers demand minimization (for example, through optimization of spaces), integration of energy-efficient systems (types and sizing), use of renewable energy sources (on-site), and access to energy-efficient transportation.[10]

For water, Green Globes looks for specific features that allow the structure and its occupants to conserve water. These include on-site treatment of water, such as graywater and wastewater; efficient use of cooling towers; types of irrigation strategies; and submetering.[11] Scoring for the "Emissions, effluents and other impacts" category reviews four areas: (1) air emissions, (2) ozone depletion and global warming, (3) protection of waterways and impact on municipal waste water treatment facilities, and (4) minimization of land and water pollution, including integrated pest management and storage of hazardous materials.[12]

The building must meet one of four slightly different tests to get points for energy performance. The 2004 approach required the building to be "approximately" 25 percent more efficient than the average building built to the ASHRAE 90.1-2004 standard to get any points for energy performance. Several of the evaluation factors have specific, scientifically measurable components. For example, of the possible 380 points available for Energy, 100 of them relate to energy performance. Points are awarded under this standard based upon kilowatt-hours per square foot per year (kWh/ft^2/yr) and megajoules per meter squared per year (MJ/m^2/yr). Both of these standards measure energy consumption. The minimum possible number of points is 10, if the building uses less than 36 kWh/ft^2/yr and 1,395 MJ/m^2/yr, increasing incrementally based upon reduction to award of the full 100 points for less than 10 kWh/ft^2/yr and 388 MJ/m^2/yr.[13] Similarly, 30 of the

10. Green Globes Rating System, *supra* note 3, at 3 (Organizational Structure).

11. *Id.* at 9.

12. Hubbell testimony, *supra* note 2, at 10; Green Globes Rating System, *supra* note 3, at 4 (Point System).

13. Green Globes Rating System, *supra* note 3, at 11.

85 points available for water performance are based on measured consumption rates, calculated by meters cubed of water used over square meters of space per year (m^3/m^2/year). For office buildings, the target range starts at less than 1.5 m^3/m^2/year of water consumption and goes to less than 0.5 m^3/m^2/year. For apartments, it ranges from less than 300 m^3/apartment/year (cubic meters consumed per apartment per year) to less than 50 m^3/apartment/year.[14]

Generally, Green Globes represents that its system ensures that a building's energy use is the primary area for gaining efficiency by its use of comparing the probable energy consumption to the EPA's Target Finder—that is, to real data on actual buildings, as opposed to a hypothetical building designed to ASHRAE 90,1 standards.[15]

B. Energy Star

The EPA represents that "[a]n ENERGY STAR certified facility meets strict energy performance standards set by EPA and uses less energy, is less expensive to operate, and causes fewer greenhouse gas emissions than its peers."[16]

III. CRITICISMS OF ABILITY TO MEET PROMISED PERFORMANCE

A. Broad Criticisms Relating to All Systems

1. Sufficiency of Requirements

a. International Context

One criticism directed toward U.S.-based green building rating systems is that they do not go far enough with respect to energy savings. For example, while LEED buildings have been shown to use 25–35 percent less energy than the national average,[17] the European Union has already set a requirement that all new public buildings reach net-zero-energy status by 2018, and that all other new buildings

14. *Id.* at 15.

15. Green Globes, Frequently Asked Questions, http://www.greenglobes.com/about-faq.asp#energyefficiency.

16. Energy Star, Energy Star Certification for Your Building, http://www.energystar.gov/index.cfm?c=business.bus_bldgs.

17. Cathy Turner & Mark Frankel, New Bldgs. Inst., Energy Performance of LEED for New Construction Buildings: Final Report 3 (Mar. 4, 2008), https://wiki.umn.edu/pub/PA5721_Building_Policy/WebHome/LEEDENERGYSTAR_STUDY.pdf.

reach the same target by 2020.[18] Despite the criticism, the LEED rating systems is moving in a direction toward net-zero-energy buildings. In fact, some have suggested that as early as 2018, a LEED Platinum rating may follow suit and require net-zero-energy construction.[19]

b. Energy-Limited Component of LEED

An article by Rik Master, architect and former president of the AIA Chicago chapter, in April 2007 expressed concerns about the lack of emphasis to reducing energy use under the LEED rating system. Master claimed that "reduced operations energy is one of the LEED credits least used in certified buildings," despite the fact that operating energy use accounts for 90 percent of the energy consumed over the life of the building.[20] Even the LEED claimed energy savings of 25–30 percent over conventional buildings, which has been challenged on several fronts, has been criticized as being too low. For example, the Architecture 2030 initiative to reduce greenhouse gas emissions has adopted a 50 percent target.[21]

2. Marketability of Requirements (FTC Regulations)

The Federal Trade Commission (FTC) has had regulations relating to marketing materials and environmental claims in place for some time. In 2012, it issued its revised "Green Guides," a document intended to provide insight into the FTC's current perspective on environmental claims. While the Green Guides is not regulation in and of itself, it is indicative of the FTC's position as to what might be an unfair or deceptive act in violation of section 5 of the FTC Act.[22]

Under the Green Guides, environmental marketing claims must be "truthful, not misleading, and supported by a reasonable basis."[23] The marketer must ensure that all reasonable interpretations of their statements meet this test prior to making the claims. The FTC recognizes that, in this context, a reasonable basis "often requires competent and reliable scientific evidence." This type of evidence would include "tests, analyses, research, or studies that have been conducted and evaluated in an objective manner by qualified persons and are generally accepted in the profession to yield accurate and reliable results."[24]

18. Ecofys, Towards Nearly Zero-Energy Buildings: Final Report 18 (Feb. 14, 2013), http://ec.europa.eu/energy/efficiency/buildings/doc/nzeb_full_report.pdf.

19. Justin Gerdes, *Net-Zero Energy Buildings Are Coming—What about the Buildings Already Standing?*, Forbes, Feb. 28, 2012, http://www.forbes.com/sites/justingerdes/2012/02/28/net-zero-energy-buildings-are-coming-what-about-the-buildings-already-standing/.

20. Rik Master, *To Lead or Just LEED*, Apr. 25, 2007.

21. Anya Kamenetz, *The Green Standard*, Fast Co., Dec. 19, 2007, http://www.fastcompany.com/60675/green-standard.

22. Fed. Trade Comm'n, Green Guides 1–2 (2012).

23. *Id.* at 3, § 260.2.

24. *Id.*

Significant here, certification by a third party does *not* eliminate the marketer's obligation "to ensure that it has substantiation for all claims reasonably communicated by the certification."[25]

In addition, to be certified, marketers have to meet standards developed and maintained by what the Green Guides refers to as a "voluntary consensus standard body."[26] Per the Memorandum for Heads of Executive Departments and Agencies on Federal Participation in the Development and Use of Voluntary Consensus Assessment Activities,[27] voluntary consensus bodies are "organizations which plan, develop, establish or coordinate voluntary consensus standards using agreed-upon procedures." It is defined by the attributes of "(i) openness, (ii) balance of interest, (iii) due process, (iv) an appeals process, (v) consensus, which is defined as general agreement, but not necessarily unanimity, and includes a process for attempting to resolve objections by interested parties, as long as all comments have been fairly considered, each objector is advised of the disposition of his or her objection(s) and the reasons why, and the consensus members are given an opportunity to change their votes after reviewing the comments."[28] In its Green Building Certification System Review, the U.S. Department of Energy evaluated both Green Globes and LEED (along with Living Building Challenge) and those rating systems' different review processes. One question under that analysis was whether the certification system was developed using a consensus-based approach. It found that both Green Globes and LEED were developed in that manner.[29] Even stronger, Green Building Initiative (GBI), the entity that operates Green Globes, went through the process of becoming an accredited standards developer under the American National Standards Institute (ANSI), as well as the significantly consensus-based process of establishing an official ANSI standard for green buildings, ANSI/GBI 01-2010: Green Building Assessment Protocol for Commercial Buildings.[30]

B. Broad Criticisms Relating to Data and Studies

1. Sufficiency and Availability of Data

One of the challenges with both LEED and Green Globes is the use of a point or percentage system that allows points from various

25. *Id.* at 11, § 260.6(c).

26. *Id.* at 12, § 260.6(3), ex. 2 and fn. 2.

27. The White House, Office of Mgmt. & Budget, Circular No. A-119 Revised (Feb. 10, 1998), http://www.whitehouse.gov/omb/circulars_a119.

28. *Id.*

29. U.S. Gen. Servs. Admin., Green Building Certification System Review, at xvi (Mar. 2012).

30. Green Globes, Introduction, http://www.greenglobes.com/about.asp; Green Bldg. Initiative, GBI is an ANSI-Accredited Standards Developer, http://www.thegbi.org/about-gbi/ANSI-accredited-standards-developer.shtml.

categories to be used to reach the various levels of certification. Thus, two buildings with the same certification may reach that certification in different ways. This is one area criticized by studies.

2. Interested Parties

The USGBC can obviously not be described as an uninterested and unbiased party. It has an agenda to promote green building using its own, proprietary rating system. Its objectivity is also subject to criticism based on the large revenues it receives from certification.[31] As of 2007, it was reported that the nonprofit USGBC had a staff of 116 people and a budget of nearly $50 million.[32] As the challengers to the certification of a public high school in Wisconsin noted, "[U]nfortunately, most designers and owners are not inclined to dispute or question LEED Certification after it is granted, especially if it might reflect unfavorably on them."[33]

3. Comparability

a. Structure Types

The various systems consider structure types differently. Energy Star, which forms the basis for both its own and, in part, the Green Globes rating, considers structures by category of space type; however, it does not yet have all space types and specifically identifies that one should not try to "force" a different space type into one of the space types it does have. At this time, Energy Star recognizes the following as eligible for EPA energy performance ratings:[34]

- bank/financial institutions
- courthouses
- data centers
- hospitals (general medical and surgical)
- hotels/motels
- houses of worship
- K–12 schools
- medical offices
- offices
- residence halls/dormitories
- retail stores

31. Kamenetz, *supra* note 21.

32. *Id.*

33. Complaint at ¶ 40, Gifford v. U.S. Green Bldg. Council, Case No. 10 Civ. 7747 (S.D.N.Y. 2011).

34. The EPA does track other building-type-related information in its 2003 CBECS National Median Source Energy Use and Performance Comparisons (CBECS); however, per EPA, "[t]he CBECS results are not normalized for climate, building size, occupancy, or other characteristics that may affect energy use." *See* Energy Star, http://www.energystar.gov/index.cfm?c=cbd_guidebook_apply_2.

- senior care
- supermarkets/grocery stores
- warehouses (refrigerated and unrefrigerated)[35]

b. Impact of Specific Users

Green Globes addresses the impact of specific users through its Green Globes-CIEB (Continual Improvement of Existing Buildings), which requires recertification every three years to demonstrate that the building is being managed in a way that allows it to continue to perform as projected based on the initial assessment.[36]

4. Attempts to Respond to Concerns Relating to Reliability of Data

a. Reporting Obligations and Building Performance Initiative

In 2009, USGBC revised the LEED rating system to add a requirement for building owners to report ongoing energy performance data from their buildings. In conjunction with this change to measure green building performance, the USGBC also launched a project in 2009 called the Building Performance Initiative (BPI).[37] All owners of LEED buildings were asked to participate in the initiative, and were told that they would "receive information about how your project is performing, and where there might be gaps or room for improvement."[38]

b. Geographical Adjustments

Another concern of earlier iterations of the LEED rating system was how to appropriately award and allocate credit points to construction projects scattered over diverse climates. For example, conserving water is more important in a desert locale than in a lush, tropical environment. In order to acknowledge and better address these concerns, LEED introduced Regional Priority Credits (RPCs) in 2009 "to incentivize the achievement of credits that address geographically specific environmental priorities."[39] The RPCs are determined by the project's zip code and provide the opportunity to earn bonus points toward certification.

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35. *Id.*

36. Hubbell testimony, *supra* note 2, at 8.

37. U.S. Green Bldg. Council, Press Release, USGBC Tackles Building Performance Head On (Aug. 25, 2009), http://www.usgbc.org/Docs/News/BPI082509.pdf.

38. U.S. Green Bldg. Council, LEED News, Project Owners: Participate in Building Performance Initiative (Apr. 2010), http://www.usgbc.org/Docs/Archive/General/Docs7192.html.

39. U.S. Green Bldg. Council, Regional Priority Credits Frequently Asked Questions, http://www.usgbc.org/Docs/Archive/General/Docs5732.pdf.

C. Studies Comparing Actual versus Anticipated Performance

One of the most heated areas of controversy within the green building industry is how well the rating systems predict or indicate actual performance versus the design expectations. As of 2009, the USGBC's own data indicated that a quarter of new buildings that have been certified did not save as much energy as their designs predicted.[40] In the USGBC's study of 121 new buildings certified through 2006, it found that more than half (53 percent) did not qualify for the Energy Star label and that 15 percent of the new buildings used more energy per square foot than at least 70 percent of comparable buildings in the existing national stock.[41] There are myriad reasons for the discrepancies between design expectations and actual performance, and the reasons vary between rating systems and occupants.

1. New Solutions Study—Rise and Fall of Green Buildings (Three Parts)

One of the most common points of criticism directed toward the LEED rating system has been to single out the ability to earn points by installing a bike rack. The Rise & Fall Study notes that under the then-prevailing version of LEED, a bike rack can get a building the same amount of LEED points as buying 5 percent of its energy from renewable sources.[42]

2. NBI Study

In 2008, the New Buildings Institute (NBI) published a study on the energy performance of LEED for New Construction buildings.[43] The report, which was funded by USGBC and the EPA, measured energy performance in over 120 LEED New Construction buildings and compared the actual energy usage to the expected design energy usage. Among other things, the report found that the average Energy Star rating of LEED buildings was 68, as compared to the median rating of 50 for all buildings in the country. Of note, 25 percent of the LEED buildings were below the median rating of 50, which means they used more energy than most of the buildings in the country. Also, while overall average energy savings were generally met in the study, "several" buildings used more energy than the predicted baseline modeling.

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40. Mireya Navarro, *Some Buildings Not Living Up to Green Label*, N.Y. Times, Aug. 31, 2009.
41. *Id.*
42. *LEEDing from Behind: The Rise and Fall of Green Buildings*, New Solutions, May–June 2009, at 7, http://www.communitysolution.org/pdfs/NS18.pdf.
43. Turner & Frankel, *supra* note 17.

.Ecofys, *supra* note 18, at 18.

3. Green Building Market and Impact Report

Green Biz publishes an annual report on the green building market and impact. The annual report, which is published by the self-described "Founding Father of LEED," has long championed the energy savings from LEED buildings. The 2009 Impact Report recognized the NBI study's finding that 20 percent of LEED-certified buildings received "poor to abysmal" Energy Star scores.[44] Part of the explanation behind this poor showing is that many of the buildings were certified under older, less stringent versions of LEED, according to the report.[45] The report argues that later versions of LEED have corrected many of the energy efficiency problems of early versions.[46] This raises an important point about any studies addressing the effectiveness of a building rating system: be conscious of comparing apples to apples and make sure you have an understanding of which version of the rating system is being evaluated since updates and changes are frequent.

According to the 2009 Impact Report, the early versions of LEED were flawed for relying on ASHRAE 90.1-1999 standard for its calculation of energy efficiency, stating that the ASHRAE standard "was never intended to be applied in the way LEED applied it."[47] Another problem was that the ASHRAE standard did not address computer equipment and office electronics, which have grown exponentially in energy consumption since the formation of the standard. These problems have since been addressed by newer versions of the LEED rating system, but any existing building that was certified under the old version would still have less favorable data if included in a study.

The 2011 Impact Report estimates that projected energy savings by the year 2030 are almost 25 percent higher than 2010's forecast, and that this increase is mainly due to higher energy savings per building.[48] The report also calculated an average energy savings for LEED 2009 new construction projects at over 32 percent.[49] Despite these findings, even the 2011 Impact Report, which generally takes a very favorable view toward the LEED rating system, has criticism for energy savings, or lack thereof:

> Not only does LEED need to save more energy, it needs to do it more broadly: This year's increase in project energy efficiency does not sufficiently move the needle regarding total energy consumption.[50]

44. Rob Watson, Green Biz, Green Building Market & Impact Report 2009, at 19 (2009).
45. *Id.*
46. *Id.*
47. *Id.* at 20.
48. Rob Watson, Green Biz, Green Building Market & Impact Report 2011, at 30 (2011).
49. *Id.*
50. *Id.* at 31.

The Impact Report helpfully includes an appendix that details its methodologies, which is important in order to assess and evaluate its particular points.[51] For example, the appendix explains how the number of future LEED buildings was projected, a calculation that first started with determining current penetration (based on construction and registration data) and then utilizing a Pearl-Reed curve (a type of S curve) to project that into the future.[52] The appendix also provides helpful information as to the source for some of the data, such as the use of the U.S. Geological Survey for water consumption data.[53]

4. National Institute of Building Sciences Report

At least one national report has identified unmet expectations as a risk to the green building industry.[54] The task force that drafted the National Institute of Building Sciences (NIB) report met and interviewed representatives from over 15 different construction industry groups about the various green building rating systems. The NIB Report concluded that "after a building is completed, the unmet expectations of policy makers, building owners and the public, when presented with the actual results of the application of building rating/certification systems, is of serious concern and causing rising apprehension in the building community."[55] In addition to unmet expectations, the report also identified "misguided expectations" and "significant misperceptions."[56] It also recognized that design and contractor liability risk may rise "if performance expectations are not realized in completed projects," and that the vast majority of insurance claims involved miscommunication and misunderstood expectations between owners and design and construction professionals.[57]

Another problem identified by the report was the lack of data available to link "verifiable improvements in building performance" to the requirements of the particular building rating system.[58] Of the few available data sets with such information on building performance, the task force reported that "many people" found the methodologies of these data sets, and the conclusions drawn from them, to be "controversial." Unfortunately, no details with respect to this criticism were provided, although at least one critique appears to be grounded in the lack of an agreed-upon standard or format for data collection

51. *Id.* at 31–34.
52. *Id.* at 31.
53. *Id.* at 32.
54. National Institute of Building Sciences Task Group on Building Rating and Certification, Report of Building Rating and Certification in the U.S. Building Community (Sept. 2009).
55. *Id.* at 7.
56. *Id.*
57. *Id.* at 8.
58. *Id.* at 6.

or a common set of metrics or consistent methodologies to determine building performance levels.[59]

In order to address some of these expectation problems, the NIB Report recommended verification of building performance data prior to allowing a building to obtain certification.[60] The NIB Report also recommends that green rating organizations require submittal of actual validated building performance data demonstrating conformance with the rating system requirements.[61]

5. Case Study: Youngstown, Ohio, Federal Building

The federal building in Youngstown, Ohio, is an example of how a LEED-certified building may not meet the energy-saving expectations of the owner. An environmental assessment conducted by the General Services Administration determined that the building did not score high enough to qualify for the Energy Star label granted by the EPA. The reported reason for this poor showing on energy has to do with the very structure of the LEED rating point system. Instead of focusing on what may be most important to an owner, such as lower operating costs, the point system allows a design team to cobble together the minimum number of points through a wide variety of design features that may or may not directly address the owner's reason for wanting a green building. In the case of the Youngstown federal building, the reported culprit for the poor energy showing had to do with the design: "to get its LEED label, it racked up points for things like native landscaping rather than structural energy-saving features."[62]

6. Unmet Expectations in Massachusetts Study

There are surprisingly few academic studies comparing actual energy consumption with designed and expected energy consumption. One study in Massachusetts found that the green buildings were consuming an average of 42 percent more than they were designed to consume.[63] The study assessed energy use in 19 green buildings that had adopted various energy conservation measures and on-site renewable energy generation.[64] The predicted energy usage was primarily obtained from grant applications that had been submitted prior to construction.[65] The largest variation was found in a middle school that had actual energy

59. *Id.* at 6, 8.
60. *Id.* at 9.
61. *Id.*
62. Navarro, *supra* note 40.
63. Jorge Luis Barrientos Sacari et al., Green Buildings in Massachusetts: Comparison between Actual and Predicted Energy Performance 1 (Univ. of Mass. Lowell, 2007).
64. *Id.*
65. *Id.*

consumption 86 percent higher than predicted.[66] The study identified the following reasons for the large differences between predicted and actual energy usage:

- Inability to predict human behavior with respect to the use of plug loads, levels of occupancy, and the building's operation hours.
- Design changes made during construction due to budget limitations and/or changes in the types of materials used.
- The use of incremental energy savings in the energy models that did not capture the characteristics of the building in its entirety.
- Delays in completely and correctly commissioning the heating, ventilation, and air conditioning systems, which led to early high rates of energy consumption.

The study concluded that education and training of the building's end users is one of the keys to successfully realizing the full benefits of a green building's energy-saving features. Despite the variances between the expected and actual energy benefits, the study did point out that the green buildings in the study still consumed much less energy than comparable buildings designed to code in that region.

7. Kibert Critique of Other Green Studies

Charles Kibert, a professor at the University of Florida, is one of the most prominent scholars to have turned a critical eye on some of the studies and reports that address the green building industry in often glowing terms without any peer review.[67] Kibert warns about the "growing and dangerous trend of green building advocates making increasingly outlandish and unsupportable claims about green buildings" and "the uncritical acceptance of reports touting the benefits of going 'green' in the design and construction of buildings."[68] In particular, Kibert provides a detailed critical analysis of an October 2006 report by Capital E, "Greening America's Schools: Costs and Benefits." As an example of the flawed analysis, Kibert points out that one of the sources used to support the claim that green schools benefit students was based on a report that only studied "better school facilities," which may or may not include green school facilities.[69]

66. *Id.*
67. *See* Charles Kibert, *Uncertified Green Building Claims*, KIBERT BLOGSPOT (Apr. 22, 2007), http://kibert.blogspot.com/2007/04/uncertified-green-building-claims.html.
68. *Id.*
69. *Id.*

Other flaws included comparing new green schools against the entire stock of existing school buildings, many of which would have been built much earlier and thus were not very suitable as comparators. Kibert ultimately found that few of the claims withstood scrutiny. In closing, he summarized the problem as follows:

> The U.S. green building movement is plagued by hyperbolic claims that must be challenged if the movement is to have any integrity. There is a critical lack of methodologies and protocols, not to mention a severe shortage of pertinent research about high performance buildings. The Capital-E report critiqued here is just one of a number of similar reports that are badly flawed and which the USGBC, instead of embracing, should repudiate. Otherwise similar pseudo-scientific reports will become the norm. This approach to research and the repeating of green building benefits that cannot be substantiated will ultimately result in serious negative impacts on the green building movement. Reports that make unsupportable claims about the benefits of green building simply reinforce the countervailing forces that argue green building is too expensive.[70]

The flaws examined by Kibert serve as a reminder to closely scrutinize all studies relating to green building, especially when they are conducted and drafted by self-proclaimed proponents of sustainability.

8. Criticism of the High Cost of Optimization

Green building rating systems have also been criticized for what has been called the "high cost of optimization." In other words, "the practice of imposing increasingly detailed and strict regulations in an effort to take development from merely good to nearly perfect."[71] The architect Andres Duany has called for a "LEED Brown" rating that would give credit for traditional but low-cost measures that are not easy to measure or quantify.[72] Duany criticized the high cost of LEED certification and predicted that the system would crash under its own weight if changes were not made to bring a measure of common sense to the rating system.[73]

70. *Id.*

71. Andre Shashaty, *Duany Predicts Decline of Strict Green Building Standards*, SUSTAINABLE CMTYS. (undated), http://www.p4sc.org/articles/all/duany-predicts-decline-strict-green-building-standards.

72. *Id.*

73. *See id.*

9. Energy Performance of LEED for New Construction Buildings, Final Report

This 2008 study by the New Buildings Institute (NBI) analyzes how the measured energy performance of 121 LEED New Construction certified buildings compared to energy efficiency objectives.[74] The study utilized one full year of measured postoccupancy energy usage data for a whole building. This data was analyzed in light of three metrics: (1) energy use intensity comparison of LEED and national building stock; (2) Energy Star ratings of LEED buildings; and (3) measured results compared initial design and baseline modeling.

The median measured energy usage intensity of all 121 LEED buildings was 24 percent below the national average for all commercial building stock. Gold and platinum LEED buildings had median performances were very close to the interim goals of Architecture 2030.

LEED buildings had an average Energy Star rating of 68, which means the buildings use energy better than 68 percent of similar buildings. The complete national building stock had a median rating of 50. Almost half of the LEED buildings had Energy Star ratings of 75 or more and thus qualified as an EPA-certified Energy Star building. However, one-quarter of LEED buildings had ratings below 50, which means they used more energy than average for comparable existing building stock.

Measured energy savings for the 121 LEED buildings studied was 28 percent compared to code baselines, which were created based on energy cost budget approach and performance requirements in the ASHRAE 90.1 standard. This 28 percent measured energy savings closely matches the average 25 percent savings predicted by the energy modeling in LEED submissions. There were some buildings that used more energy than predicted by the code baseline modeling, which may be attributable to operational practices, schedules, construction changes and other issues not foreseen in the energy-modeling process.

In light of the three metrics, the NBI concluded that the average LEED building has a 25–30 percent better energy performance than the national average, which is consistent with LEED energy modeling. However, modeling could be improved; over half of the LEED buildings' energy usage intensity differed from design projections by over 25 percent. The NBI also found that neither LEED nor the modeling protocol accurately predicts the energy performance of projects with high process loads, such as laboratory buildings. Finally, improved energy modeling and benchmarking could result from the design community exploring measured-to-design deviations.

74. Turner & Frankel, *supra* note 17.

10. Reexamination of the NBI Study

The NBI study was critiqued in "A Re-examination of the NBI LEED Building Energy Consumption Study," a 2009 report by John H. Scofield, professor of physics at Oberlin College and a member of the American Physical Society.[75] The primary purpose of this report was to identify purported "critical flaws" in the NBI study. One significant point made was that according to an American Physical Society study, the LEED buildings relied upon in the NBI study used more energy per square foot than the average commercial building.

The two primary flaws identified by Scofield are (1) the comparison of the median site energy intensity for LEED buildings to the mean site energy intensity for commercial buildings generally and (2) the comparison of gross square footage (gsf)-weighted site energy intensity for commercial buildings to non-gsf-weighted site energy intensity for the LEED buildings. Site energy intensity is the amount of energy (electricity and natural gas) consumed per square foot of gross building area. Scofield's criticism of the underlying report is that it used weighted data based upon gsf and compared that data to unweighted data.

Scofield presents a case for the use of source energy intensity (which considers both on-site use and off-site loss) instead of site energy, which is relied upon by LEED. He notes that the EPA uses source energy as its metric. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses. By taking *all* energy use into account, the score provides a complete assessment of energy efficiency in a building. Scofield then eliminates what he calls "high energy" and "low energy" principal building activities to identify a data set he refers to as medium energy. He ultimately finds that while LEED medium-energy buildings use an average of 10 percent less site energy than general commercial buildings, they do not use less source energy. Similarly, he concludes that LEED office buildings decrease site energy by 17 percent but do not reduce primary energy usage. His ultimate conclusion is that LEED certification does not lead to greenhouse gas reduction as the LEED certification only reduces site, and not primary or source, energy.

11. Scofield Testimony on the Science Behind Green Building Rating Systems

In written testimony to the House Committee on Science, Space, and Technology, Subcommittee on Investigations and Oversight, Scofield's overarching conclusion was that there "appears to be no scientific

75. John H. Scofield, A Re-examination of the NBI LEED Building Energy Consumption Study, presentation at the 2009 Energy Program Evaluation Conference, Portland, Oregon.

basis for institutions such as colleges, universities, or the Federal Government to require LEED certification as a GHG [greenhouse gas] or energy reduction strategy for its buildings."[76] Scofield also used the opportunity to encourage the government to perform more detailed and scientific analysis to move toward the goal of lowering energy consumption for new and existing buildings. He recommended combining the scientific basis of the Energy Star rating process, which he finds to have some validity, with the appeal of LEED.

12. 2011 Residential Codes Energy Use Savings Report

In a 2011 report on residential energy codes, Ecotope and the Northwest Energy Efficiency Alliance (NEEA) documented the savings potential for energy code improvements and beyond code efficiency programs in the Pacific Northwest.[77] NEEA works to help states craft energy codes in the residential sector that are both more effective and more efficient. Ecotope looked at a handful of northwestern states, specifically Oregon, Washington, Idaho, and Montana, to quantify NEEA's impact on energy savings. It calculated energy use for new residences built to current state energy codes compared to previous energy codes; estimated incremental new construction costs of new state energy codes compared to previous energy codes; compared current energy code energy use to that used in the 6th Northwest Power Plan baseline house; calculated a savings rate for houses built in Oregon under the Energy Star Homes program in 2011; and calculated energy savings for gas-heated houses built to various beyond code energy-efficient programs in 2011.[78]

The study used simulations and engineering models calibrated to measurements at various points to estimate energy use and savings; Ecotope did not conduct field work or take real-world measurements. In addition, the study did not take into account code compliance rates, suggesting that the energy savings reported likely represent a maximum or upper bound of savings.[79] Ecotope concluded that Oregon residences experienced an overall savings of 141 kWh/yr following code revisions in 2011; Washington experienced a savings of 731 kWh/yr; Idaho experienced a savings of 818 kWh/yr; and Montana experienced a savings of 885 kWh/yr following code revisions.[80] Ecotope also looked at each state's incremental cost per unit built,

76. *Hearing before the H. Comm. on Science, Space, and Technology, Subcomm. on Investigations and Oversight*, 112th Cong. 2 (May 8, 2012) (testimony of Dr. John H. Scofield).

77. Ecotope, Inc., & Nw. Energy Efficiency Alliance, Report No. E12-242, 2011 Residential Codes Energy Use Savings (2012), http://neea.org/docs/reports/2011-residential-codes-energy-use-savings.pdf?sfvrsn=18.

78. *Id.* at 4.

79. *Id.* at 19.

80. *Id.* at 5.

in 2006 dollars, to comply with revised energy codes. States' incremental cost ranged from $614 per unit (Idaho) to $2,299 per unit built (Montana.)[81]

D. Real-World Challenges to Unmet Expectations

Expectations are an important piece of the green building puzzle because when they are unmet, the circumstances are ripe for creating disputes. Although this concept is not unique to green building, the particular expectations and reasons behind them are specific to the green building industry. Becoming aware of the shortcomings, perceived or real, of the green building industry will help those involved better avoid costly disputes by addressing the potential problem areas at the forefront of a project.

1. Northland Pines High School LEED Certification Challenge

As long as a building obtains the desired certification, there is almost no incentive for any involved party to create a dispute or challenge the certification. The owner gets its plaque and the designer and contractor get to market their success in obtaining green building certification and move on to the next job. The USGBC gets another participant, and collects another fee. Construction of a public building may be one of the few instances where an involved party (e.g., the public end-user who is ultimately paying for the construction through taxes or fees) may have incentive to challenge the certification that a building has already received.

This is exactly what happened to a high school in Wisconsin when five individuals challenged their own high school's LEED Gold certification with the USGBC in 2009.[82] The challengers alleged that the building should not have been awarded the Gold certification because it did not meet the prerequisites for Indoor Air Quality and Energy Efficiency.[83] Essentially, they believed the USGBC had not ensured that the building met the LEED requirements and that the building was not green enough to be recognized as such. The challengers hired their own engineer to provide a critique of the design and the as-built conditions.[84] The engineer concluded that the building did not meet LEED prerequisites EA2 and EQ1, and identified a total of 2,333 alleged violations of ANSI/ASHRAE/IESNA Standard 90.1-1999 and ANSI/

81. *Id.*

82. Meeting Minutes, Northland Pines Bd. of Educ., Nov. 30, 2009.

83. *Id.*

84. Lawrence G. Spielvogel, Inc., Appeal of the Gold Certification for Northland Pines High School (Dec. 23, 2008) (on file with author).

ASHRAE Standard 62.1-1999.[85] Armed with this report, the challengers filed a 126-page document with the USGBC requesting that the high school's LEED Gold certification be revoked.[86]

In response to the challenge, the USGBC began a review of the high school's original certification and its performance data. USGBC hired two independent consultants to review the alleged concerns and conducted a site visit to the high school.[87] After the investigation was complete, the USGBC affirmed the high school's certification and rejected the challenge.[88] The USGBC released the findings of its technical experts, and issued the following statement:

> USGBC stands by its conclusion that the Northland Pines High School project and project team complied with all the requirements necessary to achieve LEED Gold certification. In response to a complaint, USGBC followed its certification challenge policy, which requires a thorough and technically rigorous review of the project. Given the vociferous and confrontational nature of the complaint, we further asked for two additional and separate technical reports detailing the expert professional opinions of highly regarded independent consultants. Their findings agreed with ours.[89]

Once the USGBC reached its decision, there were no other alternatives left for the challengers in the formal appeals process. Taking the challenge to court would have been an interesting option, but no lawsuit was ever filed (perhaps due to the high costs of litigation). Instead, the challengers opted to press their case in the media and even released a detailed response to the USGBC's finding.[90] Although Northland Pines High School retained its certification, the challengers did bring much attention to several important issues.

The Northland Pines challenge exposed the inexperience of the USGBC in handling appeals and raised questions on both sides of the argument. Describing the complaint as "vociferous and confrontational" exhibits a misunderstanding of an adversary appellate process and borders on institutional arrogance. What formal complaint is not confrontational? The third-party challengers raised legitimate questions about who has, and who should have, standing to challenge

85. *Id.* at 3.

86. *Id.*

87. Meeting Minutes, Northland Pines Bd. of Educ., Nov. 30, 2009.

88. Northland Pines School Dist., Press Release, Northland Pines Retains Status as First LEED Gold Public High School in U.S.

89. Chris Cheatham, *Breaking: USGBC Stands by Its LEED Challenge Decision*, Green Bldg. L. Update (June 10, 2010), http://www.greenbuildinglawupdate.com/2010/06/articles/legal-developments/breaking-usgbc-stands-by-its-leed-challenge-decision/.

90. Appellant's Statement (June 5, 2010) (on file with author).

LEED certifications. Since the time of the challenge, the USGBC has also modified and expanded its appeal procedure.

2. *Gifford v. U.S. Green Building Council*

There have been relatively few legal challenges to the USGBC rating system as a whole. The most prominent attack was launched by noted LEED critic Henry Gifford in 2011.[91] Gifford, who as far back as 2009 argued that a LEED "plaque should be installed with removable screws,"[92] claimed that USGBC advertising contained false statements, misleading consumers in violation of the Lanham Act and also in violation of state false advertising and deceptive trade practices law. Specifically, Gifford alleged that a USGBC press release, which stated that the results of a 2008 study showed new LEED-certified buildings perform, on average, 25–30 percent better than non-LEED-certified buildings in terms of energy use, was false. Gifford argued that the statement misled consumers and unfairly diverted customers to LEED-accredited professionals and away from his business. The court dismissed Gifford's claims on standing grounds. The court held that Gifford was not in competition with USGBC because the two offer different services—Gifford advises real estate developers and other clients about how to design and construct energy-efficient buildings, whereas USGBC is a not-for-profit organization that reviews and rates building designs created by others. With respect to the state law deceptive trade practices claims, the court held that because the federal claims upon which jurisdiction was predicated were dismissed, plaintiffs' state law claims were properly dismissed as well, albeit without prejudice.

In conclusion, green building promises much for the future, but those promises should be scrutinized with care in order to protect against overly optimistic projections of resulting benefits. Just as in any other field, it is important to identify credible sources of information and opinion. As more and more green building rating systems require the sharing of data and information about green building performance, it is likely that more and more credible and thoughtful studies will be generated to assist the construction community make informed decisions about the costs and benefits of green construction.

91. Gifford v. U.S. Green Bldg. Council, Case No. 10 Civ. 7747 (S.D.N.Y. 2011).
92. Navarro, *supra* note 40.