

The dollars and sense of green construction.

## THE ECONOMICS OF SUSTAINABILITY

BY JOHN CROSS, P.E., LEED AP

**OF ALL THE TRENDS** impacting building design and construction in the 21st century, the emergence of sustainability as a driver in the selection of building materials and systems has been at the forefront.

The push for green, high-performance buildings is evident to even the most casual observer, thanks to the proliferation of professionals sporting “LEED AP” behind their names, USGBC LEED plaques on a growing number of buildings, new publications focused on green construction and the growth of new energy standards, guidelines, rating programs and building codes focused on raising the baseline sustainable performance of all buildings. In fact, sustainability—which embraces the triple bottom line of environmental, social and economic benefits—was seen to be joining the historic trio of cost, schedule and quality as the major decision drivers for building projects.

So it was a major surprise that sustainability was ranked at the bottom of the list of framing selection criteria when AISC contracted with a nationally recognized consulting firm, FMI, to conduct a national survey of more than 900 project owners, developers, general contractors, architects and structural engineers. The traditional criteria of cost, schedule and quality came in first, second and third; sustainability came in a distant eleventh. Even when the results were segmented by respondent type, sustainability never ranked higher than tenth. We were shocked and our initial reaction was that survey respondents were confused or didn’t fully understand the question.

The decision was made to probe further into this surprising response by conducting focus groups of owners as well as design and construction professionals in various areas of the country. Among other questions, the role that sustainability plays in the selection of a framing system was explored at length, and the results of the focus groups confirmed the findings of the original survey.

So what did we find out? Several key observations stood out.

**First, in the current building real estate market, there is no consensus that green buildings command a higher lease rate than conventional buildings.** There are certainly a few examples of green buildings where lease rates are higher, but there may be a variety of reasons unrelated to sustainability behind the higher rates. As a general statement, in this market investing in green does not increase either the selling price of the building or the lease rates that can be charged to tenants.

**Second, owners want their buildings to embrace as many green features as possible—but only if there is no incremental increase in the cost of the building.** Building owners are looking for a return on their investment in the

form of either higher leasing rates, reduced operating costs or improved productivity. The green buildings movement has been successful in persuading owners and designers to build green as an expression of commitment to the stewardship of the environment and natural resources. This desire for high-performance, green buildings on the part of owners and designers is not driven by a philosophical agenda, but rather by common sense responsibility. That common sense responsibility also manifests itself economically in requiring their projects to provide a reasonable rate of return on their investment. The bottom line is that between two products of the same price, owners and designers in today’s market will choose the greener product. But if the green product increases the cost of the project, they will typically default to the less expensive product.

This issue becomes even murkier when operating costs are considered. The window for recovering incrementally higher up-front costs in exchange for greater building energy efficiency varies by the nature of the project owner and the financing challenges facing businesses in today’s economic climate. For a developer focused on turning a project quickly, improved energy efficiency does not easily translate into an increased selling price. (As noted earlier, leasing rates are not compensating for the incremental costs associated with high-performance buildings.) For owner-occupied buildings, available financing often limits the amount of funds available for “optional” energy-related improvements. The exceptions to this trend are those buildings financed by the owner from internal funds that will be occupied long-term by the owner. In those cases the owner will gain direct benefit from the incremental up-front costs and may capture a healthy return on investment.

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**Third, owners are increasingly unwilling to pay to have their building certified as sustainable.** The first line item eliminated when a building project is over cost is the soft cost of gaining a LEED or similar certification. The prevailing attitude among focus group participants was that “we can still be green without the plaque in the lobby.” Certainly this is not a negative statement regarding the value of LEED or similar programs, but rather an endorsement of sustainable construction and suggests that it is being embraced regardless of gaining some form of recognition.

**Fourth, owners, architects, engineers and general contractors are confused about the currency of sustainability.** Cost is measured in dollars, speed in days and quality in meeting the owner’s expectations. But what about sustainability? Is sustainability measured in the number of LEED points achieved? Comments about bicycle racks and the ever-changing point system within LEED have created confusion in the marketplace. Is it measured in greenhouse gas emissions? Attempting to quantify greenhouse gas emissions in equivalent tons of CO<sub>2</sub> does not relate to the majority of decision makers who ask, “Just how large or how bad is a ton of CO<sub>2</sub>?” Is it measured in energy consumption? Measuring primary energy consumption starts to come closer, because energy consumption can be translated into dollars, but primary energy is just one of many aspects of green construction. How is energy consumption balanced with water consumption or resource utilization? There is simply no clear or simple way to measure sustainability.

#### What does this mean?

Within the last several weeks I met with an architect committed to sustainability, who told me, “On projects where green is the goal, cost doesn’t matter.” The strength of the sustainability movement has been the promotion of that triple bottom line of environmental impacts, social considerations *and* economic value. Project decision makers need to know that the cost of implementing a green solution is justified by equal or lower construction costs and/or reduced operating costs over a short period of time—which is measured in years, not decades—as well as an improved working environment for those constructing and occupying the building. When sharing these thoughts lately I have been accused of having “a capitalistic American mindset.” Maybe that is true, but if the direction of the green movement in the U.S. is to set itself at odds with the established economic model of the country, then history tells us that sustainability will be a passing trend—and that would be a most unfortunate outcome.

Instead, product producers, designers and builders committed to sustainable stewardship need to focus on providing sustainable solutions that do not increase the cost of projects, but rather increase the value of the project. An excellent example of this was included in the March issue of *Modern Steel Construction*, where two modifications of standard details were presented that not only reduced the level of operating energy for

the model building by limiting the amount of thermal bridging, but also reduced the cost of the structural steel package by using a less expensive detail (see the “Thermal Bridging Solutions” supplement to the March 2012 issue, available online at [www.modernsteel.com/backissues](http://www.modernsteel.com/backissues)).

Sustainable products and materials must not just be *used* in a project; they must be *sustainably designed* into a project. Frankly, there is very little difference in the overall environmental impacts between a concrete-framed building and steel-framed building. The simple fact is that there is a great deal of concrete in a steel building and a significant amount of steel in a concrete building. The life-cycle assessment studies that have been performed indicate a small advantage for steel in some categories and a small advantage for concrete in other categories (see *MSC*, August 2010 “And the Winner is...” available online at [www.modernsteel.com/backissues](http://www.modernsteel.com/backissues)). Yet on projects where the structural designer was able to optimize the use of framing materials by collaboration with other members of the project team early in the design phase, environmental impact improvements in the range of 20% have been realized. For steel, that can be easily recognized by seeing the combination of the tonnage of the project and the average cost of fabrication per ton (a reflection of the required amount of shop operations) decrease.

Certainly, the growth of green codes and standards will also impact the economics of sustainability by raising the base level of energy and environmental performance required of every building. Unless these requirements are cost-neutral, which they do not appear to be, this will increase the base cost of all buildings. When these additional costs are absorbed into the market, there will be a natural inflation of lease rates. It will be interesting to observe the dynamics of the building market as green building codes are adopted in some jurisdictions and not adopted in adjacent jurisdictions. Will the differential costs of construction change the pattern of development? It is certainly too early to tell, but it is a trend that needs to be watched closely.

The results of the national survey and focus groups have not diminished the structural steel industry’s commitment to sustainability. The industry remains committed to sustainable performance both in terms of steel production and the contribution our products make to a sustainable built environment. We believe that the sustainable attributes of our products—a high strength-to-weight ratio, an average recycled content of 93%, a recovery rate of 98%, a low equivalent use carbon footprint (industry embodied energy on a per-ton basis has decreased 67% since 1980 and our carbon footprint is down 47% since 1990) and a regionally distributed manufacturing base—contribute directly to the sustainable performance of buildings without increasing their costs. Our commitment is to use the inherent and continually improving sustainable attributes of our products as a means of providing economically justifiable sustainable solutions for building construction.

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