Green Buildings and Plugging the Gaps in Environmental Laws

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I. INTRODUCTION

Green buildings are not just cloaked as an architect's dream, an engineer's challenge, an accountant's tax credit, or a contract claim for attorneys. They have emerged from those technical black boxes and stand as building blocks for a better environment. They can address gaps in the law and should be part of innovative environmental and safety compliance. It is time to make that broader green building-compliance gap connection. To be sure, there are technical standards to be aware of. They are noted as concepts in this Article, but everything is new at some point, such as the intricacies of electronic discovery to litigators. In short, this Article addresses the question of why more environmental professionals should learn about green buildings.

Air, water, and waste issues dominate our regulatory horizon.[1] Command and control policies (permits) and enforcement (penalties) are still the trend for environmental compliance in the United States.[2] The United States Environmental Protection Agency (EPA) intended to

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1. *See* OFFICE OF ENFORCEMENT & COMPLIANCE ASSURANCE, EPA, NATIONAL PROGRAM MANAGER GUIDANCE 6 (2012).

2. *See id.*

reduce investments in its self-policing policy in the 2013 fiscal year,[3] possibly due to doubt that it significantly reduced pollution. That leaves a piecemeal approach to compliance—those who voluntarily comply and those who do not comply but are caught. Those in the middle must simply be trusted. There lies the compliance gap.

Environmental compliance is enhanced by focusing on what all polluters have in common: buildings. I am referring to pollution in the societal context, not just in the industrial sectors. We all pollute.

Buildings can serve to minimize air, water, and waste problems significantly, even if they do not represent a panacea to all environmental problems. Buildings serve us all, and they are omnipresent almost worldwide where human populations exist. They all must be built, maintained, or, in time, reconstructed, repaired, or renovated. "Greening" buildings is the direction to follow.

But what does "green" mean? Certainly it is not a simple definition of color. Independent objective standards may prove helpful to determine whether a building qualifies for a green status.[4] Several organizations issue green building guides,[5] and the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) is prominent among them. For instance, LEED has several rating guides for different types of building projects: new construction, operation and maintenance of existing buildings, leases, homes, neighborhoods, retail, health care, schools, and so on.[6]

Building teams may register their buildings with these organizations and usually demonstrate through third-party verification that they are "green" by meeting specific features, not only through estimates, but now also by performance. Prerequisites and credits are achievable by various prescriptive and innovative approaches for categories of siting, water efficiency, energy and atmosphere, materials and resources, indoor

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3. *Environmental Update: Potential Changes to EPA Self-Policing Incentives*, THOMPSON HINE (Dec. 6, 2012), http://www.thompsonhine.com/publications/publication2602.html.

4. *Cf.* 16 C.F.R. § 260.6 (2013) (indicating third-party objective certification required to avoid deceptive marketing).

5. Examples of green building guides are BREEAM, Built Green, CASBEE, Green Globes, Green Star, LEED, Living Building Challenge, NAHB Model Green Home Building Guidelines, and Passive House. *See A Natural Choice: How Wood Contributes to Sustainability's Triple Bottom Line*, MCGRAW-HILL CONSTRUCTION (Sept. 2011), http://continuingeducation.construction.com/article.php?L=221&C=823&P=7. There is also an International Green Construction Code for use as a model by local governments. *See International Green Construction Code*, INT'L CODE COUNCIL, http://www.iccsafe.org/cs/IGCC/Pages/default.aspx (last visited Nov. 21, 2013).

6. *LEED Rating Systems*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/leed/rating-systems (last visited Sept. 4, 2013).

air quality, and regional specifics.[7] These are point-chasing systems. Certainly certifications are awarded, which have value for public relations, tax credits, expedited permits, and zoning, but LEED criteria can also be used as guidelines to improve the built environment.

Therefore, in the following Parts, I will address select air, water, and waste issues in terms of green building initiatives, particularly by using LEED certification criteria under the existing version 3 of USGBC's *Green Building Design and Construction* (adopted in 2008) and the new version 4 (approved by USGBC in July 2013, and launched and phased-in at the Greenbuild International Conference in November 2013) (LEED version 4 or v4).[8]

These LEED "specifications" or guidelines are used herein in a composite or conceptual sense to show how green buildings overall can help us meet many environmental challenges. Green guidelines for credit require meeting design and performance parameters to reduce indoor and outdoor air pollution, stormwater pollution, waste generation, and water and energy use, with results reviewable by third parties. LEED also has criteria for siting, such as protecting sensitive lands,[9] but more innovative habitat preservation or creation is beyond the scope of this Article. That criteria is mainly to preserve habitat, not to comprehensively restore it. Credits for the use of regional materials and certified wood products also address reduced transportation emissions and habitat preservation.

II. TRENDS

USGBC reports that 1.5 million square feet of space are being certified daily under LEED.[10] This includes 54,000 projects participating worldwide, with 9.7 billion square feet of construction space in more than 140 countries and territories, as well as 40,000 residential LEED-certified units and 100,000 more homes registered.[11]

Executive Order 13,514, issued on October 5, 2009, mandates energy efficiency, greenhouse gas reduction, and high-performance

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7. Stanley A. Millan, *FAR in the LEED in Going Green*, PROCUREMENT LAW., Winter 2011, at 7, 8.

8. *See generally LEED v4*, U.S. GREEN BLDG. COUNCIL, http://www.usgbc.org/Leed/v4 (last visited Nov. 21, 2013).

9. Millan, *supra* note 7, at 8. Wetlands, prime farmland, and streams are examples of resources to protect.

10. Press Release, U.S. Green Bldg. Council, USGBC's LEED v4 Passes Ballot and Will Launch This Fall (July 10, 2013), *available at* http://www.forconstructionpros.com/press_release/10984644/usgbc-LEED-v4-passes-ballot.

11. *Id.*

sustainable federal building design and operation.[12] The General Services Administration (GSA) and other federal agencies have sustainability design programs often using LEED.[13]

The Green Building Certification Institute (GBCI), the certifying arm of USGBC, reports that over 60,000 trained LEED accredited professionals with specialty certification currently exist in the United States to assist in LEED certification.[14] Although a LEED accredited professional is not absolutely required for project certification, LEED training is necessary.

The Turner Construction's "Green Building Market Barometer" and other surveys report that there is increasing demand for green buildings, growing from $10 billion in 2005, to an estimated $85 billion in 2012, and predicted to exceed $200 billion by 2016.[15] Reasons reported for "greenness" included human health, energy efficiency, and water efficiency. However, the interest in LEED certification declined among those surveyed from 61% in 2008, to 48% in 2012.[16] The preference for Energy Star is increasing among executives when compared to the relatively complex LEED.[17] Even the National Defense Authorization Act for Fiscal Year 2013 restricts the use of additional federal funds for above basic LEED certification levels.[18] Some of the other negatives for LEED and similar systems include cost, payback period, and politics.

The Energy Star certification is an emerging choice and is based on EPA criteria, is simpler than LEED at the facility level, focuses on the energy efficiency of products with third-party verification (e.g., heat pumps and refrigerators), and allows for building certification by an engineer's verification that it is in the top 25% of performers in a given

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12. Exec. Order No. 13,514, 74 Fed. Reg. 52,117 (Oct. 8, 2009).

13. *See Sustainable Design*, U.S. GEN. SERV. ADMIN., http://www.gsa.gov/portal/content/104462 (last modified Sept. 17, 2013).

14. Rob Cassidy, *GBCI: New Kid on the Block*, BLDG. DESIGN & CONSTRUCTION, June 2013, at CE3, *available at* http://www.editiondigital.net/print.php?issue_id=161835&pages=1,79,70.

15. Erin Weaver, *Green Building Sees Growth, but Fewer Firms Pursue LEED*, BUILDINGGREEN.COM (Jan. 1, 2013), http://www.buildinggreen.com/auth/article.cfm/2012/12/31/Green-Building-Sees-Growth-But-Few-Firms-Pursue-LEED.

16. *Turner Construction Company's Latest Green Building Market Barometer Reveals New Findings on Green Buildings and Certification*, TURNER CONSTRUCTION CO. (Nov. 8, 2012), http://www.turnerconstruction.com/news/item/30a1/Turner-Construction-Companys-Latest-Green-Building-Market-Barometer-Reveals-New-Findings-on-Green-Buildings-and-Certification.

17. Weaver, *supra* note 15.

18. H.R. 1540, 112th Cong. § 2830(b)(1) (2012).

industry.[19] However, in 2010, the Government Accountability Office (GAO) reported that Energy Star is largely self-certified by manufacturers with test data not verified by third parties, and a GAO "sting" operation found the program was susceptible to fraud and abuse.[20] Although aftermarket testing and self-policing were available, the EPA and the United States Department of Energy agreed in April 2010 that the program needed revamping, such as submission of complete lab data from accredited labs for independent review against Energy Star specifications.[21] This leads to criticism of green building standards addressed in the next Part.

III. CLIMATE CHANGE—OUTDOOR AIR

This Article is not a debate. Even if man-made activities are uncertain in climate cycles, it would be best to take our speculation out of the climate change equation. Since the United States Supreme Court held that the EPA has authority to regulate greenhouse gases such as carbon dioxide and methane under the Clean Air Act,[22] Congress and the EPA have gone their separate ways. The EPA found that greenhouse gases threatened public health and welfare,[23] regulated greenhouse gases from mobile sources (motor vehicles),[24] phased in regulation of greenhouse gas emissions from large stationary sources (facilities),[25] and proposed regulation of greenhouse gases from new natural gas and coal-fired power plants.[26] Meanwhile, the 111th Congress failed to pass a "cap and trade" program or other greenhouse gas reduction goal legislation.[27] Carbon taxes are still debated. This leaves U.S. climate control to the guise of innovative EPA rulemaking under existing law. This avenue is potentially weak.

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19. *See* U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-10-470, ENERGY STAR PROGRAM: COVERT TESTING SHOWS THE ENERGY STAR PROGRAM CERTIFICATION PROCESS IS VULNERABLE TO FRAUD AND ABUSE 2 (2010); Weaver, *supra* note 15.

20. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 19, at 15.

21. *2010 DOE/EPA Partnership Work Plan*, ENERGY STAR (May 7, 2010), http://www.energystar.gov/ia/partners/downloads/mou/2010_DOE-ES_Work_Plan.pdf.

22. Massachusetts v. EPA, 549 U.S. 497, 528 (2007).

23. Press Release, EPA, EPA: Greenhouse Gasses Threaten Public Health and the Environment (Dec. 7, 2009).

24. *See* 40 C.F.R. §§ 85, 86, 600 (2012); 49 C.F.R. §§ 531, 533, 538 (2012).

25. *See* Coal. for Responsible Regulation, Inc. v. EPA, 684 F.3d 102, 129 (D.C. Cir. 2012) (per curiam) (upholding EPA's rules).

26. *Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units*, EPA (Sept. 20, 2013), http://www2.epa.gov/sites/production/files/2013-09/documents/20130920proposal.pdf.

27. *See* American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009); Clean Energy Jobs and American Power Act of 2009, S. 1733, 111th Cong. (2009).

Similarly, binding international climate control emission reductions have not been realized since the Kyoto Protocol was issued in 1997.[28] The Intergovernmental Panel on Climate Change, however, continues to issue dire reports.[29] This leaves us with a lot of talk and no substantial action. Furthermore, no one nation can act alone in addressing climate change. Global leadership is required.

The United Nations has, conservatively, forecast that residential and commercial buildings account for approximately one-third of all energy-related greenhouse gas emissions worldwide, and that is expected to increase in the future.[30] As buildings are constructed, renovated, or updated, there lies low-hanging fruit to pluck and significantly reduce human greenhouse gas emissions over the coming decades.[31] An initial commitment, rather than forced compliance, is an answer. How can green building guides help?

First, as an aside, two principal criticisms of guidelines like LEED must be addressed—added cost and poor performance. As seen, these negatives have caused some public enthusiasm for green buildings to wane. Estimates include a 2% to 4% increase in the cost of green buildings over traditional ones.[32] Much of this financial impact may be due to a lack of initial coordination and early planning among the parties—owners, architects, engineers, contractors, and landscapers—which inevitably results in contract change orders, tear-outs, delays, and excess costs.[33] Early integration of the parties at the predesign, design, and specification stages of the planning process is a cure. An early overall site assessment will also benefit integration.

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28. *See* Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (1998); *The Global Climate Change Regime*, COUNCIL ON FOREIGN RELATIONS, http://www.cfr.org/climate-change/global-climate-change-regime/p21831 (last updated June 19, 2013).

29. *See Reports*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml (last visited Sept. 4, 2013). The Fifth Assessment Report was recently issued. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS (2013).

30. UNITED NATIONS ENV'T PROGRAMME, ASSESSMENT OF POLICY INSTRUMENTS FOR REDUCING GREENHOUSE GAS EMISSIONS FROM BUILDINGS: SUMMARY AND RECOMMENDATIONS 1 (2007).

31. Clark Brockman, Keynote Address at the Tulane University Case Studies in Sustainable Design Symposium: Tomorrow's Built Environment, Today (Nov. 3, 2012). *See generally* Clark Brockman, *Imaging* Tomorrow's *High Performance Neighborhoods* Today, SERA (May 10, 2012), http://www.serapdx.com/wp-content/uploads/Tomorrows-Neighborhoods-Today_c.pdf.

32. Millan, *supra* note 7, at 8.

33. *Id.*

LEED version 4 adds the "integrative process" as a prerequisite to support high-performance and cost-effective outcomes through early analyses.[34] Assessments of site conditions, building forms, building envelope attributes (e.g., insulation, glazing, and shading), and sizing of building systems (e.g., HVAC and lighting) are accomplished under the LEED standard for energy, plumbing, and electrical systems.[35] Assessment of water demand, water sources, and plumbing is accomplished for water systems.[36] This integration process achieves early synergies among disciplines and systems to control and reduce costs. Missteps are thus avoided.

Occasional lack of energy system performance may also be due to lack of tenant training or equipment failure. LEED historically has been mostly a design standard rather than a pure performance-based standard.[37] GBCI has requested voluntary reporting of energy and water use data from certified projects in recent years, but the value of that data to the public is unknown. Version 4 cures that weakness by stressing features for more building commissioning (performance trials like a shakedown cruise for a sea vessel), verification, operation and maintenance, planning, and metering energy performances.[38] LEED will be more performance-based in the future. Other LEED criticisms such as qualified sources for wood-certified products are also being addressed in version 4.[39]

This leads right back into the substance of LEED credits for energy and atmosphere. Energy efficiency, renewable energy, reduction in demand, building orientation, green power, and verification and metering are keys.[40] The concept here is that a green building must remain energy efficient to demonstrably save costs and reduce greenhouse gas emissions. Reduction in energy used must not only be modeled against

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34. *Integrative Process*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/node/2613097 (last visited Aug. 28, 2013).

35. *See id.*

36. *Id.*

37. *See* Millan, *supra* note 7, at 10. Voluntary reporting of performance is currently encouraged by GBCI.

38. *See* U.S. GREEN BLDG. COUNCIL, GREEN BUILDING DESIGN AND CONSTRUCTION 213-14 (2009) [hereinafter GREEN BUILDING DESIGN AND CONSTRUCTION]; *Fundamental Commissioning and Verification*, U.S. GREEN BLDG. COUNCIL, http://www.usgbc.org/node/2612328 (last visited Sept. 26, 2013).

39. An alternative compliance path to Forest Stewardship Council (FSC) products, favored by USGBC, is allowed in version 4 for USGBC "approved equivalents." *See* Letter from Chris Isaacson, Exec. Vice-Pres., Ala. Forestry Ass'n et al., to Allen Skodowski, Chair, USGBC Exec. Comm. of the Bd. et al. (Aug. 1, 2013) (on file with author). However non-FSC entities are still displeased. *See id.*

40. Millan, *supra* note 7, at 8.

technical American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) standards,[41] but will also be performed over time.

For instance, *minimum* energy credits can be earned for a 10% energy reduction (improvement) for new construction or a 5% improvement in major renovations, or up to a 50% improvement for *optimal* energy credits.[42] This stretch of "before and after" improvements can be demonstrated by comparing baseline simulation models with proposed green performance or through prescriptive ASHRAE designs. Verification is again achieved through system commissioning. Commissioning requires one to prepare an operation and maintenance plan, measurement requirements, action plan for errors and deficiencies, training plan, system manual updates, seasonal testing, and so forth.[43] These initiatives, when coupled with advanced metering, trace energy use and identify additional savings. Innovation, like demand-response programs of lower energy use during peak loads, produces more savings for the user and environment.[44]

Although past green energy use failures exist, there are also LEED success stories. USGBC estimated in 2008 that LEED-certified buildings performed on average 25% to 30% better for energy use than nongreen buildings.[45] The Key Financial Center green building in Idaho saved over 500,000 kilowatt-hours annually, enough to serve more than thirty houses.[46] The Gulyas' passive green home in Indiana uses four kilowatt-hours per square foot per year, making it super energy efficient.[47]

The demand for building commissioning and measurement and verification (M&V) has changed over the years.[48] Once, these costs were

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41. ASHRAE is an international technical society to advance the arts and sciences of heating, ventilation, air conditioning, and refrigeration. ANSI/ASHRAE/IES Standard 90.1-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings (2010).

42. GREEN BUILDING DESIGN AND CONSTRUCTION, *supra* note 38, at 237, 257, 284.

43. *See id.* at 214.

44. *See Demand Response*, U.S. GREEN BLDG. COUNCIL, http://www.usgbc.org/node/2606878 (last visited Sept. 5, 2013).

45. CATHY TURNER & MARK FRANKEL, ENERGY PERFORMANCE OF LEED FOR NEW CONSTRUCTION BUILDINGS 31 (2008).

46. *Custom Efficiency for Complex Projects*, IDAHO POWER, http://www.idahopower.com/pdfs/EnergyEfficiency/CustomEfficiency/KeyFinancialCenterEnergyEfficiencySuccessStory.pdf (last visited Sept. 25, 2013).

47. *Real Numbers for a LEED for Homes Indiana Success Story*, ALLIANCE FOR ENVTL. SUSTAINABILITY (Aug. 5, 2012), http://www.alliancees.org/2012/08/05/leed-for-homes-indiana-success-story/.

48. *LEED Stories from Practice Article Building Management*, U.S. GREEN BLDG. COUNCIL 1 (Dec. 17, 2012), http://www.usgbc.org/sites/default/files/StoriesfromPractice_BuildingMgmt.pdf.

thought to be unnecessary. Building owners came to recognize that reducing energy consumption and realizing cost savings required more project teams working with building operations and facility managers to identify discrepancies between energy modeling and actual usage data. Solutions to discrepancies can then be achieved, and lessons learned can inform future projects. For instance, monitoring at a California school disclosed that energy loads increased due to lighting being left on unnecessarily all night and due to the use of old commercial freezers.[49] Better energy monitoring and personnel training were also needed as solutions.[50] A Portland center following the Energy Star protocol for daily monitoring found a way to compensate for energy use during heat waves, including shutting down HVAC systems in evenings and starting them earlier in the morning.[51] At the Biodesign Institute in Arizona, ongoing commissioning exists to tweak building energy systems to address actual usage.[52] Energy Star for certified buildings has energy audits for system performance, benchmarks, and improvements as part of its energy efficiency guides.[53]

LEED will now more fully adopt commissioning and verification as part of comprehensive performance credits. A new version 4 Energy and Atmosphere credit provides: "*Intent*[.] To further support the design, construction, and eventual *operation* of a project that meets the owner project requirements related to energy, water, indoor environmental quality and durability."[54] This intent is accomplished by enhanced commissioning, enhanced and monitoring-based commissioning, or envelope commissioning of the building's thermal envelope and its mechanical and electrical systems.

Green buildings further serve to reduce greenhouse gases by accommodating green vehicles, locating near mass transit, using renewable energy (e.g., solar), reducing outdoor lighting, and owners purchasing green power, renewable energy certificates, and carbon offsets from greenhouse gas emission reduction projects.

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49. *Id.* at 2.
50. *Id.*
51. *Id.* at 4.
52. *Id.* at 5.
53. *See Plant Energy Auditing*, ENERGY STAR, http://www.energystar.gov/buildings/facility-owners-and-managers/industrial-plants/improve/plant-energy-auditing (last visited Aug. 27, 2013).
54. *Pilot Credit 65: Monitoring Based Commissioning*, U.S. GREEN BLDG. COUNCIL 1, http://www.usgbc.org/Docs/Archive/General/Docs18552.pdf (last updated Mar. 1, 2012) (emphasis added).

IV. INDOOR ENVIRONMENT

The Clean Air Act regulates "ambient air," the air around us, and the EPA reads this to mean outside air (air outside fence lines only), but not indoor air.[55] Indoor chemicals could be regulated by the Toxic Substances Control Act (TSCA).[56] However, TSCA regulation of existing chemicals has been low since 1976 (approximately 5 out of 80,000),[57] and its regulation of new chemicals is restricted by a demanding statutory finding of "unreasonable risk."[58] Additionally, its public disclosure of chemical ingredients is restricted by proprietary claims.[59] The United States Occupational Safety and Health Administration (OSHA) has authority to regulate indoor air in the work place, but it has limited itself mostly to general duty standards and has specific standards only for a relatively moderate list of industrial chemicals (asbestos, ammonia, benzene, formaldehyde, etc.).[60] OSHA did propose more comprehensive indoor air regulation in 1994, but retreated in 2001.[61] OSHA considered "sick building syndrome," which are building-related illnesses, and tobacco smoke before proposing the regulation in 1994.[62] Now it is up to employers and local and state governments to regulate indoor air quality with only federal guidance.[63] Is that enough?

Future health concerns are voiced because past energy conservation measures have reduced exchanges between outdoor fresh air and indoor air. Low ventilation and the presence of numerous sources of synthetic and volatile organic compounds (chemicals) cause health complaints of

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55. 40 C.F.R. § 50.1(e) (2013). "Ambient air means that portion of the atmosphere, external to buildings, to which the general public has access." *Id.* (emphasis omitted). This refers to outside air or a fence line definition of ambient air.

56. *See What Is TSCA?*, SAFER CHEMS. HEALTHY FAMILIES, http://www.saferchemicals.org/resources/tsca.html (last visited Aug. 27, 2013); *see also* 15 U.S.C. § 2601 (2012).

57. *What Is TSCA?*, *supra* note 56.

58. *TSCA Section 6 Actions*, EPA, http://www.epa.gov/opptintr/existingchemicals/pubs/sect6.html (last updated July 18, 2012).

59. *Confidential Business Information*, EPA, http://www.epa.gov/opptintr/tsca8e/pubs/confidentialbusinessinformatio.html (last updated Apr. 29, 2013).

60. 29 C.F.R. § 1910.1000 (2013).

61. *See* Indoor Air Quality, 59 Fed. Reg. 15,968 (Apr. 5, 1994) (to be codified at 29 C.F.R. pts. 1910, 1915, 1926, 1928); Indoor Air Quality, 66 Fed. Reg. 64,946 (Dec. 17, 2001) (to be codified at 29 C.F.R. pts. 1910, 1915, 1926, 1928).

62. Request for Information on Occupational Exposure to Indoor Air Pollutants, 56 Fed. Reg. 47,892 (Sept. 20, 1991) (to be codified at 29 C.F.R. pt. 1910).

63. *See* OCCUPATIONAL SAFETY & HEALTH ADMIN., OSHA 3430-04, INDOOR AIR QUALITY IN COMMERCIAL AND INSTITUTIONAL BUILDINGS 9-10 (2011).

sick building syndrome.[64] Respiratory diseases, allergies, and asthma are believed to be attributed to poor indoor air quality.[65] These impacts can be significantly felt by the impoverished in particular.

Green buildings take a holistic view to indoor air quality: controversial product disclosure, ventilation and monitoring, reduction of products emitting volatile organic compounds, indoor air quality management plans, and construction air testing and air flushing.[66] No indoor tobacco smoking is a given.

LEED credit is given for usage of controversial building product disclosures that are third-party verified for parameters such as reduction in greenhouse gases, upper stratospheric ozone eaters, and low-level ozone.[67] This includes environmental product disclosures of raw materials and material ingredients for furniture, insulation, pipes, ducts, plumbing fixtures, faucets, lamp housings, and so forth.[68] This new knowledge allows a better informed choice of building interiors.

Indoor air quality performance is ASHRAE-driven for mechanically and naturally ventilated spaces and aided by monitoring air flow with measurement devices (e.g., for carbon dioxide). Strategies for indoor air include prevention of cross-contamination from garages, housekeeping, and copy rooms as well as particle filtration, air-cleaning devices, and material handling plans to reduce the likelihood of contamination.

A low-emitting interior is also a vital part of indoor air quality. To meet the LEED credit, low-volatile-organic-compound products are needed for flooring, ceilings, walls, insulation, and furniture. Again, standards, such as model state laws, are used for products,[69] e.g., documented low formaldehyde emissions for composite wood products.

Green buildings can also go beyond air quality by providing indoor comfort to workers: reducing glare, adding thermal comfort and good acoustics, using good lighting, and addressing ergonomics.[70] This potentially addresses worker health and safety more comprehensively

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64. Junfeng Zhang & Kirk R. Smith, *Indoor Air Pollution: A Global Health Concern*, 68 BRIT. MED. BULL. 209, 211 (2003).

65. *Id.*

66. GREEN BUILDING DESIGN AND CONSTRUCTION, *supra* note 38, at 402, 405.

67. *Building Product Disclosure and Optimization-Environmental Product Declarations*, U.S. GREEN BLDG. COUNCIL, www.usgbc.org/node/2616376 (last visited Sept. 15, 2013).

68. *See Low Emitting Materials*, U.S. GREEN BLDG. COUNCIL, www.usgbc.org/node/2614095 (last visited Sept. 15, 2013).

69. *E.g.*, INDOOR AIR QUALITY SECTION, CAL. DEP'T OF PUB. HEALTH, STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS VERSION 1.1, at 2-3 (2010).

70. *See, e.g.*, *Ergonomics Strategy*, U.S. GREEN BLDG. COUNCIL, http://www.usgbc.org/node/2606916 (last visited Sept. 25, 2013).

than OSHA.[71] Comfortable workers are likely more satisfied, more productive, and less inclined to injury or illness.[72]

Indoor green building standards are potentially more proactive and can thus exceed OSHA guidance for indoor environmental quality—the stepchild of environmental law. They also exceed EPA and American Society for Testing and Materials International (ASTM International) standards for vapor intrusion controls of contaminated sites.[73] LEED, of course, can cover any site, not just those on redeveloped brownfields.

V. WATER EFFICIENCY AND QUALITY

The Clean Water Act has several programs, and prevention of water pollution from industrial and construction activity stormwater discharges is an important aspect.[74] Reducing polluted stormwater is still an aggressive goal of the EPA's Office of Enforcement and Compliance.[75] Controversial stormwater pollution regulation still breeds Supreme Court litigation for such things as logging roads and municipalities.[76] Water rights and usage, however, are mainly state law games.

Green building standards address both water quality and usage efficiency.[77] They complement and synthesize legal compliance. Compliance with state stormwater construction permits and pollution prevention plans is a given. Further, reduction in volume of indoor water demand (flow and flush fixtures), outdoor water demand (landscape irrigation), and process water demand (kitchen, laundry, and cooling towers) is assessed against a project's water budget. This analysis is used to reduce potable water loads. Additionally, assessing potential nonpotable water supply sources (e.g., rainwater, gray water, and condensate) can further conserve municipal water supply and waste water treatment systems. Green infrastructures (e.g., green vegetated

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71. *Cf. Ergonomics Enforcement*, OCCUPATIONAL SAFETY & HEALTH ADMIN., http://www.osha.gov/SLTC/ergonomics/faqs.html (last visited Aug. 27, 2013).

72. *Pilot Credit 44: Ergonomics Strategy*, U.S. GREEN BLDG. COUNCIL, http://usgbc.org/Docs/Archive/General/Docs10097.pdf (last updated Mar. 1, 2012).

73. *See generally* ASTM INT'L, E-2006-10, STANDARD GUIDE FOR ASSESSMENT OF VAPOR ENCROACHMENT SCREENING ON PROPERTY INVOLVED IN REAL ESTATE TRANSACTIONS 11-17 (2010); Potential Addition of Vapor Intrusion Component to the Hazard Ranking System, 76 Fed. Reg. 5370 (Jan. 31, 2011) (EPA vapor intrusion plans at Superfund sites); 42 U.S.C. § 9601 (2006).

74. *See* 33 U.S.C. §§ 1251, 1342(p) (2006).

75. OFFICE OF ENFORCEMENT & COMPLIANCE ASSURANCE, *supra* note 1, at 6.

76. *See, e.g.*, Decker v. Nw. Envtl. Def. Ctr., 133 S. Ct. 1326 (2013); L.A. Cnty. Flood Control Dist. v. Natural Res. Def. Council Inc., 133 S. Ct. 710 (2013).

77. GREEN BUILDING DESIGN AND CONSTRUCTION, *supra* note 38, at 165, 194.

roofs, retention basins, rain gardens, and reduced impervious structures) can also reduce municipal stormwater pollution.[78]

VI. WASTE REDUCTION

The EPA regulates and oversees hazardous waste disposal and permits through the Resource Conservation and Recovery Act, and states regulate solid waste disposal and permits through state laws.[79] Regardless of the technologies used to identify, store, transport, treat, and dispose of such wastes, it is best to legitimately and safely recycle material after use in order to reduce waste generation. In fact, the EPA has wrestled with the idea of legitimate waste recycling as an alternative to full-scale waste regulation for decades, including confronting environmental justice concerns.[80] Green buildings address this issue head-on, mostly for construction material and waste other than hazardous waste, but sustainable site credits can also be earned for developing green buildings on former brownfield (contaminated) sites.

LEED version 4 continues its program for new-construction waste management, including during construction, maintenance, renovation, and operation of existing buildings. LEED prerequisites include having in place an environmentally preferable purchasing policy to reduce environmental harm.[81] This includes a policy for the most purchased products, like paper, toner, batteries, lamps, and food, as well as durable office goods. A solid waste management policy is also needed to divert a large percentage of waste from landfills and achieve reuse.

Another waste reduction prerequisite is a facility maintenance and renovation policy. Besides indoor air quality (using filters, air flushing, and testing), practices in favor of purchasing recyclable products and materials for facility maintenance and renovation as well as for waste diversion goals are needed.

Maintenance of a waste reduction and recycling program is creditable for materials and resources, e.g., 50% for ongoing waste and 75% for durable goods.[82] Safe disposal of discarded batteries and mercury-containing lamps is an addition to the program. Solid waste

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78. Each year the "Water Challenge" gives individuals in New Orleans and surrounding areas an opportunity to develop ideas to better manage and live with stormwater.

79. 42 U.S.C. § 6901 (2006).

80. *See* Definition of Solid Waste, 76 Fed. Reg. 44,094, 44,102-03 (July 22, 2011) (to be codified at 40 C.F.R. pts. 260, 261, 266).

81. *Facility Maintenance and Renovations Policy*, U.S. GREEN BLDG. COUNCIL, http://www.usgbc.org/node/2613431 (last visited Aug. 28, 2013).

82. *Solid Waste Management*, U.S. GREEN BLDG. COUNCIL, www.usgbc.org/credits/mr21 (last visited Sept. 15, 2013).

management for facility maintenance and renovation includes diversion of 70% of waste away from landfills. Ongoing purchasing of 60% of consumables that meet EPA recycled content guidelines or that meet other criteria (e.g., certified wood products) is creditable.[83] Additionally, 40% of purchases of electric-powered equipment must meet the Energy Star or better rating or replace gas-powered equipment.[84] Material reuse for construction purposes is also creditable.[85]

Therefore, green building guidelines can surpass law and make waste reduction part of the life cycle of green buildings and the culture of building occupants.

VII. POLICY CONSIDERATIONS

What role do green buildings play in the environmental law setting?

Besides detailed rules, most statutes are set up in permit modes and compliance or enforcement modes.[86] That is, the regulated community must apply for and obtain various air, water, waste, and other permits or certificates to build and operate their businesses. If not, they face enforcement. Even if they obtain required permits, they still must continually comply with permits or else face enforcement. Green buildings can have a place in both permitting and enforcement.

For instance, in clean air permitting for air pollutants (which now includes greenhouse gases), permit conditions often require applicants to "offset" some of their air emissions.[87] This means the permit applicant has to shut down or buy out another existing source of similar air pollution at a similar or greater amount of pollution than the new source's potential emissions. These offsets must be verifiable, and if the reduced emissions are more than legally required, those offset emissions can qualify as early emission-reduction credits and be traded to other regulated firms that need to offset emissions at a new facility.[88]

There are legal issues in mandating greenhouse gas offsets and trades in the existing structure of the Clean Air Act.[89] For instance, most

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83. *EBOM-2009 MRc1: Sustainable Purchasing—Ongoing Consumables*, LEED USER, www.leeduser.com/credit/EBOM-2009/MRc1 (last visited Sept. 15, 2013).

84. *LEED for Existing Buildings: Operations & Maintenance Recertification Guidance*, U.S. GREEN BLDG. COUNCIL 64 (Oct. 2013), www.usgbc.org/sites/default/files/Recertification%20Guidance%26Oct2013.pdf.

85. *Solid Waste Management*, *supra* note 82.

86. *See, e.g.*, STANLEY A. MILLAN, ANNE J. CROCHET & ROGER A. STETTER, LOUISIANA PRACTICE SERIES: LOUISIANA ENVIRONMENTAL COMPLIANCE §§ 3:1, 5:1-:76 (2012-13 ed. 2012).

87. *See, e.g.*, *id.* § 5:13.

88. Nathan Richardson, *International Greenhouse Gas Offsets Under the Clean Air Act* 3 (Resources for the Future, Discussion Paper No. 10-24, Apr. 2010).

89. *See id.* at 14.

criteria air pollutants are regulated on a county, regional, or state basis, and often on a transboundary basis. Greenhouse gases are, however, global in nature, and cleaning up a few isolated locations does not handle the climate change problem adequately. Many states still could devise models for such a new offset trade program outside of the traditional program or in state implementation plans.

The Clean Air Act already has a useful model for an air-emission-trading program for sulphur dioxide emissions in the acid rain program.[90] The concept works on the market theory that the polluter pays for the right to pollute.[91] Market forces should motivate a polluter to forge new ways to reduce their pollution, because new statutory disincentives (taxes, penalties, or fees for pollution units) are strong. Otherwise, their goods become too expensive and are not bought, sold, or produced for long.

For example, a thermal electric utility that burns coal can become a more efficient energy user but still will produce greenhouse gases. It may be too expensive for the utility to rely on new control technology for natural gas plants, to convert to a natural gas operation, or to shut down. However, the utility can invest in green building construction. Through energy and atmosphere LEED credits, this investment can reduce greenhouse gas pollution below the baseline for nongreen building energy usage. This reduction can be used to offset the utility's own greenhouse gas emission ceilings under a new state program.

The offset model could be merged into developing climate markets. President Obama's climate agenda speech on June 25, 2013, specifically addressed greenhouse gas emission controls for utilities,[92] but other industrial business sectors will follow. Market-based approaches (e.g., cap and trade) and Clean Air Act state implementation plans were also mentioned.[93] However, few states have effective carbon markets.[94] A California state program extends to offsets from projects such as forest

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90. *See* 42 U.S.C. § 7651 (2006).

91. *See* Stan Millan, *Federal Facilities and Environmental Compliance: Toward a Solution*, 36 LOY. L. REV. 319, 401 (1990).

92. President Barack Obama, Remarks at Georgetown University on Climate Change (June 25, 2013).

93. *See id.*

94. California is a notable exception with its Early Action Offset Program under the state's Cap-and-Trade Program. *See generally* Air Res. Bd., *Early Action Offset Credits*, CAL. ENVTL. PROT. AGENCY, http://www.arb.ca.gov/cc/capandtrade/offsets/earlyaction/credits.htm (last updated Aug. 20, 2013) (providing Early Action Program credit system).

management, but not to green buildings.[95] There is the potential to introduce green buildings into the California program as a nationwide model.

The original federal plan, the now defunct Waxman-Markey American Clean Energy and Security Act of 2009, proposed an emissions trading program.[96] Percentage cuts in greenhouse gas emissions were to be phased in based on industrial time lines. I propose using green buildings as an offset or credit to greenhouse gas emissions to the extent that they conceivably reduce such gases and to the extent an affected facility builds or invests in them. In the United States, this proposal would likely have to be part of a state-legislated program under a state implementation plan of the Clean Air Act.

Besides using market forces instead of command-and-control permits, green buildings can also enter the picture when there is noncompliance and enforcement needed on traditional environmental laws and permits. Typically, violators face administrative, civil, or criminal enforcement actions by federal, state, or local governments.[97] Penalties, fines, and injunctions are possible remedies. Penalties can be reduced with voluntary supplemental environmental projects as long as they have a nexus with the violation. Court orders can compel mandatory compliance through various protocols such as compliance audits. Enter green buildings.

Green buildings can be made mandatory through innovative ways of looking at permit mitigation, supplemental environmental projects, and compliance agreements. For instance, green buildings can be added as an alternative project that has mitigating measures for air or water discharge permits. In compliance litigation, an otherwise voluntary green building project that produces relevant environmental benefits can be used as a credit to penalties. In other civil and criminal litigation, settlements and decrees can impose green building obligations on violators. Environmental improvement conditioned on green building requirements may be environmentally preferable to general penalties, redundant abatement equipment, or buying distant wetland credits, which are the more traditional solutions.

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95. Press Release, Cal. Envtl. Prot. Agency, Air Resource Board Sets Stage for Carbon Offset Projects (Dec. 14, 2012), *available at* http://www.arb.ca.gov/newsrel/newsrelease.php?id=376.

96. American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

97. *See*, *e.g.*, MILLAN, CROCHET & STETTER, *supra* note 86, § 3:1; *Policy, Guidance & Publications*, EPA, http://www2.epa.gov/enforcement/policy-guidance-publications#sep (last updated July 16, 2013).

VIII. CONCLUSION

Green buildings have the capability to significantly address climate change, indoor air quality, stormwater pollution, water conservation, and recycling in ways that complement, and in some cases address gaps in or exceed, environmental and safety laws. They are voluntary choices now, but can be an adjunct to environmental law compliance. New markets can be developed to register, bank and sell, or trade greenhouse gas environmental offsets produced by green buildings.

Further protocols include "Living Building Projects," which holistically limit building growth, protect habitat, promote care-free living, protect sustainable water usage, rely on sustainable energy usage (e.g., solar), maximize occupant health, and promote excellent indoor air quality.[98] Such buildings produce their own power, recycle their own water, and produce resources for others. You cannot even park a motor vehicle near them—you must walk or bike. This goes beyond a facility's net-zero impact on the environment to producing positive net impacts. We cannot achieve the possible without confronting man-made limits. Therein lies the challenge of tomorrow's environmental professionals.

98. *See, e.g.*, *Lilypad, a Floating Ecopolis for Climate Refugees*, VINCENT CALLEBAUT ARCHITECTURES, http://vincent.callebaut.org/page1-img-lilypad.html (last visited Aug. 28, 2013).