The Costs and Benefits of Green Affordable Housing: Opportunities for Action

Executive Summary

A report by the Tellus Institute and the Green CDCs Initiative*

Developers of affordable housing are particularly sensitive to cost considerations. In addition to other challenges, interest in greening affordable housing — minimizing impacts on the environment and public health — has therefore been tempered by concerns over cost. This paper identifies the range of benefits that greening affordable housing can provide, discusses the limitations of conventional project financial analysis focusing almost exclusively on "first costs," suggests use of life-cycle costing techniques, and through a literature review and series of case studies demonstrates that:

1) the incremental cost of developing green versus traditional affordable housing is very small, on the order of 1-2%; and
2) the net present value of operational savings of green affordable housing is far greater than the additional up-front costs, often 5-10% or more of initial development costs.

By providing analytical support and real-world examples, this paper is intended to assist affordable housing developers and financiers in carefully considering the costs and benefits of greening their projects.

As the concept of sustainable development has become more prominent over the past decade, the impact of the built environment on human health and the health of ecosystems has received increasing attention. Worldwide, buildings consume 25 percent of the world's harvested wood and utilize 40 percent of all materials produced. In the U.S., construction and operation of buildings consume over 60 percent of the electricity and 35 percent of total energy used, and account for 30 percent of total greenhouse gas emissions. Climate change, diminishing forests, water contamination, air pollution, and foreign oil dependence are concerns associated with building construction and operation. Moreover, buildings are critical elements of community character and livability, affecting land use, crime, transportation, urban design and other key facets of community life. Because we spend the majority of our time indoors, buildings also significantly affect human health by way of indoor air quality and exposure to toxic materials.

Due to growing health concerns and higher operational costs, questions have begun to emerge about whether we can produce, operate and maintain buildings more sustainably to minimize

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adverse impacts on the environment and public health, and whether this can be done economically. The building industry is responding and a growing field called "green building" is emerging. "Green" is the term given to high efficiency buildings (also known as "high performance" or "sustainable" buildings) that, unlike typical contemporary buildings, are designed through an integrated design process to create buildings that use limited resources efficiently while minimizing their negative environmental and health impacts. In 1993 the U.S. Green Building Council was established to promote environmentally responsible, profitable buildings. The Council is best known for its widely accepted Leadership in Energy and Environmental Design (LEED) national rating system for evaluating and certifying high-performance, sustainable commercial buildings. The LEED system, and the potential financial benefits of green development in general, are increasingly convincing mainstream commercial building developers that green design merits a second look. Green design is also well suited for residential development.

In addition to their environmental benefits, green buildings provide direct value to the inhabitants, including lower operating costs, improved comfort through energy efficiency and better design, as well as improved health through thoughtful selection of non- or less toxic materials and improved ventilation systems. The nature of affordable housing presents an excellent opportunity for green building. Whether located as part of a mixed-use development, on a brownfield, or an infill project, the benefits of green building in terms of affordability, livability, and promotion of public health address the fundamental needs of residents of affordable housing. For these reasons, a green building approach presents an attractive option to developers of affordable housing. This is especially true for community development corporations (CDCs), whose broad mission includes the health and quality of life of their low-income constituents.

Until very recently green building principles have not been widely applied to affordable housing. A number of barriers impede the adoption of green principles in the development of affordable housing. Some of the challenges include the short ownership horizon of certain developers, the frequent need to coordinate multiple funding sources, the increased regulatory burdens and contracting constraints imposed when government funding is utilized, the lack of well-documented case studies of green affordable housing projects, and the limited institutional capacity and experience of CDCs and others with green building. The most important barrier is the perception that green buildings cost more than conventional buildings and that they have unproven benefits. To properly consider the economics of a green building (or any building) requires a life-cycle costing approach that assesses not only the initial design and construction costs, but also the operational and maintenance costs over the life of the building. For example, it may be somewhat more expensive to design and construct a building that is highly energy efficient, but the annual operational savings from lower utility costs should also be considered when analyzing the economics or financial viability of the project.

It is important to recognize that the economics of an affordable housing project can be considered from multiple perspectives. Developers of projects with a very short ownership horizon, which is frequently the case, are usually not concerned with longer-term operational savings, unless the value of such savings can be reflected in the selling price. In contrast, operational savings should be important to developers with a long-term ownership interest and

others who are mission driven such as public housing authorities and community development corporations (CDCs). Unfortunately, given the limited experience with green building, such value has generally not been reflected in the market. As a result, the economic benefits of green building have largely been ignored by project financiers in their assessment of lending and investment opportunities in affordable housing. All too often banks and other financing organizations focus on "first costs" (i.e., the initial capital costs required for design and construction). This short time horizon and the lack of market recognition by financial institutions of long-term savings is an important impediment to more widespread adoption of green building practices.[1]

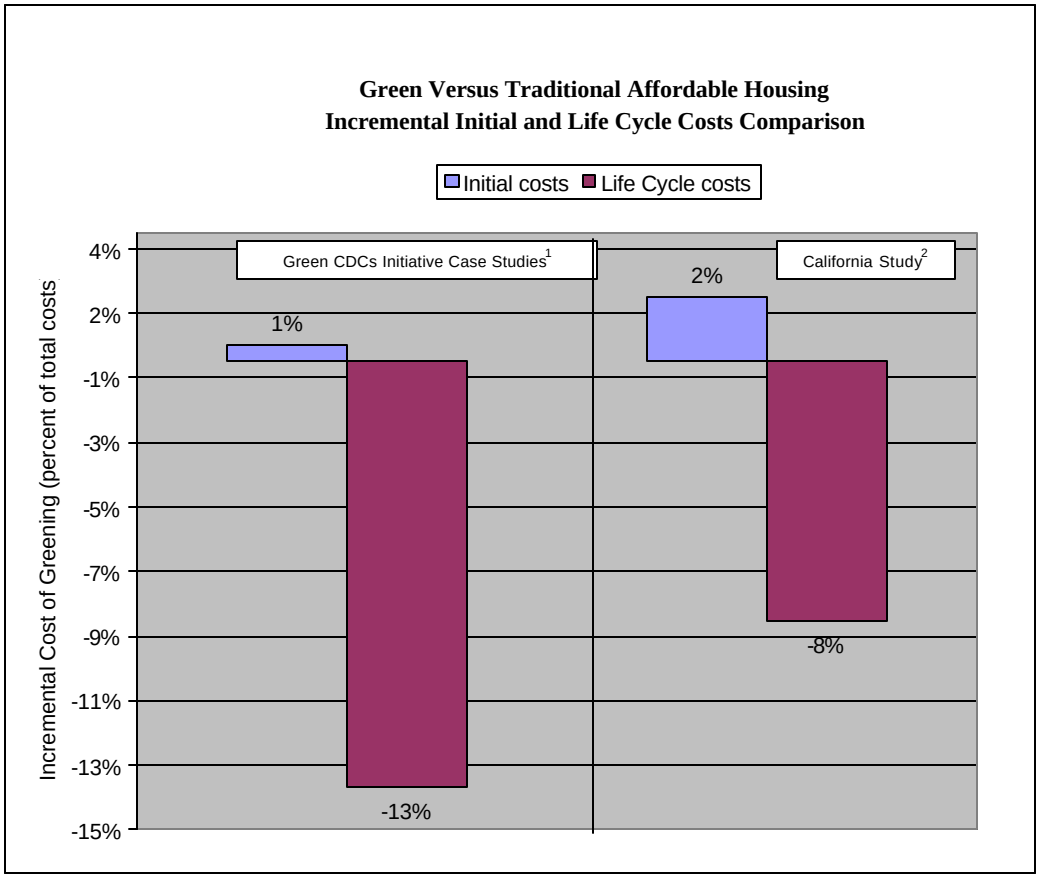
This paper explores the thesis that green affordable housing projects can be financially viable, while at the same time provide significant improvements in comfort and health to occupants. It discusses a life-cycle costing methodology for evaluating the economic viability of green housing and provides several illustrative case studies in which this methodology is applied. Though there are a myriad of affordable housing types as well as many site specific conditions that affect costs, these cases and others in the literature are an early demonstration that it is possible to design, construct and operate green affordable housing at close to, and in some cases below, the cost of more conventional development. In the case studies described in this paper, up-front capital costs for green affordable housing projects range from 14 percent *more* to 18 percent *less* than comparable traditional housing, while in all cases there are significant annual operating cost reductions in the green projects. Combining capital and operating costs on a net-present value basis, the green affordable housing cases presented have total costs ranging from four percent *higher* to 34 percent *lower* than comparable traditional cases.[2] These findings are summarized in Table ES-1 on the following page.

The paper is intended to add to the growing evidence that green affordable housing is not an oxymoron, and to help alter the way affordable housing developers and financiers assess such projects. Moreover, it is meant to contribute to the larger process in which the market is being transformed by technical, policy, and social changes driven by a growing sustainability ethos. Other challenges requiring further research include the development of more comprehensive and systematic cost data of green versus traditional affordable housing from a life-cycle perspective, the role of government policies and cost caps as a barrier to green affordable housing and policy options to address these, and how best to create the institutional capacity to implement green building approaches among CDCs and the other stakeholders involved in creating affordable housing.

[1]The Green CDCs Initiative is currently preparing a companion paper on the challenges of financing green projects.

[2]These findings are consistent with the findings in the recently published *The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force*, October 2003. This is the most comprehensive assessment of the costs and financial benefits of green buildings conducted to date. While focused on institutional buildings and schools, this report found that an up-front investment of less than 2% of total construction costs produces life-cycle savings of 4-10 times the initial investment.

Table ES-1



1. The Green CDCs Initiative completed four in-depth case studies of the costs and benefits of green affordable housing: Emeryville Resourceful Building in Alameda, California; Johnson Creek Commons in Portland, Oregon; Erie-Ellington Homes in Boston, Massachusetts, and Melrose Commons II in Bronx, New York. While there is much variability among the projects, this graphic presents the average initial and life-cycle costs of these projects.
2. The California Sustainable Building Task Force Study researched the costs and benefits of green building using data from 33 LEED certified institutional and school buildings. Here we present average data representing Certified and Silver-level LEED buildings. Not included in the above graph are the significant additional health and productivity benefits of the green buildings reviewed in the California study, reported to be over 18% (or $36.89 per square foot) of total design and construction costs in net present value terms. This would bring total benefits to roughly 20% of initial costs or ten times the initial incremental cost.