

Grading Exercise along with each student's performance in the class presentation.

Example:

65/75 for the "Design Group A" slide presentation and written summary.

20/25 for "Student A" based on assessing the **Peer Group Grading Exercise** and the student's performance in the class presentation.

Student A's grade is 85/100 equaling 21.25% out of the 25% assignment weighting.

CONTEXT

(Context piece taken, with minor changes, from:

BUILDING EFFICIENCY INITIATIVE: BIG IDEAS FOR BETTER BUILDINGS AND CITIES™

<http://buildingefficiencyinitiative.org/articles/economics-green-building>)

As with all business decisions, the "build or not to build" decision depends on a cost-benefit analysis: a particular construction project or installation is executed if it is expected to generate monetary value that exceeds the price. If, on the other hand, perceived costs outweigh benefits, the project is not typically advanced.

The same basic rule applies to construction of green building designs. However, there are important additional considerations that influence the green building costs versus benefits analysis—specifically, the price of going green and the value it will impart. But there is growing recognition that "green" should not be considered a discreet "add-on" feature—grafted on to an otherwise normal project and evaluated independently as to its relative financial burdens and benefits. Rather, it is becoming ever clearer that sustainable building requires changes of both paradigm and process that, when embraced and applied to the entire building process, can make green building an attractive option seen in context of benefits exceeding costs. This is especially the case when benefits are seen both in terms of immediate construction project results (i.e. revenue versus costs) and longer-term benefits to company brand and competitive

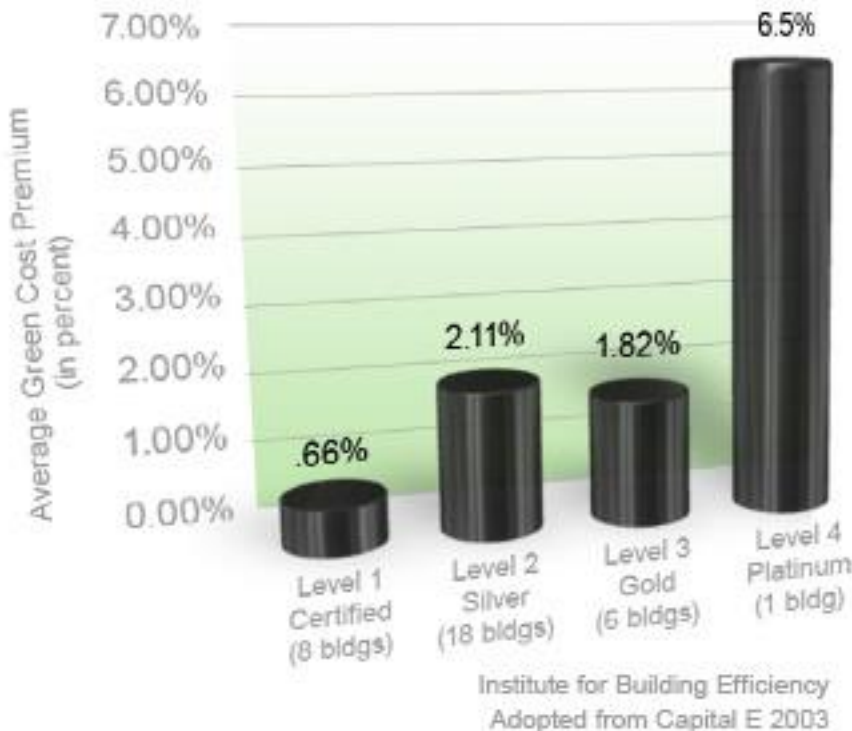
market position.

Costs

The traditional lens views green building features as add-ons. Through this lens, constructing a green building naturally costs more than a less sustainable alternative because it entails the use of premium materials, high-efficiency equipment, and additional layers of process workflow. The mindset that paying extra is an unavoidable element of greening a project is beginning to give way to more holistic designs and a lifecycle view of costs and benefits.

Today, researchers, designers and owners are finding that a focus on sustainability at the beginning of the design process can uncover techniques that will provide environmental and social benefits without necessitating unmarketable incremental costs. To cite one example: simply orienting a building to optimize windows and passive solar heat gain may allow developers and architects to design for lower energy usage and increased sustainability as well as offer daylight, which can increase productivity for employees without adding any additional construction expenses.

Average Green Cost Premium vs. Level of Green Certification for Offices and Schools

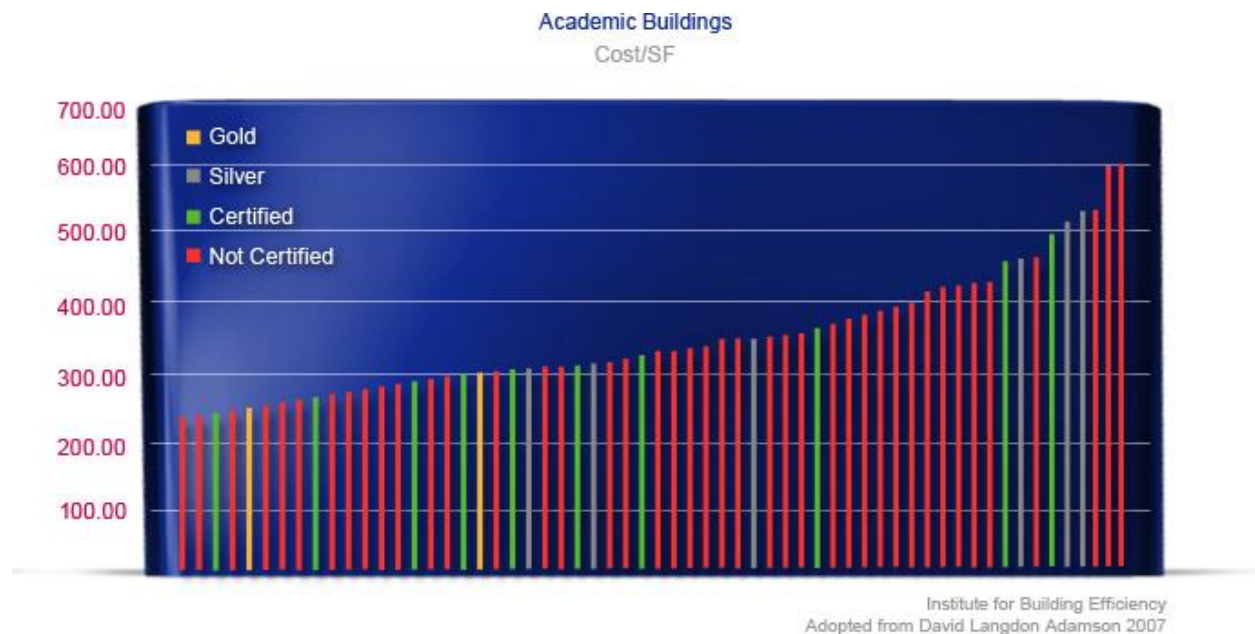


Green building can even help the owner avoid expenses at the outset. Selection of cooling equipment provides one example: if a green building design minimizes waste heat through efficient lighting equipment and includes an energy efficient building envelope, the building may require significantly less cooling capacity. This may eliminate the need for an additional chiller and result in a significantly reduced project budget.

An integrated design approach--still relatively new in the construction industry—is taking hold. Recent studies show that building green through an integrated approach can result in modest cost increases when compared to traditional building, and present opportunities to enjoy comparative revenue premiums exceeding costs. A 2003 analysis, conducted on behalf of California’s Sustainable Building Task Force, of 25 office buildings and eight schools seeking certification through the LEED green building rating system found a small cost premium associated with completing the steps necessary for basic levels of certification, with a more substantial cost premium for the single building seeking platinum status.¹

A few years later, however, an analysis of 83 buildings seeking LEED certification

compared to a control group of 138 non-green buildings and normalizing for building function and other major drivers of cost, found “no significant difference in average cost for green buildings as compared to non-green buildings.”²



Benefits

A green building may have little or no incremental cost, but it does not happen on its own. The change of process required to design and construct a building in an integrated way takes effort and must be perceived as sufficiently value-added before it will become widespread in the industry. Owners and developers seek reassurances not only that green building won't decrease returns, but that it will, in addition, produce benefits substantial enough to justify the effort.

Of course, one benefit to green building is its use as a public relations vehicle. The public has come to expect a certain level of green in the organizations and structures with which they interact. A green building serves as physical and permanent message about the commitment of an organization to environmental stewardship and accountability.

But investing in a green building goes beyond good will or an altruistic sense of social responsibility. Green building may help the owner comply with legal responsibilities and fiduciary duties, as well. Concern over climate change is spurring governments to enact laws mandating carbon-cutting measures. Likewise, shareholders are increasingly demanding that companies responsibly manage their environmental and carbon footprints and address their own climate change risks. Building green may help the owner comply with these mandates.

While these tangible and intangible green building benefits contribute to the perceived value of a building, they may not always be sufficient to motivate an owner to build green. As with other business decisions, a financial return on the investment is still paramount. In many cases, however, building green means saving energy, and the potential to save big can help push the owner over the green line.

When properly designed to maximize efficiency and minimize the use of resources, a green building will experience lower utility costs. It is not unusual for energy bills to be up to 50 percent less than for a building constructed to minimum code requirements – even lower when onsite renewable energy generation is included in the project.

This energy savings benefit, however, usually flows to the occupants of the building, not the original designer and construction contractor. To address this perceived disconnect between cost and benefit, recent studies have attempted to quantify the value (to the owner) of building green in metrics common to the real estate industry. Some of the findings:

- Green buildings sell at a higher price. McGraw Hill measured the price premium for the sale of Energy Star ®-labeled buildings to be 12%.³ Another study estimated the premium on LEED-certified buildings at 31%.⁴
- Green buildings command higher rent premiums. By comparing rental agreements involving Energy Star buildings with non-Energy Star leases, researchers at Maastricht University found that efficient buildings command 3.5% higher rents.
- Green buildings are more attractive to tenants. The same study found a 6% higher occupancy rate for Energy Star certified buildings.⁶
- For more information on green building benefits, see Ceres' [Energy efficiency and real estate: Opportunities for investors](#).

As data accumulate and building owners are better able to evaluate green building benefits, more and more projects are likely to follow this path. Under a new paradigm of integrated design, it is possible to render green building costs negligible. Meanwhile, the benefits are becoming increasingly visible and measurable. Both sides of this equation are evolving gradually toward an era of sustainable building construction. Real estate professionals are noticing, and the increase in green building is leading to more sustainable cities and towns all over the world.