LEED was never intended to remain static but rather evolve over time—and evolve it has yet again.

Version 4 of the U.S. Green Building Council’s rating system (which stands for Leadership in Energy and Environmental Design) is now a reality, approved by ballot in late spring of 2013 and announced to be open for the registration of new projects at USGBC’s Greenbuild conference in Philadelphia this past November.

In an attempt to push building performance levels to a higher level, LEED V4 represents a major change from earlier versions of the rating system. In no section are the credit changes more dramatic than the one focusing on building materials. Whether these changes were well thought through, appropriate and based on a good analytical foundation was certainly much debated. But the fact is that LEED V4 is now a reality and the design and construction community is in the process of adapting to this new world.

LEED is not intended to exist in a vacuum as the only green building standard or rating system available for project owners. USGBC’s stated strategy is to encourage the adoption of green building codes and standards, such as the International Green Building Code and ASHRAE 189.1, by state and local jurisdictions to define a baseline for sustainable construction. The LEED program will then sit on top of this baseline, recognizing projects that go above and beyond building code requirements. The combination of this strategy and the more complex and stringent credit requirements in LEED V4 will probably result in a decrease in projects seeking LEED certification but also an increase in the sustainable performance of the overall inventory of new buildings.

Many of the nuances relative to the implementation of LEED V4, as it relates to materials used in building projects, are yet to be worked out in practice. Below are a series of questions related to LEED V4 that merit immediate attention by designers, fabricators and constructors.

Does LEED V4 immediately replace prior versions of LEED? No, projects can continue to be registered under LEED 2009 until June 1, 2015, and based on previous transitions between LEED versions those projects will then probably have until mid-2021 to complete construction and apply for actual LEED certification. This means that the existing requirements for recycled content and regional material documentation will continue to be in use for another seven years. For an overview of how these credits are addressed by the use of structural steel, see “A Green Roadmap” (MSC 02/13).

Does LEED V4 encourage the use of life-cycle assessments (LCAs) to select framing systems? Yes, the only way that new construction can gain any credit points under the MR credit for “Building Life-Cycle Impact Reduction” is either through the use of a large percentage of reused or salvaged materials or to conduct a life-cycle assessment of the project’s structure and enclosure, comparing the structure to a similar “baseline” building. To gain three credit points the LCA must demonstrate a 10% improvement of the selected building in three of six environmental impact categories (one of which must be global warming potential) and no degradation of greater than 5% in the remaining three categories.

Are the data, expertise and technology required for LCAs available to support this level of analysis? No, the world of LCAs is a return to the Wild West. A limited number of LCA experts exist that understand the boundaries and calculation methodologies behind the various material data sets and are trained to use assessment tools that require the actual modeling of the entire construction process rather than an estimation of average impacts.

A variety of estimating programs for comparing the environmental impacts of competing framing systems have entered the marketplace in the last few years. The intention of these tools is to allow a design professional not trained in life-cycle assessment to perform these comparisons. The problem with them is twofold. First, relative to the environmental impact data, many assumptions are being made with respect to the environmental impacts of various materials and construction operations. These assumptions include the boundary definitions for the equivalent comparison of data and underlying methodologies for determining the LCAs for individual products and materials. In addition, no distinction is made between different sources of (or process for making) the same product; rather industry averages are used for material impacts. Secondly and of even greater

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**UP TO SPEED ON LEED**

**By John Cross, P.E., LEED AP**

What you need to know about the new version of the ubiquitous green building rating system.
A concern is the determination of the quantities of materials used in each of the two framing scenarios. The quantities being used in these tools are based on rough parametric estimates rather than on preliminary design quantities. The parametric estimates are based on simple assemblies and limit the opportunity of the design professional to improve the efficiency of the structural system before the LCA comparison is made.

The AISC Steel Solutions Center routinely develops conceptual solutions for structural steel-framed projects using structural design software. While these conceptual solutions are one step before an actual preliminary design, they have been found to be typically within 10% of the final steel quantities for a project—a range that is appropriate for use in a LCA estimate. A random sample of 100 structural steel-framed projects for which conceptual solutions had been performed were analyzed using one of the more prevalent environmental impact estimators. The difference between the quantities generated by the estimator and the quantities determined in the conceptual solution were significant, ranging from an 80% overstatement of steel quantities to a 40% understatement (see Figure 1). It is impossible to make a meaningful comparison of environmental impacts to the required level of 10% improvement or 5% degradation if the variation of the material quantities can be as great as plus 80% or minus 40%.

![Figure 1: Variation (by percentage) between LCA estimator and conceptual solution material estimate, by project.](image)

The AISC Steel Solutions Center is happy to answer questions regarding the documentation required for responsible sourcing and material ingredients. As the transition to LEED V4 will be occurring over the next several years, this should meet the ongoing requirements of any building project.

Will LEED V4 result in more sustainable buildings? Any rating system like LEED cannot guarantee that it will result in more sustainable buildings. A rating system only focuses on limited discrete aspects of the building’s design and construction. It is when design and construction professionals work together, using their expertise to optimize their designs and activities from both an economic and sustainable perspective, that the actual building becomes a more sustainable structure.

Where can I get additional help in understanding the requirements of LEED V4? MSC will continue to publish articles exploring the requirements of LEED V4. In addition, AISC regional engineers are available to discuss issues—and give presentations—regarding the sustainable characteristics of structural steel and the requirements of LEED V4, and the Steel Solutions Center is happy to answer questions regarding this new version of LEED.