



THE EMERGENCE OF GREEN BUILDING STANDARDS AND CODES

By **Tim Serie**,
American Coatings
Association

Green building is here to stay. Gone are the days when green building was viewed as merely a cutting-edge, progressive phenomenon, affecting only a few of the most environmentally friendly building projects. It is now fully incorporated into mainstream thought in the construction industry and is having a widespread influence. As green building programs flourish, they represent a fundamental change for the building and construction industry. This, in turn, signifies a difference in how paint and coatings are not only regulated, but how these products are evaluated, compared, specified, and selected. This article provides a background, outlining how the green building market is expanding and where it is evolving from voluntary programs to mandatory code requirements. Discussion on the Leadership in Energy and Environmental Design (LEED) rating system, the most prominent green building standard in the United States, will be woven in throughout. Also highlighted are emerging trends in this space—especially those that directly affect the paint and coating industry—such as the concept of healthy buildings and radical transparency.

THE RISE OF GREEN BUILDING

Sustainable design and construction, high performance building, or just simply “green building” all represent basically the same thing and can collectively be referred to as green building.¹

Green building is defined as an approach to the siting, design, construction, renovation, and operation of buildings to reduce the overall negative impact of the built environment on the natural environment and human health.² Green building is a broad term that is used to describe a number of activities under this umbrella, but most green building schemes seek to address a few key issue areas: the building location and site, energy efficiency, water conservation, materials and resources, pollution and waste, and indoor

environmental quality.³ Green building programs come in different forms—from voluntary rating and certification systems in the private market to binding government regulations and mandatory building codes. The rationale for high-performance green building stems from the desire to reduce the negative environmental impact of buildings and construction, save energy and money, conserve resources, and protect the health of building occupants.⁴ Many of the actual benefits are well-documented, but others may be exaggerated or illusory.⁵ Either way, the green building movement has continued to flourish since its inception a few decades ago.

Environmental laws have expanded from traditional forms—federal, state, and local government laws and regulations—to the private sphere, where standard-setting occurs through nongovernmental actions and institutions. This expansion beyond public law is referred to as “private environmental governance,” or, in essence, “actions taken by non-governmental entities that are designed to achieve traditionally governmental ends . . .”⁶ Consumers, corporations, nonprofit organizations, and other nonstate actors have sought to address environmental and human health concerns where government actors have left off. Green building is a significant form of private environmental governance that has emerged over the past decade outside the traditional public governmental framework. Private green building standards are generally developed through different processes involving a standard-setting organization’s staff, experts in the construction and design field, technical advisors, product manufacturers, and other interested stakeholders. Since the development of these green building programs lies outside the traditional governmental regulatory process with its associated safeguards, it is vital that green building certification programs or standards have a clearly defined development process that is open, balanced, and transparent, meeting full due process procedures.

“In 2012, green building was estimated to represent 44% of all commercial and institutional construction, and this piece of the pie is expected to grow to 55% by 2016.”

The LEED Rating System

Green building began as a small niche market in the 1990s outside the governmental regulatory world, and has since proliferated. In the United States alone, the value of green building has grown eightfold from 2005 to 2011.⁷ In 2012, green building was estimated to represent 44% of all commercial and institutional construction, and this piece of the pie is expected to grow to 55% by 2016.⁸ The LEED rating system has been at

the forefront of this growth. Since the launch of the LEED rating system in 2000, 102,742 projects are currently participating in LEED in some form, comprising more than 9.9 billion square feet of construction space.⁹

LEED is the most recognizable green building program in the U.S. and epitomizes the rapid changes in the marketplace and the emerging trends that will be discussed in this article. The U.S. Green Building Council develops, implements, and administers the LEED rating system, which at its core is a certification program based on a number of individual green building practices or credits, from increasing the energy efficiency of a building to reducing its demand for water. Projects are awarded points for achieving these credits, and these points allow a project to attain a desired level of certification, from the base LEED certification to silver, gold, and platinum. Since LEED 1.0 was launched in 1998, the rating system has undergone multiple revisions. The fourth version, or LEED v4, was recently adopted on July 1, 2013 and includes drastic changes to the program, some quite controversial, increasing the complexity and the rigor of the rating system. As the most prominent green building standard in the United States, the green building practices in the LEED rating standard trickle down in the marketplace and heavily influence other green building standards and codes.

Federal, state, and local governments have played a pivotal role in fostering the growth and market demand for LEED and other green building standards. Government institutions and agencies reference green building standards for public construction or incorporate green building requirements into their procurement guides or preferences. Nearly every federal agency, from the Department of State to the National Aeronautics and Space Administration, requires varying levels of LEED certification or an equivalent for agency construction.¹⁰ Not only is green building prevalent in the public construction sector, governments are also inducing the private sector to embrace voluntary green building practices and certification through the use of tax breaks and incentives, grants, expedited permitting, fee waivers, and free technical services.¹¹

From Voluntary Programs to Mandatory Codes

The voluntary nature of green building may soon be ending. State and local jurisdictions are moving beyond recommending voluntary green building rating systems and are now adopting mandatory, overlay green building codes. In contrast to voluntary programs, green building codes supplement or are imbedded within a city’s or state’s official building code and are fully binding—carrying the force of law and imposing mandatory requirements on building and construction. Green building codes are even starting to outpace federal and state product volatile

“Nearly every federal agency, from the Department of State to the National Aeronautics and Space Administration, requires varying levels of LEED certification or an equivalent for agency construction.”

organic compound (VOC) regulations for paint in some instances. For example, the California Air Resources Board finalized its model architectural paint regulations in late 2007. Since then, only nine of California's 35 air districts have implemented the model paint regulations. In contrast, since January 1, 2011, CALGreen, the state's new mandatory overlay green building code, incorporates these same model rule VOC limits for all new construction. California is not alone. Other state and local jurisdictions are adopting mandatory green building codes, such as the International Green Construction Code, or IgCC, for individual localities. Washington, D.C., for example, is in the process of adopting the IgCC for all new or substantially renovated commercial buildings larger than 10,000 square feet and multifamily buildings four stories or taller.

For the architectural paint and coatings industry, the rise of green building certification programs, standards, and codes represents a fundamental change. Under the traditional regulatory framework, air pollution control agencies, whether at the federal, state, or local level, impose mandatory VOC regulations on architectural paint: "It is unlawful for anyone to supply, sell, offer for sale, or manufacture any architectural coating that does not meet a VOC limit of x." On the other hand, green building rating systems and certification programs do not force product manufacturers to meet the requirements, yet they still have a significant impact on how projects and customers specify architectural paint and coatings.

Green building standards contain a variety of requirements that either directly or indirectly influence the choice of paint, coatings, adhesives, and sealants products that are used in building construction. This drives consumers, downstream users, retailers, architects, designers, and specifiers to ask new questions and make new demands. The question is no longer simply "what is the VOC content of this can of paint, and does it comply with the regulations in this jurisdiction?" Instead, the questions revolve around new requirements and standards: what chemicals are in this product and what hazards are associated with those chemicals; what does the product's emissions profile look like; how will this product impact indoor air quality and human health; or what are the environmental life-cycle impacts of this product.

EMERGING TRENDS: HEALTHY BUILDINGS AND TRANSPARENCY

With the rise of green building, a number of trends have emerged. The most significant revolve around the concepts of healthy buildings and radical transparency. Concern over the health of building occupants is nothing new, but the green building community has taken up this cause with renewed vigor. Activists in this space argue

"The principal focus of the paint and coatings provisions in green building standards is to improve indoor air quality in the built environment."

that green building should be about more than just energy efficiency, water conservation, and pollution reduction; green buildings should address indoor environmental quality, chemicals in building materials, and occupant health. Chemical emissions testing evaluations are becoming a baseline for interior building materials. With a sense of

fervor, many are seeking to prohibit the use of certain chemicals, in any form, in building materials and are demanding "radical transparency"—the disclosure of all the ingredients in a product or building material. As these developments begin to seep into the mainstream, they will have a significant effect on building product manufacturers, especially in the paint and coatings industry.

Indoor Air Quality

The principal focus of the paint and coatings provisions in green building standards is to improve indoor air quality in the built environment. The U.S. Environmental Protection Agency (EPA) has stated that levels of some pollutants may be two to five times higher in the indoor air environment than outside.¹² This statistic has been cited over and over, and paint is often pointed out as one of the main culprits and significant sources of VOCs in the indoor air environment. This messaging has a profound impact on consumers and the green building movement. Every green building program now includes requirements that encourage or mandate VOC limits for interior coatings, adhesives, and sealants to attain this objective. In an attempt to protect occupant health, green building standards include limits on the amount of VOCs in paint to reduce the level of these compounds that are emitted into the indoor air environment. These VOC content requirements are often modeled on the most stringent state or local laws and regulations in the United States, such as the South Coast Air Quality Management District's Rule 1113 for paint and coatings.

Green building standards are now moving beyond VOC content, though. Regulatory agencies in the United States developed VOC content limits to address outdoor air pollution and ground-level ozone. The indoor air quality requirements in green building standards, on the other hand, are primarily concerned with the indoor environment, and outdoor air pollution is secondary. VOC content is viewed by some as an inadequate measure of the VOCs that will ultimately be emitted from a given product, and therefore, a poor indicator of the impact a coating will have on indoor air quality.¹³

Small scale environmental chamber testing is a path to examine product emissions by measuring emissions and attempting to calculate the long term impact of chemical emissions on indoor air.¹⁴ Although it is quite expensive and there may be some flaws with using cur-

rent small chamber testing methods as a screening tool, it has become the most prevalent test for evaluating building materials for indoor air quality impacts. A number of green certification programs rely on small chamber testing to evaluate products to determine whether they achieve certification. Europe is at the center of this activity. Mandatory emissions testing regulations are now in place in Germany⁷ and France,⁸ and will likely surface in Belgium and for adoption throughout the European Union in the next two to three years. Other green building programs in the United States also include small chamber emissions testing requirements, such as the Collaborative for High Performance Schools and LEED for Schools. The newest version of the rating system, LEED v4, will encourage emissions testing, too. Given recent indoor air quality regulations in Europe and mounting developments in the United States, the end result is becoming clear: green building codes, sustainability standards, and baseline construction material specifications will likely require interior building products to meet emissions testing evaluations in the future.

The Rise of 'Red Lists'

The healthy buildings movement is also concerned about the selection and use of materials and resources. By attempting to address complex human health challenges, green building advocates are sailing into uncharted waters. New credits in LEED v4 seek to discourage and eliminate the use of certain chemicals. As some state government regulations are evolving from chemical prohibitions to more nuanced approaches to chemicals management and green chemistry,⁹ green building systems are devolving into "chemical of the week" prohibitions and ever-expanding "red lists" for banned chemicals. While efforts to reduce the risk that certain chemicals of concern pose to building occupants are laudable, any approach to chemicals management in a standard should be based on actual risk, investigating both chemical hazards and exposure. Instead, many green building chemical avoidance schemes are based on red lists and focus on the hazards of discrete raw material components while ignoring whether the final product—a finished can of paint, for example—poses any risk to building occupants.

Pass/fail tests based on red lists are simple, but they tend to mislead consumers and the architectural and design community regarding the health risks associated with building materials. This ultimately triggers the deselection of products based on chemical ingredients that may otherwise serve important performance or sustainability functions in a product. Key raw materials used in architectural paint and coatings may be prohibited regardless of whether they pose any risk to building occu-

pants in the final product form. Ironically, chemicals that are substituted for the banned substance may be more hazardous or pose a greater threat to building occupants than the banned substance itself.

The Challenge of Transparency

LEED v4 is also encouraging radical transparency: the public disclosure of 100% of the ingredients contained in building materials and products. Those who insist on full ingredient disclosure imply that manufacturers are intentionally hiding toxic chemicals in their products from the public eye. The CEO of the U.S. Green Building Council recently publicly stated, "Another issue of major concern [is] the organizations that work feverishly to deny the market transparency and accountability. If you even suggest that we bring more information to the marketplace, these folks revolt, and will do anything to keep us in the dark . . . Don't you want to know if

there are toxic VOCs in your paint?"¹⁰

The Health Product Declaration, a transparency initiative launched in November 2012, is a standardized way for building product manufacturers to report the contents, chemical hazards, emissions, and health effects of their products. Initiatives to provide the public with access to informa-

tion to assess the potential risk of products may be well-intentioned; however, current transparency schemes, such as the Health Product Declaration, drive manufacturers to disclose the ingredients in their products while offering little information above and beyond a Safety Data Sheet (SDS), which is required by law. Currently, hazards of the product must be disclosed on the SDS, but they still include trade secret protections to protect intellectual property. Disclosing discrete ingredients above the required SDS format is not warranted.

These trends are especially problematic for formulated products such as paint and coatings. Paint and coatings manufacturers depend on confidential proprietary information and the use of a certain raw materials to advance coatings technology and remain competitive in the marketplace. Without adequate trade secret protection, sensitive proprietary formulations will be exposed to competitors and the public. Public disclosure requirements without adequate trade secret protection will have a chilling effect on the paint industry and its willingness and ability to provide products for green building projects. Despite the intellectual property concerns and the stifling effect the existing transparency initiatives may have on innovation, green building programs and the architectural and design community are powering forward to demand this information.¹¹ Unfortunately, the chemicals of concern and radical transparency credits in LEED

"Key raw materials used in architectural paint and coatings may be prohibited regardless of whether they pose any risk to building occupants in the final product form."

threaten to disqualify many high-performing, environmentally friendly products that now play a leading role in green building and energy efficiency.²⁰

Green building programs, such as LEED and other European standards, are requesting more information regarding the environmental impacts of products, especially life-cycle assessments. The newest version of LEED rewards projects for specifying products for which Environmental Product Declarations (EPD) are available. EPDs offer a standard communication tool for those who wish to objectively measure and describe a product's environmental impact throughout its entire life cycle. These life-cycle impacts are generally measured from raw material extraction and processing to the manufacturing process, and may even cover the use of a product and its end of life. The life-cycle assessment examines a defined set of environmental impact criteria, which usually include water, resource, and energy use; greenhouse gas emissions and ozone-depleting emissions; ozone-forming emissions; water pollution; and nonhazardous and hazardous waste production. Reliance on life-cycle assessments will increase as end users and consumers seek to gain a more holistic view of the environmental impacts of products.

CONCLUSION

Green building standards and codes will continue to expand and shape the building industry. As sustainable building is becoming commonplace in the new construction market, green building programs are seeking new territory. The U.S. Green Building Council is now striving to transform the current building stock, touting its LEED for Existing Buildings: Operations and Maintenance. As green building standards and codes are adopted faster than traditional government regulations, product manufacturer

ers must stay keenly aware of new developments in sustainable design as a baseline for continued market access. The pressure on product manufacturers to meet new requirements and provide additional environmental information will continue. As key stakeholders in the building construction supply chain, building product manufacturers must actively engage in the green building standard-setting process to ensure that their technical expertise and perspectives are heard. 

“As green building standards and codes are adopted faster than traditional government regulations, product manufacturers must stay keenly aware of new developments in sustainable design as a baseline for continued market access.”

References

1. <http://books.google.com/books?hl=en&lr=&id=njneo3rwzjC&oi=fnd&pg=PR3&dq=%22green+building%22&ots=sN28WF55YK&sig=OVVzmbZjXvBxmGCEYSk5OY9t82c#v=onepage&q=%22green%20building%22&f=false>.
2. <http://www.epa.gov/greenbuilding/pubs/about.htm>.
3. <http://www.epa.gov/greenbuilding/pubs/about.htm>.
4. <http://books.google.com/books?hl=en&lr=&id=njneo3rwzjC&oi=fnd&pg=PR3&dq=%22green+building%22&ots=sN28WF55YK&sig=OVVzmbZjXvBxmGCEYSk5OY9t82c#v=onepage&q=%22green%20building%22&f=false>.
5. <http://www.usatoday.com/story/news/nation/2012/12/10/green-schools-construction-leed/1753823/>.
6. Private Environmental Governance, Vanderbilt Univ. Law, Public Law & Legal Theory, Working Paper Number 13-11, pg 16.
7. <http://www.construction.com/about-us/press/green-building-outlook-strong-for-both-non-residential-and-residential.asp>.
8. <http://www.construction.com/about-us/press/green-building-outlook-strong-for-both-non-residential-and-residential.asp>.
9. http://www.usgbc.org/sites/default/files/USGBC_AR_2012.pdf, Pg 19.
10. https://www2.buildinggreen.com/sites/buildinggreen.com/files/Blog/Images/Paula_Blog/Images/govt-table.png.
11. <http://www.usgbc.org/Docs/Archivo/General/Docs2021.pdf>
<http://www.epa.gov/iaq/voc.html>.
12. http://www.ul.com/global/documents/newscience/whitepapers/indoorairquality/IAQ_Paint%20Volatile%20Organic%20Compound%20Emissions%20and%20Volatile%20Organic%20Compound%20Content%20Comparison%20Study_10_12.pdf.
13. *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers* (CDPH/EHLB/Standard Method V1.1 (2010)).
14. *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers* (CDPH/EHLB/Standard Method V1.1 (2010)).
15. *Key International Chemical Emissions, Labeling and IAQ Programs for Building Materials & Products* (Spring 2012).
16. *Key International Chemical Emissions, Labeling and IAQ Programs for Building Materials & Products* (Spring 2012).
17. http://news.aria.com/deln/DELNWB/split_display.adp?fedfid=32379543&vname=dennotallissues&rl=a0d9k9v5n8&split=0.
18. <http://www.treehugger.com/green-architecture/rick-fedrizzi-defends-leed-at-lanks-naysayers-and-delivers-barn-burner-defense-green-building.html>.
19. <http://www.healthcaredesignmagazine.com/article/nccor-2013-push-greater-transparency-products>; <http://www.metropolismag.com/Point-of-View/May-2013/Its-Show-and-Tell-Time-for-Building-Product-Manufacturers/>.
20. <http://www.ecobuildingpulse.com/leed/materials-resources-and-contention.aspx>.

AUTHOR

Tim Serle, Counsel, American Coatings Association, 1500 Rhode Island Avenue NW, Washington, D.C.; tserie@pain.org.