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The LEED-NC "Green Building" Rating System  
and Energy Efficiency in U.S. Commercial Buildings

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**Don't Worry About the Government?  
The LEED-NC "Green Building" Rating System  
and Energy Efficiency in U.S. Commercial Buildings**

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"My building has every convenience  
It's gonna make life easy for me"  
- *Don't Worry About the Government*  
(From the album Talking Heads '77)

*I. Introduction: The First "E" in LEED*

Since its inception in 1998, the Leadership in Energy and Environmental Design (LEED) family of rating systems for buildings and its parent organization, the United States Green Building Council (USGBC), have grown at an extraordinary rate. The system is not merely preeminent among environmentally-inclined property developers and owners, having "no major competitor"<sup>2</sup> in this niche; its advocates claim that it has become a "de facto standard" for new class A office space in the U.S.<sup>3</sup> "The business case [for LEED] is so strong," according to the president of the National Association of Industrial and Office Properties (NAIOP), that "you would be foolish to ignore it."<sup>4</sup>

LEED certification is taken by many casual observers to be synonymous with energy efficiency. Such an association is hardly surprising, given that the first "E" in the acronym stands for "energy." The USGBC itself touts LEED's potential impact on the "energy hogs" that comprise America's building stock.<sup>5</sup> There is, however, no necessary relationship between LEED

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<sup>1</sup> Thanks to the experts interviewed for this paper (see appendix) for their time and insights. They are not responsible for, nor should it be assumed that they endorse, the inferences or conclusions in it; I am solely responsible. Thanks also to Rachel Wellhausen, Rohit Sakhuja, Richard Lester, and the IPC project team for their support and assistance. The author is grateful to the Doris Duke Charitable Foundation for its sponsorship of the Energy Innovation Project of which this research is a part.

<sup>2</sup> Andrew C. Burr, "Coming Soon: A Bigger, Bolder U.S. Green Building Council," CoStar Group News, September 25, 2008, available at <<http://www.costar.com/News/Article.aspx?id=F64F90DA76BA6E14F3FBC11C9C2BD06A>> accessed November 7, 2008.

<sup>3</sup> Hydes interview.

<sup>4</sup> Bisacquino interview

<sup>5</sup> Michelle Moore (senior vice-president, USGBC), "To drill or not to drill is not the question," *Christian Science Monitor*, October 6, 2008, accessed at <<http://www.csmonitor.com/2008/1006/p09s01-coop.html>> on October 17, 2008.

certification and building energy efficiency. A recent study by the New Buildings Institute<sup>6</sup> found that comparable buildings that had received the same LEED rating used vastly different amounts of energy. Some LEED-certified buildings used more energy than permitted by code, which is supposed to define “the worst possible building you’re allowed to build.”<sup>7</sup>

Variation in energy efficiency is in fact intrinsic to the LEED system, part and parcel of its success. LEED’s designers sought to create a system in which “green building” could mean different things to different people in different places. Building on a “brownfield” site in an older industrial region or conserving water in a desert environment, for instance, may take precedence over saving energy in these locations. LEED’s flexibility permits builders to define and fulfill their responsibilities in many ways, reflecting the diversity of environmental demands put upon them across the country and the specific opportunities available in any given project.

LEED is a much bigger program than it would have been if it had used a rigid checklist instead of a menu of alternatives. Awareness of “green building” is much broader, too, penetrating the mainstream of the industry and even public consciousness to an unprecedented degree. But these achievements, impressive as they are, hardly mean that the U.S. building industry is destined for a high-efficiency future, as is required to stave off climate change.

For LEED to have a significant impact on carbon emissions, its energy efficiency components will need to be ratcheted up further, even as the rating system continues its exceptional growth. Under this “ratchet” scenario, USGBC would use the leverage that it has gained with the LEED “brand” to make well-established but under-utilized energy efficiency techniques into standard building practices and to diffuse innovations as they arise. In fact, the organization has already moved in this direction, and it promises to keep doing so. Yet, as LEED has become more prominent and popular, the process of upgrading and implementing it has become more contested. Internal conflict and external pressure could weaken USGBC’s commitment to energy efficiency in the future.

The other major contingency in the “ratchet” scenario would arise if LEED’s growth stalls. In that circumstance, USGBC’s leverage on building energy efficiency would be reduced, no matter how stringent LEED’s energy efficiency components became. The ratcheting process could itself be the cause of slower growth if the market perceived LEED’s demands to be excessive. USGBC is well aware of the challenge (as Brendan Owens, LEED’s technical director puts it) of “strik[ing] the optimal balance between market uptake and technical advancement.”<sup>8</sup>

Of course, USGBC is not operating in a vacuum. Its past success depended on collaborators and allies, and its future impact on energy efficiency will also depend on what other actors do. Chief among these other actors are governments at all three levels – federal, state, and local. LEED is widely perceived to be (as Thomas Friedman puts it) a “perfect example of an

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<sup>6</sup> Cathy Turner and Mark Frankel, “Energy Performance of LEED-NC Buildings,” New Buildings Institute, March 4, 2008.

<sup>7</sup> Hammack interview.

<sup>8</sup> Brendan Owens, “LEED Evolution, Not Revolution,” *HPAC Engineering*, October 1, 2008, <[http://hpac.com/columns/engineering-green/leed\\_evolution\\_not/](http://hpac.com/columns/engineering-green/leed_evolution_not/)> ,accessed November 7, 2008.

energy/environment standard that did not come from government down, but from society up.”<sup>9</sup> Yet government agencies, in their roles as buyers and owners of buildings, as land use and taxing authorities, and as regulators of construction, undoubtedly helped to catalyze LEED’s explosive growth in the past decade.

Government action may well have a decisive influence in the coming decade, too. If LEED is to fulfill its potential to steadily push the leading edge of “green building” practice, public policy-makers will need not only to continue to support that effort, but to act assertively to pull along the trailing edge of “brown building” practice as well. “Market transformation,” the avowed goal of USGBC, will only occur if stronger building energy codes are enacted and enforced across the country. The voluntary model that LEED represents has accomplished a good deal, but it is inevitably bumping up against its limits in the current policy environment.

This paper describes the history, development, and current operation of USGBC and LEED, particularly with regard to energy efficiency in commercial buildings, the subsector in which LEED has had its greatest impact. The narrative situates “green building” in a political as well as a business context. While USGBC may well have been “the right idea at the right time,”<sup>10</sup> its leaders skillfully seized both political and business opportunities. The paper returns in the later sections to the role of LEED in future efforts to improve building energy efficiency, which may be perceived with greater clarity once its past and present are better understood.

## *II. Building in America: Fragmented Industry, Fragmented Governance*

The most salient facts about the U.S. building industry are great size and extreme fragmentation. It has no Big 3 like the auto industry nor even a Big 8 like the old accounting industry. Instead, some 10,000 firms collectively employ about 4 million people.<sup>11</sup> This fragmentation of the industry is paralleled by fragmentation in its governance structure. No single authority, public or private, prescribes what a building should look like or do. Instead, a complex network of associations and agencies shape norms and standards for the country’s largest economic sector. These arrangements comport well with the liberal and federal political traditions of the U.S. and perhaps with the diversity of its building needs as well, but they have helped to thwart improvement in building energy performance.

Industrial fragmentation in the building industry is both horizontal and vertical. Only about a dozen or so construction firms in the U.S. have more than 1000 employees, and less than 900 have more than 250 employees.<sup>12</sup> Individual projects typically require a welter of specialized subcontractors, whose work is integrated by a general contractor. Although the cry to make construction, especially home-building, more like the auto industry – that is, standardized and mass-produced – dates back to the days of Henry Ford,<sup>13</sup> progress toward this end has been halting at best. “Buildings,” one leading researcher put it, “are the largest handmade objects in

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<sup>9</sup> Thomas L. Friedman, *Hot, Flat, and Crowded* (New York: Farrar, Straus, Giroux, 2008), 284.

<sup>10</sup> Gottfried interview.

<sup>11</sup> Barry B. LePatner, *Broken Buildings, Busted Budgets* (Chicago: University of Chicago Press, 2007).

<sup>12</sup> *Ibid.* (LePatner).

<sup>13</sup> David M. Hart, *Forged Consensus* (Princeton: Princeton University Press, 1998).

the economy.”<sup>14</sup> Innovations in real estate finance have consolidated ownership and management of commercial buildings to some extent in recent years,<sup>15</sup> but whether this consolidation is sustainable and whether it will carry over to design and construction is unclear.

Industry associations, trade unions, and professional organizations are products of industrial fragmentation and contributors to it. Key functions of such entities include the maintenance of standards of practice, the socialization of new members, and the perpetuation of collective identity. These functions are often pursued with such vigor that the distinctions among trades, professions, and market sectors are simply taken for granted by industry participants. At the same time, as the history of “green building” shows, industry-wide organizations can facilitate communication and deliberation that might otherwise be inhibited by firm boundaries.

The role of the federal government in the building industry is constrained, broadly speaking, by traditional state and local prerogatives. To be sure, a wide variety of federal policies, such as tax laws, securities regulations, and environmental statutes, impinge upon private decision-making about buildings. But more direct interventions often face resistance from state and local governments as well as from industry, as illustrated by federal efforts to raise energy efficiency in buildings. Upon establishing the Department of Energy (DOE) in 1977, Congress asked it to develop standards for buildings “designed to achieve the maximum practicable improvements in energy efficiency.” But when DOE tried to do so two years later, the proposals provoked such a fierce barrage of comments that Congress retracted the requirement, endorsing only voluntary performance standards.<sup>16</sup>

Mandatory state and local building codes have their roots in the Progressive era when unsafe structures in America’s burgeoning cities led to fires, collapses, and other tragedies.<sup>17</sup> The energy crises of the 1970s prompted several states, led by California in 1978, to go beyond health and safety regulation by promulgating building energy codes. This policy diffused slowly and unevenly; in 2008, nine states had no such code. (See Figure 1.) In some cases, local governments adopted energy codes in the absence of state action, while in others, local energy codes go beyond what the state mandates.<sup>18</sup> Most energy codes focus on the installation of specific components and technologies, rather than the building system as a whole and its performance. Perhaps more important, enforcement (which is sometimes done for states by local authorities) is inconsistent. Many buildings simply fail to meet code.<sup>19</sup>

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<sup>14</sup>Marilyn Brown, Deputy Director Energy Efficiency and Renewable Energy Program, Oak Ridge National Laboratory. “Energy-efficient buildings: does the marketplace work?” (1997).

<sup>15</sup>Peter Turnbull and John Reed, “The Commercial Building Market Structure: An Act with Five Players,” paper presented at the 2008 ACEEE Summer Study on Energy Efficiency in Buildings, San Diego, August 17-19, 2008.

<sup>16</sup>D. L. Shankle, J. A. Merrick, and T. L. Gilbride, “A History of the Building Energy Standards Program,” PNL-9386, Pacific Northwest Laboratory, February 1994, p. 1-3. DOE Assistant Secretary Andrew Karsner labeled building codes “the third rail of energy efficiency” in his keynote address to the ACEEE 2008 Summer Study on Energy Efficiency, San Diego, August 17-19, 2008.

<sup>17</sup>David Listokin and David B. Hattis, “Building Codes and Housing,” *Cityscape* 8:24-72 (2005).

<sup>18</sup>Aleisha Khan, “Closing the Gap on Building Energy Codes to Achieve Carbon Reductions,” paper presented at ACEEE 2008 Summer Study on Energy Efficiency, San Diego, August 17-19, 2008. Bartlett, Halverson, and Shankle. “Understanding Building Energy Codes and Standards,” (Pacific Northwest National Labs, 2003), report no. 14235, state that some “home rule” states may be forbidden from adopting such a code.

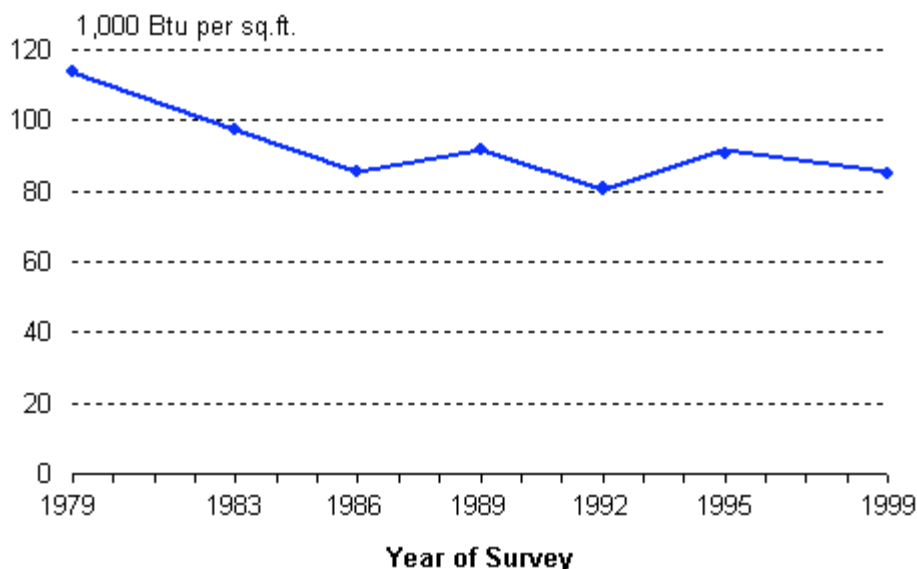
<sup>19</sup>Eric Richman, et al., “National Commercial Construction Characteristics and Compliance with Building Energy Codes: 1999-2007,” paper presented at ACEEE 2008 Summer Study on Energy Efficiency, San Diego, August 17-



design) were pioneered here in the 1970s but fell into disuse even as they were being widely adopted in Europe in the intervening decades.<sup>25</sup>

Building energy performance, not surprisingly, made little progress during these decades, especially outside California. According to the U.S. Energy Information Administration, energy intensity in commercial buildings “declined from 1979 to 1986, then remained unchanged from 1986 to 1999.”<sup>26</sup> (See Figure 2.) Between 1971 and 2004, carbon emissions of the commercial building sector in North America grew about 25% faster than carbon emissions of the overall economy.<sup>27</sup> As comparisons to Europe, Japan, and California suggest, and as the Intergovernmental Panel on Climate Change clearly states, much of what needs to be done, from a technical perspective, to slow or reverse this growth is well-known. Indeed, some of it is being done already,<sup>28</sup> not in response to DOE regulation, but instead in a looser and less centralized fashion in which other levels and agencies of government have played critical supporting roles and non-governmental actors have played leading roles.

**Figure 2: Commercial Building Energy Intensity, 1979-1999]**



Source: Energy Information Administration  
Commercial Buildings Energy Consumption Survey

<sup>25</sup> O’Connell interview.

<sup>26</sup> EIA, “Trends in Energy Consumption and Energy Sources,” accessed October 29, 2008, <[http://www.eia.doe.gov/emeu/consumptionbriefs/cbecs/cbecs\\_trends/intensity.html](http://www.eia.doe.gov/emeu/consumptionbriefs/cbecs/cbecs_trends/intensity.html)>

<sup>27</sup> M.D. Levine, *et al.*, “Residential and Commercial Buildings,” in B. Metz, *et al.* eds., *Climate Change 2007: Mitigation* (New York: Cambridge University Press, 2007).

<sup>28</sup> DOE’s *Building Energy Databook*, <<http://buildingsdatabook.eere.energy.gov/TableView.aspx?table=3.1.3>> (accessed November 5, 2008) shows a peak in 2000.



### III. The Green Building Movement and the USGBC

The USGBC was founded in April, 1993 against the backdrop of more than a decade of official neglect of energy efficiency, and of “greenness” in general, in buildings. Over the course of the next dozen or so years, the organization managed to make itself a focal point for a large portion of the fragmented building industry, even as it embraced the ideals of voluntarism and decentralization that characterize the industry and its governance. The founding moment may not have seemed propitious – and, indeed, USGBC spent its first few years struggling to survive – but the organization’s creators correctly recognized that there was a deeply committed, if initially small, base of support for their mission to “transform the way buildings and communities are designed, built, and operated.”<sup>29</sup> This “green building” movement provided the ideas and the labor that came to fruition in LEED. LEED, in turn, tapped into a large reservoir of “latent demand”<sup>30</sup> and became the engine of USGBC.

Jason McLennan, CEO of USGBC’s Cascadia chapter in the Pacific Northwest,<sup>31</sup> traces “sustainable design” all the way back to the indigenous peoples of the Americas.<sup>32</sup> But, like others, he dates the modern “green building” movement to the 1970s. In 1973, for instance, the American Institute of Architects (AIA) formed a Committee on Energy.<sup>33</sup> Ironically, some attempts to make buildings more energy efficient in this early period backfired. Tighter seals, for instance, significantly worsened indoor air quality.<sup>34</sup> This early lesson that single-minded attention to energy efficiency could undermine other “green” objectives seems to have stuck in the consciousness of the emerging movement.

A few practitioners and consultants, notably the Rocky Mountain Institute (RMI), led by energy policy pioneers Amory and Hunter Lovins, took up the mantle of “green building” and made a living at it in the 1980s.<sup>35</sup> AIA served as the movement’s hub, eventually co-hosting an international convention in 1993 on “Architecture at the Crossroads” that the trade journal *Building Design and Construction (BDC)* termed “a turning point in the history of the green building movement.” AIA also prepared the first reference guide for “green building” products with support from DOE and the U.S. Environmental Protection Agency (EPA).<sup>36</sup>

David Gottfried, a Washington DC-based property developer, caught the “green building” bug through contacts with AIA’s Committee on the Environment in 1991. His enthusiasm for the cause led him to turn his back on his prior work and set up a “green building” consulting practice. The practice struggled. Gottfried’s lawyer, Mike Italiano, who chaired the committee on environmental assessment and risk management of the American Society for Testing and

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<sup>29</sup> USGBC, “About USGBC,” < <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124>>, accessed November 7, 2008.

<sup>30</sup> McLennan interview.

<sup>31</sup> Cascadia is also a chapter of the Canadian GBC.

<sup>32</sup> Jason McLennan, *Philosophy of Sustainable Design* (Kansas City: Ecotone, 2004).

<sup>33</sup> *Building Design and Construction*, “White Paper on Sustainability,” November 2003.

<sup>34</sup> Alex Wilson, et al., *Green Development* (New York: John Wiley, 1998), 173-174. “Sick building syndrome,” a product of this design flaw, famously afflicted EPA headquarters after its remodeling in the 1980s. See also Vassilios Geras, “Indoor Air Quality,” in Matheos Santamouris, ed., *Environmental Design of Urban Buildings: An Integrated Approach* (Earthscan, 2006)

<sup>35</sup> *Ibid.* (Wilson).

<sup>36</sup> *Building Design and Construction*, “White Paper on Sustainability,” November 2003, 5.

Materials (ASTM), arranged for Gottfried to chair an ASTM committee on “green building.” The next year, according to Gottfried, he and Italiano, with the help of lobbyist Terry Bevels, midwived a \$1 million federal appropriation to the National Institutes for Standards and Technology (NIST) to support five “green building” demonstration projects.<sup>37</sup> Gottfried’s business challenges, his experience with ASTM, and the opportunity presented by the NIST earmark led to the formation of the USGBC.

Gottfried’s initial plan was to set up a trade association for “green buildings” product manufacturers, using the NIST projects as a marketing opportunity.<sup>38</sup> Encouraged by a few supportive firms,<sup>39</sup> which provided seed capital, Gottfried soon broadened his vision to form a stakeholder coalition that would encompass the entire building industry – and its customers and its critics. He deliberately recruited a diverse membership, with representatives of the various industry segments and professional groups as well as environmental organizations like RMI and the Natural Resources Defense Council (NRDC). At USGBC’s initial meeting, Gottfried proposed that it develop a “cookbook”<sup>40</sup> for “green buildings” that would define the concept and provide practical guidance not just to architects but to engineers, developers, property managers and others involved in the building industry as well.<sup>41</sup>

Gottfried had initially pursued this project through ASTM, which followed procedures laid down by the American National Standards Institute (ANSI). Adherence to ANSI requirements ensured deliberation and consensus – to a fault. “A single dissenter with ample funds and time,” Gottfried later wrote, “could put things on hold virtually forever.” The ANSI process allowed the Tobacco Institute, for instance, to influence the indoor air quality portion of the ASTM “green building” standard.<sup>42</sup> USGBC, as a result, refused to accept trade associations as members, and it adhered to the spirit rather than the letter of ANSI.<sup>43</sup> This approach helped inoculate USGBC against the charge of “greenwashing” that was inevitably hurled at any industry-funded environmental organization. It also allowed USGBC to capture the contributions of professionals who volunteered their time and expertise to develop LEED.

One key volunteer was Rob Watson of NRDC, who chaired the committee that drafted LEED. Watson’s environmental credentials made an important statement for USGBC, and he also secured a three year, \$800,000 grant from DOE to support the project.<sup>44</sup> His committee quickly adopted the principles of allowing tradeoffs across a variety of environmental impacts within the rating system and of certifying multiple levels of “greenness.” The committee also chose to reference standards written by other organizations, such as ASHRAE, that were already in the

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<sup>37</sup> David Gottfried, *From Greed to Green* (Berkeley: WorldBuild Publishing, 2004), ch. 5; Gottfried interview.

<sup>38</sup> USGBC did not in the end directly benefit from the NIST program, but Gottfried (interview) notes that NIST was supportive of USGBC from the start, lending its imprimatur to early conferences organized by the group and linking it to other federal agencies.

<sup>39</sup> Richard Federizzi of the Carrier Corporation, was appointed USGBC’s founding chairman, and in 2004, became its CEO.

<sup>40</sup> Hammack interview.

<sup>41</sup> Gottfried, *op. cit.*, chs. 6-8, Gottfried interview.

<sup>42</sup> *Ibid.* (Gottfried), ch. 5 and ch. 9. Quote from p. 68.

<sup>43</sup> Gottfried interview; Hydes interview.

<sup>44</sup> *Ibid.* (Gottfried), ch. 11, *BDC, op. cit.* Gottfried (interview) funded the organization personally for most of its first year.

public domain, peer reviewed, and widely accessible.<sup>45</sup> Yet, it chose not to license the leading “green building” guidelines at that time, the U.K. Building Research Establishment Environmental Assessment Method (BREEAM). “[A]ccording to Watson,” wrote *BDC*, a key reason was that BREEAM “was seen as focusing primarily on reducing carbon dioxide emissions, whereas the LEED committee wanted to address a much broader set of energy impacts.”<sup>46</sup>

USGBC went through a series of management crises while LEED was being drafted, nearly going under on more than one occasion. The launch of the LEED pilot version in 1998 seems to have stabilized the organization. Its rapid uptake generated much-needed revenue through registration for projects to be rated, sale of publications, and training fees. USGBC was able to hire Christine Ervin, a former assistant secretary of energy in charge of clean energy technologies, as its first CEO in 1999.<sup>47</sup> By early 2000, when it published the revised LEED version 2.0, USGBC was finally on its way to fulfilling Gottfried’s vision of being a non-profit that was “built like a business” that offered a “full suite of products.”<sup>48</sup>

#### *IV. LEED-NC’s Structure, Evolution, and Growth*

In the ten years of its existence, LEED has proliferated from a single rating system for new commercial construction (which became known as LEED-NC) to a family of systems that cover a variety of different building elements and types (commercial interiors (LEED-CI), homes (LEED for Homes), schools (LEED for Schools), etc.). USGBC modified LEED-NC several times, but did not change its basic principles and structure. Beginning with government buildings in the early 2000s, the system penetrated a series of markets, and it continues to grow at an exponential rate.

LEED-NC version 2 (including 2.0 (issued in 2000), 2.1 (2002), and 2.2 (2005)) is comprised of 69 total points divided into six categories: site (14 possible points), water (5), energy and atmosphere (17), materials and resources (13), indoor environmental quality (15), and innovation and design (5). (See Figure 3.) In order to achieve the Certified (or basic) level, the project must be awarded at least 26 points. The silver level begins at 33 points, gold at 39, and platinum at 52. The LEED-NC process is prospective; project documents are assessed before and during construction through initial occupancy. LEED for Existing Buildings (LEED-EB), which was established in 2004, certifies operation and maintenance after construction, but LEED-NC certified projects need not seek LEED-EB certification.

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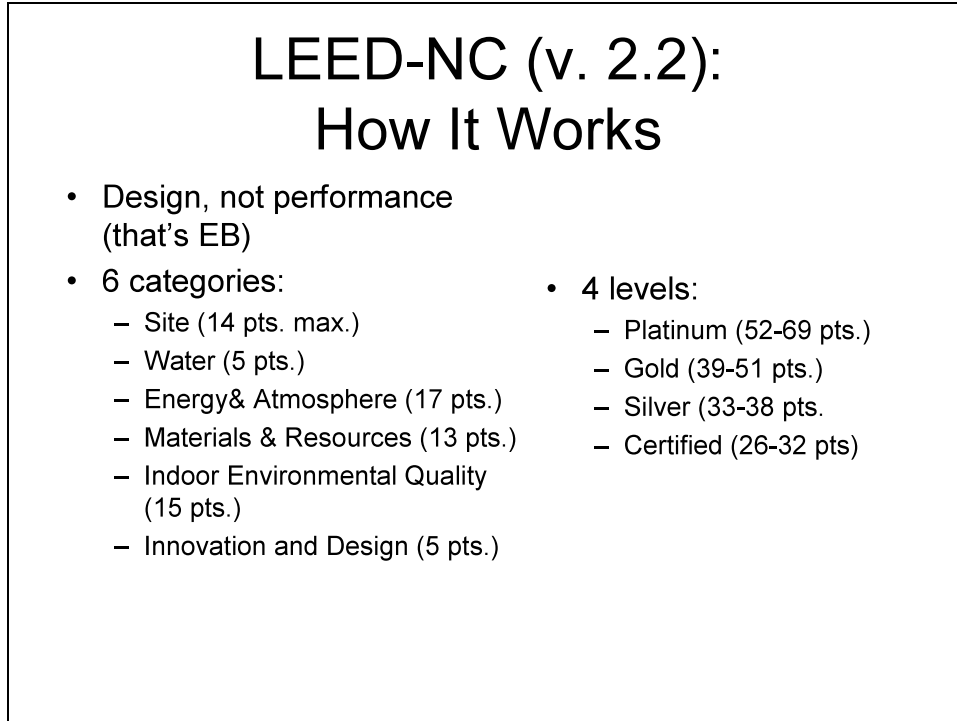
<sup>45</sup> Hammack interview.

<sup>46</sup> *BDC, op. cit.*, 7.

<sup>47</sup> Gottfried, *op. cit.*, 170; *BDC, op. cit.*

<sup>48</sup> Gottfried interview.

**Figure 3: LEED-NC (v. 2.2) How It Works**



A little math shows that a project could, in principle, earn a platinum rating of 52 points without receiving any points in the energy and atmosphere category. Indeed, in principle, a project could receive 57 points without doing anything about energy efficiency,<sup>49</sup> because five of the seventeen energy and atmosphere points are awarded for using renewable energy sources and minimizing the use of refrigerants that damage the ozone layer or cause global warming. In practice, according to a LEED-accredited architect, it is difficult to attain LEED-NC Silver or above without “attacking” the energy and atmosphere credits.<sup>50</sup>

The level of emphasis placed on energy efficiency by LEED-NC occasioned criticism, some of it harsh, within USGBC and the broader energy and environmental policy community.<sup>51</sup> Gregory Kats, a member of the LEED Steering Committee and chair of its Energy and Atmosphere Technical Advisory Group, “pounded the table” on this subject at USGBC meetings in the mid-2000s, according to former USGBC chairman (2005-06) Kevin Hydes.<sup>52</sup> Ed Mazria, founder of Architecture 2030, an advocacy organization pushing for rapid transformation of the building sector to fend off climate change, “ripped the USGBC in 2006 for not focusing enough attention on energy efficiency.”<sup>53</sup>

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<sup>49</sup> LEED 2.2 requires that building energy systems be commissioned and that building energy performance satisfy ASHRAE 90.1-2004. These are prerequisites that do not earn points.

<sup>50</sup> O’Connell interview.

<sup>51</sup> Hogan interview; Hoffman interview.

<sup>52</sup> Hydes interview.

<sup>53</sup> Dustin Block, “The LEED Creed,” *Long Island Business News*, September 4, 2008.

LEED's defenders argue that these critics have adopted a narrow-minded conception of energy efficiency. They point out that the transportation and materials credits within LEED-NC can reduce a building's energy use, too, and that changes in land use and urban design will be required to meet the climate challenge. USGBC nonetheless responded to the energy efficiency critique in June 2007 by requiring that all LEED-NC-certified buildings registered after that date earn at least two energy points. These can be gained by designing the building to perform 14% better than ASHRAE 90.1-2004 in a simulation.<sup>54</sup> It is worth noting as well that the ASHRAE standard is itself becoming stronger. DOE determined in December 2008 that the 2004 version is 11.9% more stringent than the 1999 version, which was incorporated into earlier versions of LEED.<sup>55</sup>

Former USGBC chair Hydes bluntly characterizes the organization as "asleep at the switch" on climate.<sup>56</sup> Yet, as the rejection of BREEAM as the basis for LEED-NC shows, the decision to allow certification without more stringent energy efficiency requirements was deliberate. Each credit in LEED has champions within the "green building" movement, as do some criteria, such as historic preservation and social equity, that might have been included in the system but were not.<sup>57</sup> LEED's steering committee must weigh the arguments of these advocates against one another. They must also balance the stringency of any specific requirement and of the system as a whole against its potential market.<sup>58</sup>

From the market perspective, USGBC seems to have set the balance effectively. As of December 2008, approximately 17,500 commercial projects had registered with LEED (all programs) and over 2100 had been certified.<sup>59</sup> The growth rate is accelerating, to the point that (according to a November 2007 report by Deutsche Bank's real estate investment arm) "green building is fundamentally altering real estate market dynamics."<sup>60</sup> Ernst and Young's *Real Estate Market Outlook 2007* similarly opines that "green is no longer a luxury."<sup>61</sup> The Costar Group recent year-end round-up put it this way: "2008 was the year when green building became inevitable."<sup>62</sup> These analyses equate "green" with LEED.

One of the first adopters of LEED-NC was the U.S. General Services Administration (GSA), which manages much of the federal government's real estate portfolio. The federal government is the nation's largest real estate owner and lessee. Attracted by the system's flexibility and required by executive order to "green" government buildings, GSA adopted a policy of LEED

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<sup>54</sup> John Hogan (personal communication, December 5, 2008) points out that LEED-NC "also provides limited prescriptive options (primarily for small buildings using ASHRAE's Advanced Energy Design Guides, or projects using NBI's E-Benchmark)."

<sup>55</sup> Personal communications from Bruce Hunn, ASHRAE, September 17, 2008 and March 12, 2008.

<sup>56</sup> Hydes interview.

<sup>57</sup> Horn interview. USGBC's strategic plan for 2009-2013 adds social equity as a guiding principle of the organization.

<sup>58</sup> Hicks interview.

<sup>59</sup> USGBC, "Green Building Facts," January 2009.

<sup>60</sup> Andrew J. Nelson, "Greening of U.S. Investment Real Estate," RREEF Research Report No. 57, November 2007, RREEF San Francisco, i.

<sup>61</sup> Ernst & Young, *Real Estate Market Outlook 2007*, 5

<sup>62</sup> Andrew C. Burr, "CoStar Reviews the Most Compelling Storylines," December 30, 2008, <<http://www.costar.com/News/Article.aspx?id=19098C3EE19B9BACC1D8C3EB5485A65C>>, accessed January 26, 2009.

certification for new construction and leasing in January 2000.<sup>63</sup> Several Federal agencies outside of GSA's purview, notably the U.S. Navy, which was the first federal agency to win a LEED certification, enacted similar policies.<sup>64</sup> State and local governments were also in the vanguard of LEED-NC adoption. Seattle, for instance, was the first city to enact a LEED mandate for municipal buildings, requiring Silver certification in 2001. 41% of all LEED-NC registrations through the end of 2005 were government buildings.<sup>65</sup>

Large private institutions made up a second group of early adopters. The non-profit sector, composed mainly of private universities and schools, made up an additional 21% of LEED-NC registrations through the end of 2005.<sup>66</sup> LEED-NC quickly gained traction as well among firms and other organizations that wanted to project an image of environmental responsibility, especially when constructing a new headquarters or other high-profile building.<sup>67</sup> Like government agencies, these early adopters were typically owner-operators, who stood to reap any long-term cost savings or price appreciation (as well as goodwill) that LEED certification might bring.

Speculative builders, who account for a large portion of commercial construction in the U.S., take a shorter-term view than owner-occupants. They typically seek to minimize construction costs in order to keep prices competitive and profits up. Their interest in LEED took off about three or four years ago,<sup>68</sup> as a result of several convergent factors. USGBC developed new programs, LEED for Core and Shell (LEED-CS) and LEED for Commercial Interiors (LEED-CI), that targeted speculative builders. The cost differential between construction of LEED-certified and construction of non-LEED-certified buildings declined, too, as "green building" practices and materials were routinized in LEED's early years.<sup>69</sup> Some interviewees also perceived a broader change in public priorities and the preferences of buyers and lessees, associated to some degree with the movie "An Inconvenient Truth."<sup>70</sup> And, energy prices soared, helping to extend LEED's appeal well beyond the "true believers."<sup>71</sup>

Incentives offered to private builders by state and local governments were another important factor that sparked the uptake of LEED-NC. Oregon, for instance, provides a tax credit for

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<sup>63</sup> Horn interview. The executive orders are described in *BDC*, op. cit., 6. The economic stimulus bill passed in February 2009 allocated \$5.5 billion to GSA to "green" federal buildings, a program in which LEED will figure prominently.

<sup>64</sup> USGBC, "LEED Initiatives in Government and Schools," <<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#federal>>, accessed October 27, 2008.

<sup>65</sup> Jerry Yudelson, *The Green Building Revolution* (Washington: Island Press, 2008), 97. The 2007 Energy Act requires federal agencies to further tighten the energy efficiency of government buildings and by 2020 to procure "net-zero" buildings that do not use energy from fossil fuels at all. Tim Kauffman, "Green Building Goals Appear Out of Reach," *Federal Times*, October 26, 2008, <<http://www.federaltimes.com/index.php?S=3787445>>, accessed November 6, 2008

<sup>66</sup> *Ibid.* (Yudelson), 97.

<sup>67</sup> Hammack interview. See, for instance, Long Hwa-Shu, "Bank Takes Environmental Step into Rural Town," *New York Times*, July 2, 2008 on HSBC's new North American headquarters building.

<sup>68</sup> Bisacquino interview.

<sup>69</sup> O'Connell interview; Nelson, *op. cit.* The exact cost differential is a matter of dispute. Some practitioners argue that it is negligible, even for LEED Silver buildings, while others argue that it remains significant enough to make a difference to buyers.

<sup>70</sup> Hunn interview.

<sup>71</sup> McLennan interview.

buildings that are LEED-certified at the silver, gold, and platinum levels. Chicago expedites permits and offers reduced fees for such projects. Seattle allows LEED-NC projects to be built to a higher density or greater height than normal zoning permits.<sup>72</sup> Politicians, as one observer put it, have been trying to “out-green” each another.

More recently, some jurisdictions have moved beyond incentives to mandates. Howard County, Maryland, for instance, enacted a requirement in July 2007 that new, privately-owned commercial buildings larger than 50,000 square feet be LEED-certified.<sup>73</sup> The City of San Francisco went a step further in August 2008, establishing what Mayor Gavin Newsom called “the nation's strictest ‘green’ building codes.” Commercial buildings must attain LEED Silver beginning in 2009 and LEED Gold in 2012.<sup>74</sup> State and local building inspectors are increasingly asked to become LEED Accredited Professionals (AP) by taking USGBC-affiliated training courses.<sup>75</sup> In some cases, “green building” codes require projects to meet LEED standards, but not necessarily receive formal certification, creating a LEED “shadow effect” of uncertain proportions.<sup>76</sup>

No matter how big or small the shadow effect, the evidence suggests that Michael McAteer of the utility National Grid was not exaggerating when he referred to LEED’s “incredible traction,” which has “captured the imagination” of the industry.<sup>77</sup> In just one short decade, aided by a push from all levels of government, USGBC has defined “green building” in the U.S. To the extent that LEED mandates spread, it will have attained a *de facto* position as national legislator of building standards, a status that eluded DOE thirty years ago.

#### *V. LEED-NC’s Current Energy Efficiency Impacts and Future Trajectory*

The debate over the energy efficiency implications of LEED-NC has not subsided, despite the two point prerequisite added in 2007 and USGBC’s stated commitment that “the pace of change must increase.”<sup>78</sup> In a September 2008 interview, for instance, climate scientist James Hansen labeled USGBC’s approach “‘business as usual’ described as green building” and “‘almost meaningless’ in the fight to stop global warming.”<sup>79</sup> Performance data, newly available, provide some support for this position. The ultimate impact of LEED-NC on building energy efficiency, however, will depend more on where the rating system goes from here than where it has been. Without casting aspersions on the sincerity of USGBC’s statements, whether the organization

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<sup>72</sup> Yudelso Associates, “Green Building Incentives That Work,” NAIOP, November 2007; Hogan interview.

<sup>73</sup> Derek Simmons, “Developers slow to adopt county's 'green' push,” *Howard County Times*, September 18, 2008, <<http://www.explorehoward.com/business/11533/developers-slow-adopt-countys-green-push/>> accessed October 29, 2008.

<sup>74</sup> Wendy Koch, “Builder Codes Turn a Green Leaf,” *USA Today*, August 7, 2008, accessed via Lexis-Nexis Academic, October 29, 2008; “Government Resources,” USGBC.org. The San Francisco ordinance also specifies particular credits that must be attained, but energy efficiency credits are not among them.

<sup>75</sup> Gottfried interview.

<sup>76</sup> Hogan interview. Rob Watson, *Green Building Impact Report 2008* (Greener World Media, 2008) identifies a category of “built to LEED” buildings, which registered with LEED but did not get certified. They comprise about 25% of registrations, although their floor space (p. 5) nearly equals that of LEED-certified buildings.

<sup>77</sup> McAteer interview.

<sup>78</sup> USGBC, “Strategic Plan 2009-13 (no date), 3.

<sup>79</sup> Block, *op. cit.*

can realize its role in the “ratchet” scenario described in the introduction to this paper is uncertain.

Performance evaluation of LEED-certified buildings inevitably lags practice. Buildings are registered with USGBC at the beginning of the design process and held to account for the version of LEED-NC in force at that time. Several years may pass after registration before a commercial building has been constructed and operated for long enough that meaningful energy performance data can be gathered. These data are not collected in the LEED-NC certification process, so researchers must rely on voluntary participation by building owners.

Reliance on voluntary data submission may create bias in the samples of buildings used in evaluation studies. “Green building” owners who are “energy hogs” may be reluctant to admit it and thus decline to participate. Another methodological challenge is to define a group of “brown” (or at least “non-green”) buildings with which to compare those that have been LEED-certified. Every building is unique in its location, uses, and occupants, so researchers must make difficult choices about which features to use for selection of the reference group. Data availability for the reference group may impose further constraints.

The most thorough study of energy performance of LEED-certified buildings was carried out by the New Buildings Institute (NBI). It was sponsored by USGBC and released in March 2008. The authors candidly note the possibility of bias in their 121 building sample. They use three reference groups. One is the entire building stock of the country in 2003, as measured by the authoritative quadrennial DOE Commercial Buildings Energy Consumption Survey (CBECS). They report that the median energy use intensity (EUI) for the sample buildings was 24% better than the EUI of the average commercial building in the U.S.<sup>80</sup> About half of the sample was also given a rating under the EPA-administered Energy Star program, which provides a far more precise reference group for each building. Energy Star uses CBECS data to control for building use, location, and a host of other variables. Three quarters of the LEED-certified buildings were above average using this method of comparison, and 17% were above the 90<sup>th</sup> percentile. 15%, however, were below the 30<sup>th</sup> percentile. Finally, the NBI researchers compared each building’s predicted performance, which is the basis of the certification decision, to its actual performance. While on average and for each level of certification (Silver, Gold, etc.), there was a strong correlation between prediction and performance, individual projects varied widely. Some delivered more than twice as much savings as promised, while others delivered less than half as much.<sup>81</sup>

The NBI study was limited to buildings certified in 2006 or earlier. More than 10% of the buildings in the sample did not receive two points for energy efficiency, the prerequisite for LEED-NC installed in 2007. Those that did win energy efficiency points did so relative to

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<sup>80</sup> NBI’s comparison of its sample to CBECS and its presentation of its conclusions occasioned fierce criticism and an intensive debate. Henry Gifford’s highly critical “A Better Way to Rate Green Buildings,” available on-line from <energysavingscience.com,> prompted a response from both NBI and USGBC. Joseph P. Lstiburek published a biting critique in *ASHRAE Journal*, available on-line at <[http://www.buildingscience.com/index\\_html](http://www.buildingscience.com/index_html)>. For a cross-section of the discussion, see Nadiv Malin, “Lies, Damn Lies, and...” and the associated comments at <<http://www.buildinggreen.com/live/index.cfm/2008/9/2/Lies-Damn-Lies-and-Are-LEED-Buildings-iLessi-Efficient-Than-Regular-Buildings#more>>

<sup>81</sup> Turner and Frankel, *op. cit.*



ASHRAE 90.1-1999; buildings registered since 2005 (LEED-NC v. 2.2) must beat the more stringent 2004 standard. These factors suggest that NBI's results understate the energy efficiency impact of today's LEED-NC. In addition, it seems likely that building simulations will become more accurate with greater experience, so that designers can target energy savings more precisely. On the other hand, the entire national building stock is a very generous baseline against which to compare LEED-certified buildings. The results might look very different if the study sample had been compared only to other new buildings. Buildings at the Certified and even Silver levels, according to some observers, simply mirror standard building practices in the twenty-first century.<sup>82</sup>

LEED 2009, which was approved by the USGBC membership in November 2008 and will be implemented in the coming year, will turn the ratchet one notch further. The energy prerequisite for all LEED-certified projects will become about 3% more stringent.<sup>83</sup> USGBC also reweighted the available points across categories, so that energy efficiency will comprise about 22% of the total (24/110), compared with 17% (12/69) in version 2.2.<sup>84</sup> This reweighting reflects an attempt to enhance LEED's "scientific muscle" (in the USGBC's words) by systematically assessing the environmental impacts of buildings. Climate change was considered to be the most important of these impacts in this analysis and thus in the reweighting process.

USGBC has already begun work on LEED 2011 and may undertake additional adjustments on a pilot basis in the interim.<sup>85</sup> While no specific information has yet been released about LEED 2011, it seems likely that it will incorporate ASHRAE 90.1-2010 in place of ASHRAE 90.1-2007. ASHRAE's board of directors has set a target for the 2010 version of 30% greater stringency than the 2004 version (or about 25% greater than 2007).<sup>86</sup> If ASHRAE achieves this target and USGBC brings it into LEED, that would be a strong turn of the ratchet.

But both of these steps may face resistance. ASHRAE has historically been a conservative organization. Prompted by USGBC's rapid rise, ASHRAE's leadership saw an opportunity during the past few years to reinvigorate the organization through an alliance in which ASHRAE adopted "sustainability" as a core interest. USGBC gained the benefit of ASHRAE's "technical horses" and "credibility" (in the words of ASHRAE's Bruce Hunn), while ASHRAE gained visibility and tapped into the "green building" movement's energy through its presence in

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<sup>82</sup> Nadav and Malin (and associated comments), *op. cit.*

<sup>83</sup> In version 2.2, certified projects had to perform 14% better than ASHRAE 90.1 2004. In LEED 2009, they must perform 10% better than ASHRAE 90.1 2007. ASHRAE 90.1 2007 is approximately 7% more stringent than ASHRAE 90.1 2004. LEED 2009 thus requires approximately 16.7% improvement on 90.1 2004. Hunn, personal communication, *op. cit.*

<sup>84</sup> 19 points are available for energy performance, 2 for enhanced commissioning, and 3 for measurement and verification. USGBC, "LEED for New Construction and Major Renovation 2009 with comparison Project Scorecard," undated. The increments for gaining energy performance points are roughly the same in the two versions; LEED 2009 awards 2 points for each 4% gain, while LEED-NC 2.2 awards 1 point for each 3.5% gain. Ten points are available for regional priorities and for innovation, which may also have energy efficiency implications. The required share of possible points for each level of certification has changed slightly; for instance, Certified requires 40 out of 110 points (36%) in LEED 2009, compared with 26 out of 69 (38%) in version 2.2.

<sup>85</sup> USGBC CEO Rick Fedrizzi to USGBC members, October 13, 2008,

<<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1895>> accessed October 31, 2008

<sup>86</sup> Hunn interview.

LEED.<sup>87</sup> ASHRAE's ANSI-compliant standard-setting process, however, is prone to delay and compromise. The very attention that LEED draws to standard 90.1 and the stringent goals for future versions create incentives for ASHRAE members whose interests may be adversely affected to exert themselves in the process. Hunn notes that there is no assurance that the 30% goal for 2010 will be achieved.<sup>88</sup>

USGBC does not adhere to ANSI for the LEED system, but it does place great emphasis on transparency, diversity, and openness.<sup>89</sup> The technical committees that draft LEED's rules seek to involve all key stakeholder groups and to achieve consensus.<sup>90</sup> Members and the interested public are then invited to chip in; LEED 2009, for instance, drew almost 7000 comments during its public review period.<sup>91</sup> USGBC's process allows the organization to draw on the knowledge and enthusiasm of its constituents, but, like ASHRAE's, it also creates opportunities for dilution. USGBC staff and members vehemently reject the notion that the outcome has been a "dumbing down" of LEED.<sup>92</sup> To the extent that USGBC has avoided this threat, it seems to have done so in part through effective engagement of its "greenest" members via its chapter network and in part through judicious central control of the drafting process.

LEED's advocates argue that the ratcheting up of its requirements is leading to a "revolution in building design and construction practice."<sup>93</sup> Rather than considering systems within a building (such as heating and cooling, fenestration (windows), and lighting) on an individual basis, they say, projects seeking LEED certification are encouraged to design these systems in an integrated way.<sup>94</sup> USGBC training, which leads to LEED Accredited Professional (AP) status (commonly found on the business cards of architects and engineers these days), stresses such practices.<sup>95</sup> Yet, the revolution is, at best, still in the making. Applicants at the Certified and even Silver levels, which comprise the majority of LEED-registered projects, will retain the choice of whether and how aggressively to pursue energy efficiency points.

"The revolution in property management"<sup>96</sup> seems even further away. A large part of the difference between predicted and actual performance found by the NBI study of LEED-NC may be explained by operational practices, rather than design and construction deviations. Scott Horst, who chairs the LEED steering committee, has proposed that LEED-NC buildings be recertified periodically based on performance. This suggestion was not included in LEED 2009; Horst hopes to pilot it in 2010.<sup>97</sup> In the meantime, USGBC is expanding LEED-EB, especially

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<sup>87</sup> ASHRAE has also undertaken the development of a series of Advanced Energy Design Guides that provide "prescriptive" guidance to meet a series of increasingly stringent standards, along the timeline laid out by the Architecture 2030 challenge.

<sup>88</sup> Hunn interview.

<sup>89</sup> Marseille interview; McAteer interview.

<sup>90</sup> Hicks interview.

<sup>91</sup> Fedrizzi to USGBC members, *op. cit.*

<sup>92</sup> Horn interview; Hicks interview.

<sup>93</sup> Yudelson, 2008, *op. cit.*, 168.

<sup>94</sup> Hammack interview. See also Declan Butler, "Architects of a Low Energy Future," *Nature* 3 April 2008.

<sup>95</sup> Use of a LEED Accredited Professional earns one point within LEED-NC.

<sup>96</sup> Yudelson, 2008, *op. cit.*, 159.

<sup>97</sup> "LEED Doesn't End When Doors Open," *Consulting-Specifying Engineer*, September 23, 2008, <<http://www.csemag.com/article/CA6598468.html>>.

to owners of fleets of buildings, such as Boston's Equity Office.<sup>98</sup> But LEED-EB lags far behind LEED-NC to date. Less than a quarter as many projects have registered for LEED-EB than for LEED-NC.<sup>99</sup>

LEED-NC's energy efficiency achievements to date do not fully bear out USGBC's optimistic presentation of the impact of "green building". Substantial savings have been achieved in some, but far from all, LEED-certified buildings. LEED is the "best available tool," in the words of USGBC Cascadia chapter CEO Jason McLennan, but "time has grown shorter" for addressing climate change.<sup>100</sup> From within the organization, McLennan and others who share his sense of urgency have pressed to strengthen the LEED's energy efficiency components and fill the obvious gaps. Others resist this pressure, worrying that LEED will outrun the market, reducing its leverage, however modest, on building energy efficiency.

#### *VI. The Prospects for Market Transformation: Do Worry About the Government*

USGBC seeks to achieve its mission of transforming buildings and communities by transforming the construction and real estate markets. As the LEED "brand" acquires value, this vision implies, more and more builders will voluntarily meet LEED's requirements in order to satisfy the "green" demand of owners and lessees. For a transformation to occur that would be profound enough to have a significant effect on greenhouse gas emissions, the demand for "green buildings" must continue to grow even as the "ratchet" specifying "greenness" tightens. But demand in the building sector is far from uniform; even in the best of circumstances, LEED's market would inevitably be limited. Moreover, circumstances are changing. The "perfect storm"<sup>101</sup> of the last few years, which fueled LEED's growth, is abating. Without more extensive government policies, including mandates, that reinforce and extend USGBC's voluntaristic approach, market transformation may slip out of reach.

The possibility that LEED may saturate its market may seem far-fetched, given USGBC's astounding growth, for which LEED has been the main engine. Ten years ago, the organization was in danger of going under. Today, it has an annual budget of some \$75 million, more than 18,000 organizational members, and 78 chapters and affiliates that individuals around the country can join. Its annual GreenBuild conference drew more than 28,000 attendees to Boston in November 2008. More than 77,000 professionals are now LEED-accredited. USGBC's own "green building" in Washington's Dupont Circle neighborhood, which is only two years old, is no longer able to accommodate the organization's 240 member staff, who are moving to more spacious quarters early in 2009.<sup>102</sup> "What's next," commented one observer only half-jokingly, "LEED for doghouses?"

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<sup>98</sup> Opitz interview. Casey Ross, "Boston's Biggest Property Owner Going All Green," *Boston Globe*, August 28, 2008.

<sup>99</sup> USGBC, "Green Building Facts," January 2009. I have not studied what impacts LEED-EB might have on energy efficiency in certified buildings.

<sup>100</sup> McLennan interview.

<sup>101</sup> O'Connell interview.

<sup>102</sup> Hicks interview; Gottfried interview; USGBC, "Green Building Facts," *op. cit.*; USGBC, press release, October 17, 2008; Dustin Block, "Expo, Dues, Not LEED Account for Non-profit USGBC's Revenues," *Maryland Daily Record*, September 13, 2008; "Interview with Rick Fedrizzi," *Boston Globe*, September 18, 2008.

USGBC hopes to certify 100,000 buildings by the end of 2010, which would be about fifty times its current total of certified buildings and about six times the number of registered buildings.<sup>103</sup> These “audacious goals” (as characterized by USGBC CEO Fedrizzi) far outstrip the most optimistic projections of growth in “green building.” Yet, even a (presumably) impartial analyst for Deutsche Bank projects that LEED-certified office space (LEED-CS and LEED-NC combined) may reach nearly ten times its volume in 2011 compared to 2007.<sup>104</sup> These rates are even more impressive when viewed against a backdrop of 2% average annual growth across the building industry as a whole. Although the full impact of the current recession on the commercial real estate market remains to be seen, McGraw-Hill Construction argued in a recent report that “green seems to be one area of construction insulated by the downturn.” It projected that the overall “green building” market would roughly triple in size over the next five years.<sup>105</sup>

Such projections depend critically on a persuasive business case for LEED-certified buildings. No longer strictly the province of environmentalists, participation in LEED is increasingly a matter of dollars and cents in a business populated by some of the hardest-headed capitalists in the country. But the business case for LEED has not yet been made. The challenge is similar to that for building energy performance; the database remains too small to draw definitive conclusions, rhetoric notwithstanding. A March 2008 study by the CoStar Group touting the enhanced financial value of LEED buildings, which was promoted by USGBC and reported widely in the trade press, for instance, faced a withering critique from the executive director of the Green Building Finance Consortium, because it used small samples and inappropriate reference groups.<sup>106</sup> An April 2008 study released by the Program on Housing and Urban Policy at University of California, Berkeley, by contrast, found that LEED buildings did not command higher rents.<sup>107</sup>

The Berkeley study did find that Energy Star-labeled buildings, which have an energy performance in the 75<sup>th</sup> percentile or better of comparable buildings, earned higher rents. This finding suggests that, if the ratcheting up of LEED-NC’s energy efficiency elements leads to more consistent energy performance improvements, LEED buildings might also earn higher rents. An effective link between LEED-NC and LEED-EB (which incorporates Energy Star by reference), similarly, could enhance the business case by improving transparency for prospective buyers about energy performance and thus anticipated operating costs. On the other hand, if

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<sup>103</sup> Yudelson, *op. cit.*, xix; USGBC, “Green Building Facts,” *op. cit.* These totals include all USGBC programs (excluding homes), not just NC.

<sup>104</sup> Nelson, *op. cit.*, 30.

<sup>105</sup> McGraw-Hill Construction, “2009 Green Outlook - Executive Summary”, <[http://construction.com/market\\_research/reports/GreenOutlook.asp](http://construction.com/market_research/reports/GreenOutlook.asp)>, accessed December 30, 2008. See also Lydia DePillis, “Recession or Not, Green Building to Keep Growing,” *New York Observer*, November 13, 2008.

<sup>106</sup> USGBC news release, “Newly Released Studies Confirm Energy Savings Significant in LEED, Energy Star Buildings,” April 3, 2008; Scott Muldavin, “Quantifying “Green” Value: Assessing the Applicability of the CoStar Studies,” Green Building Finance Consortium, San Francisco, June 2008, available at <[www.greenbuildingfc.com](http://www.greenbuildingfc.com)>.

<sup>107</sup> Piet Eichholtz, Nils Kok, and John M. Quigley, “Doing Well By Doing Good? Green Office Buildings,” Working Paper W08-001, Berkeley Program on Housing and Urban Policy, April 2008, available at <[http://repositories.cdlib.org/iber/bphup/working\\_papers/W08-001](http://repositories.cdlib.org/iber/bphup/working_papers/W08-001)>, accessed July 18, 2008. A forthcoming report by Gregory Kats, *Greening Buildings and Communities* concludes that the cost of a LEED building is roughly 2% more than a conventional building, while the market value is higher. The full study is not scheduled for release until the summer of 2009. See “Landmark International Green Building Study Finds Benefits of Building Green Outweigh Cost Premium,” November 19, 2008, available at [www.goodenergies.com](http://www.goodenergies.com), accessed December 30, 2008.

energy prices continue to slide, the savings associated with energy efficiency may affect real estate values less in the future than they have in the recent past.<sup>108</sup>

An important driver of LEED-NC adoption in the past has been the symbolic value of “green building.” Corporate reporting on the “triple bottom line” (financial, environmental, and social performance) seems still to be gathering momentum among investors, and LEED will likely continue to benefit from the broader movement for corporate social responsibility.<sup>109</sup> Even Devon Energy, the largest independent producer of oil and gas in the U.S., has seen fit to register its planned headquarters skyscraper in Oklahoma City with USGBC.<sup>110</sup> Such intangible benefits will nonetheless remain restricted to a relatively small portion of the total commercial construction market, even accounting for corporate building “fleets” (such as bank branches).<sup>111</sup>

State and local incentives that add to the perceived financial and symbolic benefits of “green buildings” are often essential to the business case for LEED. The momentum of public policy continues to swing in the direction of strengthening them. AIA reports, for instance, that the number of cities and counties that had some form of “green building” policy rose by more than 400% over the past five years.<sup>112</sup> In Nevada, for instance, a 2005 law provided property tax abatements to private development projects achieving a LEED Silver Certification that are “far more than the actual cost of achieving LEED Silver on a large project.”<sup>113</sup> But there are also limits to the generosity of states and localities, especially in hard times. The enthusiastic response of builders to the Nevada incentive and the state’s budget woes led to its reduction just two years after it was put in place.<sup>114</sup>

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<sup>108</sup> As described above, construction costs for the lower levels of LEED-NC certification (Certified and perhaps Silver) are said to be close to those of conventional construction. For higher levels of certification, construction costs are said to be higher. The costs of the certification process itself have been the source of many complaints; USGBC has made a large effort to reduce them. Avoided maintenance costs that are associated with passive energy saving systems may be substantial and add to direct energy efficiency benefits. See Yudelson, *op. cit.*, 36.

<sup>109</sup> Hammack interview; Nelson, *op. cit.*, 30

<sup>110</sup> Kate Galbraith, “Energy Companies Explore Energy-Efficient Building,” *nytimes.com*, October 27, 2008, accessed at <<http://greeninc.blogs.nytimes.com/2008/10/27/energy-companies-explore-energy-efficient-building/>>, November 3, 2008.

<sup>111</sup> Yudelson, *op. cit.*, 36, among others, argues that productivity and health benefits dominate any financial calculus for “green buildings.” To some extent, these benefits would be captured by employers who own the buildings, but many of them would be received by employees instead. I have seen no evidence suggesting that such benefits are priced in to “green building” values, although it is possible that that could occur if knowledge of them becomes widely known and they are validated more thoroughly by empirical research. Competition among labeling systems and associated confusion in the “green” market is another potential threat to LEED. In commercial building, a challenge mounted by the Green Building Initiative’s Green Globes system seems to be having a modest impact at best. For other LEED programs, such as LEED for Homes, however, such logo “pollution” could be a more serious issue.

<sup>112</sup> AIA, press releases, November 28, 2007 and July 9, 2008. <[http://www.aia.org/releases\\_default&defPr=1](http://www.aia.org/releases_default&defPr=1)> accessed November 7, 2008.

<sup>113</sup> Yudelson, *op. cit.*, quote from p. 33.

<sup>114</sup> NC Solar Center, Database of State Incentives for Renewables and Efficiency (DSIRE), “Nevada Incentives for Renewables and Efficiency” updated February 28, 2008, <[http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive\\_Code=NV10F&CurrentPageID=1&RE=1&EE=1](http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=NV10F&CurrentPageID=1&RE=1&EE=1)>, accessed November 3, 2008.

As of December 2008, 283.3 million square feet of commercial real estate had been LEED-certified.<sup>115</sup> As impressive as this figure is and as impressive as LEED's growth has been, that *cumulative* total is less than 20% of the non-residential space *constructed in an average year* in the U.S.<sup>116</sup> Even under Deutsche Bank's aggressive scenario, LEED-certified buildings' share of Class A office space would barely exceed 10% in 2011.<sup>117</sup> The transformation that USGBC seeks will require for moving far beyond this level and far beyond this market. The business case alone, even propped up by public incentives, seems unlikely to produce this outcome, especially in a period of falling energy and real estate prices.

As the limits to USGBC's voluntaristic model and related incentives come into view, more assertive public policies will warrant careful consideration. The mildest of such policies, which will be implemented in the coming years in California and Washington, D.C., requires energy use reporting for commercial buildings.<sup>118</sup> Energy Star has laid the groundwork for such a requirement, by rating the energy performance of about 16% of all commercial building floor space and 43% of office space in the U.S. to date on a voluntary basis.<sup>119</sup> Mandatory energy use reporting would make the contrast between "green" and "non-green" buildings sharper to all real estate buyers and lessees. If a cap and trade program to address climate change is enacted in the U.S., monitoring and disclosure of building energy performance may well be mandated in order for utilities and other participants to manage their carbon emissions under the program.

Building codes that incorporate LEED certification (or the equivalent) represent a much bigger step for states and localities than energy use reporting requirements. Already in place in a few locations, such mandates ask building inspectors to evaluate energy simulations that they may be poorly prepared to understand.<sup>120</sup> In addition, by making LEED the baseline for buildings, rather than speaking to "green" aspirations, LEED mandates seem likely to amplify the pressure on USGBC for "dumbing down" of the system. As appealing as it may seem on its face, a position as the *de facto* national legislator of building standards would subject USGBC to even more intense crosswinds than it already faces.

ASHRAE standard 189.1P for "green buildings," in which USGBC is a partner, may help deflect this pressure. This proposed standard, currently under development, will cover the same broad categories as LEED (materials, site, energy and atmosphere, etc.). Rather than relying primarily on simulation to assess energy performance, it will be written in the "prescriptive" language with which building inspectors are used to working, so that it can be adopted with relative ease by interested jurisdictions.<sup>121</sup> The energy efficiency targets are 25-30% more stringent than

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<sup>115</sup> USGBC, "About LEED," (Powerpoint presentation), 2009

<<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1720>>, accessed January 26, 2009.

<sup>116</sup> Watson, *op.cit.* p. 3, estimates that 30% of new commercial construction is registered with LEED-NC, but also concludes that the growth in this indicator will soon slow substantially.

<sup>117</sup> Nelson, *op. cit.*

<sup>118</sup> Nadav Malin, "Regulations Demanding Actual Data Are Leapfrogging LEED," BuildingGreen.com, October 1, 2008, <<http://www.buildinggreen.com/auth/article.cfm/2008/9/25/Regulations-Demanding-Actual-Data-Are-Leapfrogging-LEED/>> accessed November 5, 2008.

<sup>119</sup> Lupinacci interview; personal communication from Susan Bailey, Energy Star, January 23, 2009.

<sup>120</sup> As noted above, LEED-NC also provides for prescriptive options for some building types.

<sup>121</sup> The proposed standard will also allow for compliance through simulation. The city of Portland, Oregon proposed a new high performance green building policy based in part on ASHRAE 189.1P in December 2008.

ASHRAE 90.1-2007 (and would earn roughly 8-10 points out of LEED 2009's 110 point maximum). Ernst & Young's Katherine Hammack, a longtime participant in USGBC, expects ASHRAE 189.1P as a whole to be more stringent than LEED Silver when completed.<sup>122</sup>

This strategy would make ASHRAE, rather than USGBC, into the legislative authority for jurisdictions that would seek to "out-green" the rest of the country. ASHRAE already serves in this capacity as the Congressionally-authorized developer of commercial building energy codes for states. ASHRAE 189.1P would provide a testbed for more stringent versions of ASHRAE 90.1 and should make it more easy to implement new versions of the latter. ASHRAE's Bruce Hunn notes, however, that ASHRAE 189.1P broadens the scope of ASHRAE's activity beyond energy efficiency and indoor air quality to the other LEED categories, which has created "pushback" from some affected parties.<sup>123</sup> In October 2008, the 189.1P project committee was temporarily disbanded, due to conflicts over its composition and, reportedly, opposition from "building owners, the gas and electric industries, the steel construction industry, and wood interests."<sup>124</sup>

Although more states and localities may choose to use the institutional infrastructure being created and continually ratcheted up by USGBC, ASHRAE, and Energy Star, many will not. Only the federal government has the authority to change this hard fact. DOE could begin by more assertively implementing the provisions of the 1992 Energy Policy Act under which the Department certifies each new version of ASHRAE 90.1 and requires states to adopt it. Federal legislation may be necessary to give DOE the authority to sanction states that fail to update their codes to the newest version. More resources might also be devoted to federal activities that support states and localities in this effort, such as information dissemination and training.<sup>125</sup>

These measures will undoubtedly stir up resistance, but there is reason to hope that it will not be as intense as in the late 1970s. The technical landscape, the business climate, and the political atmosphere have all changed substantially since then, in no small part thanks to the efforts of the "green building" movement and its leading representative, USGBC. A more assertive federal role will free USGBC to continue to lead the "revolution," which has a long ways yet to run, rather than being forced into the awkward position of unelected policy-maker.

## *VII. A Brief Conclusion*

The history of USGBC and LEED demonstrates the creative capacity of U.S. civil society. A group of social entrepreneurs, far-sighted businesses, and committed volunteers have defined a product and created a market where none existed before. Government authority has supported this process in crucial ways, such as through its power to procure and lease buildings, but this authority has been exercised in a decentralized and incremental fashion. In a period in which the

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<sup>122</sup> Hammack interview; Hogan interview; Hunn interview; Hicks interview.

<sup>123</sup> Hunn interview.

<sup>124</sup> Tristan Korthals Altes and Nadav Malin, "Uncertain Future for ASHRAE Standard 189," BuildingGreen.com, updated October 29, 2008, <<http://www.buildinggreen.com/auth/article.cfm/2008/10/17/Uncertain-Future-for-ASHRAE-Standard-189/>>.

<sup>125</sup> More detailed recommendations along the same lines can be found in American Physical Society, *Energy Future: Think Efficiency*, September 2008. The MIT Energy Innovation Pathways Project may advance its own recommendations in the coming months.

federal government has been either unable or unwilling to create a national regulatory system for building energy efficiency and in which the perceived public interest in this issue has been weak, this uniquely American approach fostered substantial action when none might have occurred otherwise.

USGBC has built a brand and intends to leverage that brand to accelerate the pace of market transformation toward “green building”. But “green buildings” are not necessarily energy efficient buildings, and a voluntary approach to building energy efficiency is inevitably limited in reach. USGBC cannot and should not try to be the primary arbiter of building energy codes in the U.S. That would undermine its own capacity to achieve its mission, which is to push the upper bounds of the industry mainstream. Government, led by the DOE but in necessary collaboration with states and localities, and with the support of civil society institutions such as USGBC and ASHRAE, must exercise its authority to bring along the rest of the industry. The achievements to date, as numerous USGBC interviewees stressed, represent only a beginning toward making sure that the construction industry does its share to reduce greenhouse gas emissions.<sup>126</sup>

“I see the states, across this big nation  
I see the laws made in Washington, D.C.  
I think of the ones I consider my favorites  
I think of the people that are working for me”  
- *Don't Worry About the Government*, Talking Heads '77

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<sup>126</sup> The global construction industry as a whole lags behind even the U.S. The World Green Building Council was formed in 1999 to foster a global process of market transformation, and the USGBC plays a leading role in it. The concept of “green building” and the LEED system itself are diffusing rapidly internationally.



***Appendix: Interviews***

Bisacquino, Tom, President, National Association of Industrial and Office Properties, September 9, 2008, Herndon, VA (with John Bryant, Senior Director for Federal Affairs)

Gottfried, David, founder, USGBC, September 16, 2008, by phone (San Francisco, CA).

Erwin, Jason, Buildings Program Manager, Consortium for Energy Efficiency, August 19, 2008, San Diego, CA.

Hammack, Katherine, founding member, USGBC, September 2, 2008, by phone (Phoenix AZ).

Hicks, Thomas W., Vice President for International Affairs, USGBC. July 14, 2008, Washington, DC

Hoffman, Marc, President, Consortium for Energy Efficiency, July 29, 2008, Boston, MA.

Hogan, John, Senior Energy Analyst, City of Seattle, August 5, 2008, Seattle WA

Horn, Donald, Director, Sustainability Design, U.S. General Services Administration, August 7, 2008, Seattle WA.

Hubbell, Ward, President, Green Building Initiative, September 9, 2008, by phone (Portland OR).

Hunn, Bruce, Director, Strategic Technical Programs, ASHRAE, August 5, 2008, by phone (Atlanta GA).

Hydes, Kevin, former chair, USGBC, September 10, 2008, by phone.

Lupnacci, Jean, Director, Commercial Building Program, Energy Star, U.S. Environmental Protection Agency, July 31, 2008, Washington DC.

Marseille, Tom, Principal, Stantec Consulting, August 7, 2008, Seattle WA.

McAteer, Michael, National Grid, July 29, 2008, Waltham MA.

McLennan, Jason, President, Cascadia chapter, USGBC and CGBC, August 28, 2008, by phone (Seattle WA).

Opitz, Mike, USGBC, August 20, 2008, San Diego CA.

O'Reilly, Jim, Northeast Energy Efficiency Partnership, July 29, 2008, Lexington MA (with Carolyn Sarno and Isaac Elnecape).

O'Connell, Tim, Associate, HOK, September 12, 2008, Washington DC.



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