

Executive Summary

Green building has emerged over the past decade as a robust movement to create high-performance, energy-efficient structures that improve occupant comfort and well-being while minimizing environmental impacts. Supported by organizations such as the U.S. Green Building Council and its Leadership in Energy and Environmental Design (LEED) standards, both public and private entities are increasingly pursuing green buildings in the institutional, commercial, and residential sectors. While this progress is impressive, for a number of reasons it has not included significant numbers of affordable housing projects. These reasons, several of which are unique to affordable housing, include: an almost exclusive focus on “first costs,” the existence of per unit cost caps, regulatory rigidity that limits green innovation, and a finance system that fails to recognize the long-term value of green investments.

A common perception has been that green costs more and is, therefore, not suitable for affordable housing. Recent studies have documented the costs and benefits of green building in the commercial and institutional sector,¹ reporting that green buildings have a modest initial cost premium, but that long-term benefits far exceed the incremental capital costs. These findings have bolstered green building activity in these sectors, but their applicability to affordable housing development has been viewed with considerable skepticism.

Until now, however, no such systematic study has evaluated the costs and benefits of greening in the affordable housing sector. The current report attempts to fill this gap. We have surveyed green affordable housing projects around the country and conducted detailed case study analyses of the costs and benefits of sixteen projects for which adequate data was available.

Notwithstanding significant data gathering and methodological challenges, analysis of these case studies have led to several key findings, including:

- Community development corporations (CDCs) and other mission-driven community-based organizations are natural leaders in the effort to build green affordable housing.
- The current system to assess financial viability of green affordable housing, focused on initial capital costs, is deeply flawed. Life-cycle costing in which both capital and operating costs are considered over the expected life of a building provides a better understanding of project economics.
- Using a life-cycle approach, green affordable housing is more cost effective in net present value (NPV) terms than conventional affordable housing.
- The existing financing system for affordable housing is complex and rigid, and typically does not recognize the long-term value of green investments. This serves as an impediment to widespread development of green affordable housing.

Total development costs for the green projects reviewed in this report ranged from 18% below to 9% above the costs for comparable conventional affordable housing. On average, the sixteen case studies show a small “green premium” of 2.42% in total development costs.² These incremental costs are largely due to increased construction (as opposed to design) costs.

From a life-cycle net present value perspective, the case studies show that the benefits of green affordable housing are real and, in some cases, substantial. In virtually all the cases, energy and water utility costs are lower than their conventional counterparts. In many cases, decreased operating

expenditures alone more than pay for the incremental initial investment in greening the project in present value terms.³ The use of more durable materials and equipment in several of the case study projects result in reduced replacement costs and provide additional life-cycle financial benefits. Moreover, the value of improved comfort and health for residents, as well as reduced environmental impacts, is substantial, although not captured quantitatively in our analyses.

While the case studies presented in this report demonstrate that life-cycle green building benefits exceed costs in almost all cases, those economic impacts are not the same for all parties. Developers, owners and residents experience different life-cycle costs and benefits of green affordable housing. For example the costs to developers range from about \$9,700 more per unit to \$34,800 less per unit in net present value terms than the non-green alternative. This wide range and whether developers experienced gains or losses depends largely on whether the developer retains a long-term ownership interest and whether the owners or residents are responsible for utility costs (and savings). In five of the sixteen case studies, developers received net benefits from greening, in two cases greening the project had no net financial effect on the developers, while in nine cases the developers experienced net losses relative to investing in comparable conventional projects.⁴

For residents of affordable housing units, the life-cycle financial outcome is almost always positive, ranging from a NPV of -\$140 to \$59,861 per unit. This is the case largely because owners/residents are not responsible for the incremental capital costs of greening, but they receive the benefits of lower utility costs, not to mention the unquantified benefits of improved comfort and better indoor air quality. In 14 of the 16 cases owners/residents receive a net benefit from greening; in one case, there is no impact on the financial condition of residents, since they are not responsible for any of the utility costs; and in one case residents experience higher net costs from greening, though the project developer attributes this to anomalies in project design and resident demographics.⁵

Several factors have limited the scope of this research. First and foremost, there are a limited number of completed green affordable housing projects with comprehensive data, particularly with respect to green operating costs and the capital and operating costs of comparable conventional projects. With this small data set, broad conclusions from this research must be made cautiously. Moreover, when cost data are available they are often in non-standard formats and stored in disparate locations.

The final section of the report presents a number of suggestions for further research, which if carried out, would provide a larger set of reliable data in a consistent format and help address the limitations of the existing data. We offer additional suggestions to improve understanding of non-economic benefits of greening, the importance of building commissioning, and how the finance system can support greening of affordable housing.

Finally, we provide recommendations for green affordable housing developers and policymakers. We suggest developers focus on assembling an experienced green team, employing an integrated design approach, and utilize life-cycle costing in evaluating the economics of a project. For policymakers, we suggest creating innovative funding mechanisms that recognize the long-term value of green projects, instituting higher mandatory standards for energy efficiency in building codes, and adoption of minimum green standards for affordable housing.

It is our intention that this report informs the broad range of actors involved in developing affordable housing and provides a solid starting point for a better understanding of the costs and

benefits of greening these projects. We believe that it makes a strong case that greening affordable housing is cost effective and should be pursued with vigor.

¹ The most definitive analysis is contained in a report commissioned by the Sustainable Building Task Force, a group of 40 California state government agencies. *The Costs and Benefits of Green Buildings*, was authored by Greg Kats of Capital E and others, and was published in October 2003.

² This premium drops to 1.73% if photovoltaic panels are not included. Often inclusion of such technologies would not have occurred without targeted grant funding support from public agencies or utilities. We calculated the first-cost premium of greening based upon the non-subsidized costs.

³ Throughout this report, life-cycle costs and benefits are reported in present value terms to account for the time value of money and express the net results in present day dollars. We assume a 30-year life for projects studied.

⁴ These results change when green subsidies are included. After grants and rebates specifically for green building features, seven developers have green building benefits that outweigh costs, three break even, and six have costs that outweigh benefits.

⁵ See the Brick Capital case study for details.