



sustainable, affordable, *doable*

**Demystifying the Process of Green Affordable Housing**

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### **About Green Communities®**

Green Communities is the first national green building program focused entirely on affordable housing. Launched by Enterprise in fall 2004, Green Communities is designed to help developers, investors, builders and policymakers make the transition to a greener future for affordable housing. A comprehensive offering of Green Grants, loans, tax-credit equity, training and technical assistance gives developers and builders the resources to bring green projects to life.

[www.greencommunitiesonline.org](http://www.greencommunitiesonline.org)

### **About Enterprise**

Enterprise is a leading provider of the development capital and expertise it takes to create decent, affordable homes and rebuild communities. For more than 25 years, Enterprise has pioneered neighborhood solutions through public-private partnerships with financial institutions, governments, community organizations and others that share our vision. Enterprise has raised and invested more than \$9 billion in equity, loans and grants and is currently investing in communities at a rate of \$1 billion a year.

[www.enterprisecommunity.org](http://www.enterprisecommunity.org)

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## Executive Summary

In recent years, the principles of sustainable design and construction—“green building,” for short—have swept across the American housing industry. What had seemed, just a few decades ago, a complex, untested, even idealistic approach to construction has by now entered the practical mainstream, with more and more developers and professionals seeking certification—and vying for market distinction—as cutting-edge green practitioners. The speed and breadth of this movement still varies from one region of the country to another, but the direction of the change is both unmistakable and, as each year goes by, increasingly irreversible. Green is now an almost universal indicator of quality in judging the value of a home or apartment.

Yet only in the past five years has this change had a widespread effect on the more specialized field of affordable housing. As new technology, products, and expertise have become more widely available, the cost of green development has lately fallen far enough so that **truly affordable green housing, even for very low-income residents, can be developed at a cost not significantly different from that of conventional design.** The birth of Green Communities® in 2004, Enterprise’s national leadership effort to promote sustainable affordable housing, has helped to hasten the adoption of green principles throughout the field.

One result is that there is now a cohort, expanding year by year, of experienced green affordable housing developers with useful stories to tell. Although the field is relatively rich with technical and practical information *about* green housing, it is only in the last few years that it has become possible to produce a broad, detailed account of sustainable development *drawn from* green housing developers themselves. This report is one attempt to collect those firsthand experiences and lessons from participants in eight Green Communities developments. Together, they form a kind of present-tense dispatch from the front lines of the revolution.

After an initial overview section, the advice and reflections presented in the following pages are organized according to the three main stages of development: planning and design, construction, and

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ongoing operations. A fourth section presents an assessment of current public policy on green affordable housing and envisions some improvements that are urgently needed, and seem increasingly likely, in the next few years.

In the first of the three stages of development, the near-unanimous observation among practitioners is that a fully integrated design process — encompassing the developer, architect, engineers, the general contractor, major subcontractors, and other interested parties — is essential in ensuring that a project achieves the most fundamental requisite of good green design: an efficient, durable whole building where all the component features and systems perform in harmony for the long term. An initial charrette, in which the full team considers the particulars of green design one-by-one and chooses among additional options, has helped many projects achieve higher levels of sustainability than their developers first thought possible. It has also established a common understanding across the whole team of what green development will entail, why it is important, and how conventional practices and assumptions will have to change to make the project succeed.

In their comments on the construction phase, green developers and professionals again emphasized the importance of integration — keeping the team in regular communication all the way to completion. But they also pointed out that many green products and methods are relatively new, and even newer ones are constantly being introduced. Some of these may be unfamiliar to the various contractors and their employees, even to contractors who have experience in sustainable design. Therefore, the need for careful supervision of personnel and practices on site is even greater than it would be for normal construction. The tendency to revert to habit is natural in a business where specialists perform essentially the same job on project after project. So the challenge in green construction, as one developer put it, is to constantly remind every participant “of all the ways this project is going to be different, and why.”

After construction is completed, the challenge that most owners and managers raised was one of keeping the green features at top performance and maintaining an overall sustainable environment. For that, many organizations are experimenting with different ways of training on-site staff, tenants, and homebuyers in how the green features work and how to maintain them. There is, as yet, no established practice that everyone considers successful, though several models are available and more are being tested. Most practitioners agree, though, that a single “how-to” session isn’t enough. Presenting information in different ways at various times, and repeating the information every so often for new staff and tenants, seems to be the only approach that ensures long-term awareness and continued performance.

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Finally, almost every person interviewed for this report described a persistent gap between the swift progress of green technology and the somewhat slower evolution in housing policy and funding for sustainable development. Some states and localities, and a few prominent foundations, have been quick to adopt the green agenda. But others remain wary of unfamiliar practices—especially those whose initial cost is above the conventional minimum. Enterprise, the U.S. Green Building Council, and several other organizations are compiling data to bolster the fundamental argument for green affordability: that the truly affordable building is the one that is not only inexpensive to build, but inexpensive to own and maintain. As that message becomes more widespread, the day will draw nearer when funders and regulators recognize green affordable housing as the norm, with policies that encourage wider adoption and further innovation.

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### **David and Joyce Dinkins Gardens**

*Harlem, N.Y.*

The modern apartment building rising on West 153rd Street, on the site of a former drug bazaar and a small community garden, is not just metaphorically green. The green is literal here, from bottom to top. At the bottom, behind the building, is an orderly file of individual gardening beds, each surrounded by its own concrete border and a small staircase leading a couple of feet below ground level so gardeners don't have to stoop to tend their plants. At the top of the building is another bed of literal greenery: a green planted roof that keeps both the building and the surrounding atmosphere cooler during summer months and warmer in the winter.

In between, the building is a study in modern sustainable features, though many are nearly invisible. For example, each apartment is separately ventilated through openings that run between floors and straight out of the building—ensuring that odors and moisture disappear quickly without affecting the air of neighboring apartments. A high-efficiency boiler on the roof, high performance windows, and recycled building materials are all barely noticeable to the naked eye, yet they contribute to an overall efficiency that puts Dinkins Gardens at the high end of green construction in New York. More noticeable—though so decorative that they aren't easily recognizable as green features—are **sunshades over windows\*** on the building's southern face, reducing heat in summer months.

At Dinkins Gardens, the advantage of all the greenery has been not only environmental and economic, but political and social as well. In a rapidly gentrifying neighborhood desperate for affordable housing, the 84 units for low-income families were always going to be popular. But they had one risky disadvantage: They were going to displace an established community garden, in a city where well-organized urban gardeners have been known to delay redevelopment projects or stop them cold. To avoid any conflict with the gardeners, the developers—Harlem Congregations for Community Improvement and the Jonathan Rose Companies—promised that the new site would incorporate garden space for residents of both the building and the surrounding neighborhood, with rainwater harvested from the roof for irrigation. The project sailed through the approvals process with enthusiastic community support.

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The Marriage of  
'Affordable' and 'Green'

**'RESIDENTS SAID THEY  
WERE WARMER AND  
MORE COMFORTABLE  
THAN THEY HAD EVER  
BEEN, AND AT THE SAME  
TIME OUR BILLS WENT  
DOWN. IT DOESN'T  
GET MUCH BETTER  
THAN THAT.'**

— Lucille McEwen,  
Harlem Congregations for Community Improvement

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**I**nstant Quiz: Which home costs less?

- A comfortable-but-basic unit, built or renovated to longstanding building-code standards, with traditional methods and materials, costing \$75 a square foot to complete.

- An even more comfortable, eco-friendly dwelling with superior insulation, state-of-the-art ventilation, certified efficient appliances, and long-wearing floors and hard surfaces, among other green-tech innovations, costing \$78 to \$80 a square foot to build.

There was a time when the surface arithmetic of this question seemed to provide an instant answer: Lower construction cost was lower cost. The answer seemed even easier when the housing in question was designed for low-income people—where every extra dollar must ultimately come from the shallow pockets of poor families or from dwindling public subsidies. In many places, the instant answer still sums up the conventional wisdom, and thus official policy, on affordable housing.

Yet a lot depends on who is answering the question—with what kind of experience and with what definition of cost, measured over what period of time. The less instantaneous (but increasingly more compelling) answer is that **clean, efficient, durable, and environmentally harmonious structures can cost much less to operate, maintain, and occupy—even over a medium term of three to five years, and certainly over longer periods.** Though a few of the green features may cost a little more to construct or install, the price is usually not prohibitive, and in any case is quickly repaid in lower bills from utilities, fewer repairs and replacements, and more satisfied residents who place fewer demands on builders or managers. In short, the lower-cost unit—the truly affordable home—is the one that costs less to own, not merely to build.

## Doing the math

In years past, owners and developers of affordable housing usually had to learn this calculation the hard way: by building at the lowest initial cost, and then bearing the unexpected, often escalating expenses as time wore on. Lucille McEwen, who as president of Harlem Congregations for Community Improvement oversees a portfolio of some 3,000 units of affordable housing in New York City, recalls an early lesson in the economics of green construction that has since turned her organization into a leader in affordable green building. It began with a troubled property and a phone call to the New York State Environmental Research and Development Authority, a quasi-public agency that promotes energy efficiency in many industries, including housing. This is how she remembers the experience:

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“We had a building that had been in operation for probably 10 or 12 years, where the residents had always complained about the draftiness of the windows. The heating costs were high—and with energy prices rising, they were going to get a lot higher. Of course it’s difficult to replace all the windows in a building. That’s an expensive process, and this is a relatively big building of 90-some units. So we worked with NYSERDA, which made suggestions and helped to fund part of the cost. And you get a bonus if, after one year of operation, you can clearly document a certain level of energy savings. So that gives you, in effect, further financial support for doing more.

“Because of that support, we not only did the windows, we put in a new, efficient boiler. NYSERDA’s assistance got us past the barrier of the initial cost, and from there on, we had happy residents who said they were warmer and more comfortable than they had ever been, and at the same time our oil bills went down. It doesn’t get much better than that.”

For more than a decade, this kind of firsthand experience has been helping to formulate a new conventional wisdom among housing developers of all kinds—and more recently, galvanizing a green movement among affordable housing organizations specifically. So far, the practitioners’ consensus has been based more on their own experience than on formal research. One reason is that hard numbers are still relatively scarce. The precise savings from efficient, durable construction can vary widely depending on the type of green products used, the climate and energy markets of a given locality, and the quality of construction and installation of a building’s green features. Most green buildings are too new to yield data on very long-term savings—and the constant appearance of new green technologies can quickly make earlier research obsolete.

Yet more and more research is under way, including a 2005 study of 16 affordable housing projects around the country by New Ecology, Inc., and the Tellus Institute<sup>1</sup>. That analysis concluded that “using a life-cycle approach, **green affordable housing is more cost-effective in net present value terms than conventional affordable housing.**” In its Green Communities® program, which constitutes a much larger sample of more than 13,000 developments nationwide, Enterprise is collecting extensive data on utility costs that will begin producing findings in late 2008.

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<sup>1</sup>A summary of the study, along with other publications on sustainable development, is available from New Ecology’s website, at [www.newecology.org/publications.html](http://www.newecology.org/publications.html). The full study can be downloaded for \$20.

<sup>2</sup>“Survey Examines Home Buyer Sentiment,” *HousingZone.com*; April 10, 2007; published online at [www.housingzone.com/article/CA6432245.html](http://www.housingzone.com/article/CA6432245.html).

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## A green mission for affordable housing

Even with the shortage of firm data, the essential value of green building is by now no longer obscure or controversial. Green materials and equipment are both more common and less expensive today than ever before. Professionals and contractors increasingly offer experience in green design and construction, or at least a willingness to learn. In most places, for most kinds of housing, the decision to build green has more to do with a developer's interest and awareness than with any practical or economic obstacles.

In more upscale real estate circles, both commercial and residential, green features are becoming more widely recognized as a market draw, an asset that signifies value to consumers, lenders, and public authorities. Newspapers and television programs, industry trade magazines, and business publications extol and promote green building as the new state of the art. Even traditional builders and sellers of new homes, whose earnings don't directly depend on longer-term factors, sometimes acknowledge a bottom-line benefit to green building, including fewer expensive call-backs for faulty construction or equipment, and an image-burnishing cachet that boosts market share and makes room for higher profits.

Still, it's important not to overstate the case. These insights have not, thus far, translated into a seismic overall market shift, at least not in residential development. McGraw-Hill Construction and the National Association of Home Builders in early 2007 estimated that just three-tenths of 1 percent of American homes met the association's threshold of "truly green."<sup>2</sup> Although their research showed a surge in consumer demand for green housing, many for-profit developers still conclude that upscale homebuyers place a higher premium on aesthetic upgrades, amenities like pools and larger garages, than on less immediately visible assets like insulation and energy efficiency.

In some ways, then, the field of affordable housing may actually be a step ahead of other branches of residential development in assessing the value of green design and construction. Many affordable housing developers are driven as much by mission as by economics, and may be naturally drawn to practices that promote broad social benefit as well as high-quality buildings. But just as important is the stark, unforgiving math that governs the lives of low-income tenants, homeowners, and housing providers. Long-term economics are a more-than-usually critical factor for residents living on very tight budgets with little cushion for sudden shocks like spikes in utility costs or failures of expensive systems. Organizations that serve lower-income people—whether for-profit or not—naturally train a keener eye on the factors that their customers consider vital, and thus may take a longer view of affordability than is necessary for those serving a better-off clientele.

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**GREEN TIP:** Green materials, equipment, and expertise are becoming more and more common—and in the process their cost is falling fast. Don't be misled by out-of-date advice on prices. Many things are much more affordable than even some experts realize.

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## Overcoming obstacles

The distinctive mission and values of affordable housing providers are probably a prime reason why Green Communities, Enterprise's path-breaking program to promote sustainable affordable housing, encountered an outpouring of interest from owners and developers almost from the day it was launched in 2004. Many organizations had, by that time, already traveled some distance down the road to full-scale green development, including a few that had incorporated sustainable building into the core of their mission. Most, though, had far more interest and ambition than experience, and saw programs such as Green Communities as a way to help them get started.

Increasingly, affordable housing developers are discovering that **green building methods and materials can be integrated into any type of development, virtually anywhere.** Those who are relatively new to the process often are surprised that they hadn't made the switch earlier. Among the concerns that had kept these organizations from moving faster or sooner, the most common ones have proven, in the first several years of Green Communities' experience, relatively easy to surmount.

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**Challenge:** Many newcomers to the field don't have a clear idea of what green development entails. **Solution:** The Green Communities Criteria Checklist.

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Because many news articles and trade publications concentrate on the newest, most exotic, and often most expensive environmental technology, many developers imagined that green construction has to involve multiple, complex, costly systems that require extraordinary expertise to incorporate. Green Communities' eight-part checklist of criteria for sustainable affordable housing made it clear that the list of essential green features is neither long nor difficult to adopt. Many of the fundamental elements are commonsense ideas like energy-efficient lighting, heating, and appliances; good ventilation; proximity to public transportation and services; and paints and adhesives that don't contain unhealthy volatile organic compounds (commonly called VOC) that also cause surfaces to wear out faster. The checklist distinguishes "mandatory" features—elements that are essential to the concept of green building—from enhancements that raise the level of sustainability and efficiency even further.

Joanna Pi-Sunyer, rental housing director with Bon Secours of Maryland Foundation, first saw the checklist at the official launching of the Green Communities program and put it to use almost immediately.

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**GREEN TIP:** The best green consultants not only advise on individual technologies, but on how they fit together, on issues that may arise during construction and operation, and on how various options can be funded.

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“We were already in the very early stages of our project,” she recalls, referring to New Shiloh Village, an 80-unit senior housing development in West Baltimore that opened in 2007. “So we went through the Green Communities list to determine what we could afford as we moved through our design and pricing process, and we just started integrating in the Green Communities elements.” The most immediate benefit of having this set of criteria, many participants in the program say, is taking the mystery, and some of the complexity, out of planning a green project.

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**Challenge:** With so many options and decisions to make, it's hard to know where to begin. **Solution:** A green design charrette.

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Even after absorbing the basic features and options for green affordable housing, developers sometimes find the next steps difficult to envision: sorting among the options, choosing the right features, finding experienced contractors and professionals, integrating all the pieces into an overall development plan, and identifying possible funders and lenders for items that require additional investment. Enterprise, as well as other intermediaries (often at the state or regional level), provides advice and small grants to help developers set the green design process in motion.

Among other available resources, Green Communities offers \$5,000 grants to help developers organize a charrette—an essential first step for sifting through options, formulating a green plan, integrating it into the rest of the building design, and solidifying the technical team that will carry the project to completion. The charrette not only creates an orderly, deliberative process for setting the initial design, but it establishes a basis for longer-term collaboration among the essential members of the team whose work needs to be integrated throughout the development process. These include the owner, architect, general contractor and major sub-contractors, engineers, landscape architects, and, in most cases, a green consultant, whose role is explained below.

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**Challenge:** Many housing developers aren't well versed in green materials, methods, and funding. **Solution:** A dedicated green building consultant.

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Selecting a green building consultant early in the process—someone who combines solid expertise in sustainable design and construction with an understanding of the mission and resources of affordable housing developers—can be a developer's most important step in navigating the growing, constantly changing market for green

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technology. The field of these consultancies is ballooning, as even a cursory Internet search will reveal. The best consultants are the ones who can advise not only on costs and benefits of individual technologies, but on how a given combination of choices fits together, on the resulting issues that may arise during construction and ongoing operation, and on possible sources of funding for various options.

Most of all, the consultant should remain an active member of the development team from the earliest design all the way through to completion and occupancy, to see to it that green priorities are maintained, that systems are properly installed and tested, and that the owners and managers are prepared to operate and maintain these features once they are completed. Jeffrey Jewel, housing development coordinator of Human Solutions, Inc., in Portland, Ore., learned by experience that it's best "to go with a really hands-on building consultant." Some consultants, he learned, are accustomed to dealing mainly with large development firms that need only occasional technical advice, followed by testing of systems after they are installed. Small and nonprofit developers, and those not experienced in green construction, generally need more service than that.

"It's important to understand what an organic process it is to build a building," he adds. When the consultant isn't at the table throughout the process, you'll come to the end, and you'll have someone trying to check and test for things that didn't happen in the middle, when the consultants weren't around watching. They have to be the green eyes and ears on the project, right alongside the developer, all the way through."

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**Challenge:** Coordinating affordable housing development is complex enough—going green adds a whole new layer.

**Solution:** A fully integrated approach to design and development.

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In reality, efforts at sustainable, durable, and efficient development tend to be much less successful when they are treated as a distinct "layer" or add-on to a pre-existing concept. Instead, green developers have consistently found that the process goes more smoothly, and the results are of higher quality, when the major contractors and experts—both green and otherwise—confer with one another and with the owner/developer from the earliest stages of concept and design all the way to occupancy. As a practical matter, this takes some of the pressure off of the developer to ensure, singlehandedly, that the green elements are properly woven in. Instead, the developer and green consultant are in regular conversation with the architect, contractors, and other experts to ensure that all features work efficiently together and that the various aspects of the job don't conflict with one another.

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“That’s not just good green development,” says Green Communities Senior Director Dana Bourland. “That’s good development overall. Sustainability isn’t a layer, it’s not an item like some green bling that you tack on to give a project a better image. It’s a whole thought process, a different way of doing business, where all the parts are interdependent and all of them are linked to quality. For example, tight insulation has to go along with superior ventilation, or else the total air quality of the unit will suffer. Everyone on the development team needs to understand relationships like that, and be aware of what will happen to other parts of the system when one part is changed.”

Good, continuous communication among team members becomes especially critical during the tight construction schedule, Bourland adds. Last-minute decisions are common in this intense period of work, so the web of communication becomes a kind of safety check, to prevent sudden changes from inadvertently affecting other systems and components. “The developer may be the only person at the table whose job is to worry about the whole, integrated package,” she says. “But no developer has the time or the expertise to look after all these technical interrelationships through every minute of construction. It’s got to be a team effort, or it will start to unravel.”

Developers do, though, sometimes need to intervene to reinforce the green priorities established for the project early on. Gete Mekonnen, executive director of the Northeast Denver Housing Center, chose an exceptionally green design for the Center’s most recent finished project, an 18-unit apartment complex. But he has learned that the construction process can bring constant pressure to compromise on the less-familiar green features. “Day in and day out,” he warns, “the contractor is going to find reasons to challenge you, wanting to kind of ‘go to the shelf’ for standard equipment and materials, complaining about the time it takes to get things that aren’t available from his usual suppliers. You have to be willing always to stop the train, bring your team in, remind them of the decisions they all made in the beginning, and steer the whole thing back on track. Otherwise, you’ll start getting memos about time extensions. And time extensions are money.”

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**Challenge:** Green systems and equipment may be unfamiliar to residents, owners, and property managers, who might not know how to maintain them after they’re installed. **Solution:** Occupancy planning, with training for managers, tenants and homebuyers.

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Most sustainable equipment and materials work in much the same way as their pre-green counterparts and need no special training to use. A well-insulated building, durable floors and countertops, and

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Energy Star-rated appliances all work the same way as the alternatives, only better. So, depending on the features they incorporate into their buildings, some developers find they have little need for a special green tutorial when orienting tenants or homebuyers to their new housing. (Even then, many say they like to be sure residents know how green the building is, and encourage them to help keep it sustainable.) But some equipment and systems, like advanced heating or ventilation systems or solar energy devices, do call for particular kinds of maintenance or operation, for which property managers, homebuyers, or renters will need specific training. A little advance planning—obtaining clear manuals, preparing handbooks, or providing a detailed orientation session—can make this task relatively painless for all concerned. The green building consultant can be a prime source of guidance for this phase of work.

It's important to note, especially in rental buildings, that the value of a well-planned orientation and training regimen is not a one-time benefit. As tenants and managers change and time passes, the orientation is likely to be needed again. "The building maintenance staff is the link between a building that was built with green features and a building that will continue to be green," says a 2007 report by Advanced Energy, a green-building consultancy that advises Enterprise. The report concludes that unless residents and employees are regularly informed and reminded "to re-paint with low-VOC paints, replace carpets with CRI Green Label<sup>3</sup> carpets, change filters regularly, irrigate only according to the landscape architect's guidelines, replace bulbs with compact fluorescents, etc., a project will perform well beneath its potential."

## Building on experience from the field

This short list of concerns and solutions provides a sample of the kinds of insight that affordable housing practitioners are beginning to exchange as they develop more and more experience with green development. Until recently, much of this experience has been the result of individual effort, with organizations exploring green development mostly on their own, project by project. Recently, though—particularly since the launch of Green Communities in 2004—developers have found more opportunities to come together, exchange experiences and lessons, and begin forming a body of wisdom on effective techniques, approaches, and products for sustainable affordable housing. For example, a Green Communities Summit in 2008 gathered more than 100 practitioners for this purpose, sponsored by Enterprise and facilitated by AmericaSpeaks, a national organization that promotes town-hall-style decisionmaking.

The following sections describe some of the lessons and insights from recent projects supported by Green Communities, organized

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**GREEN TIP:** The surest way to keep a building green for the long term is to keep manuals and checklists, and to train residents, managers, and maintenance staff regularly on how the green design works and how to maintain it.

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by the three main stages of production: design and predevelopment, construction, and operations and maintenance. The purpose is not to present a how-to manual for green building, but to raise issues and ideas currently under discussion across the field. Each section draws from a wide range of projects, but focuses on two or three particular examples to bring the ideas to life. A fourth section describes some current issues in public policy that could go a long way in spreading sustainable development to more of the affordable housing industry.

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<sup>3</sup>The Carpet and Rug Institute, an industry research and advocacy organization, tests carpets, adhesives, and cushions, and certifies with its Green Label the products that produce the lowest chemical emissions.



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## 2506 Central Park at Stapleton

*Denver*

Even amid the vast field of green development that spreads across Denver's largest planned community, on the site of the former Stapleton International Airport, the 18 affordable apartments on Central Park Boulevard stand out as the greenest. In the city's master development contract with Forest City Enterprises, Denver civic leaders ensured that Stapleton's more than seven square miles of new housing, businesses, and green space would integrate two overarching public goals: affordable housing in at least 10 percent of the units, and sustainable development practices throughout the whole site.

The apartments on Central Park Boulevard, developed by the Northeast Denver Housing Center on land donated by Forest City, exceed both requirements. Not only did they earn a LEED® Silver certification, but they serve families with incomes as low as 30 percent of the area median. Besides the native plantings, ultra-efficient heating and cooling, Energy Star-rated appliances, and durable, eco-friendly bamboo flooring, the units have a **rooftop solar energy system\*** that provides much of the complex's electricity.

In each unit, over the kitchen counter, sits a small solar monitor that lets families know how much energy they are consuming day-by-day. It's not a meter, just an educational device—so families who begin to experience savings on their utility bills can see how they did it, and learn how to save even more. The meter displays the benefits of their ultra-efficient apartments in real time. Regular training programs help residents understand the green systems, interpret the monitor and other signs of energy usage, and manage their homes for economy, efficiency, and comfort.

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**‘IT’S REALLY GOOD  
TO START EARLY. IT’S  
GOOD TO HAVE A GREEN  
CHECKLIST AND BRING  
EVERYBODY TO THE  
TABLE AND SAY,  
“THIS IS A PRIORITY.”’**

**— Sharon Christen, Mercy Housing California**

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In 2007, the Northeast Denver Housing Center became the first organization in Colorado to earn a LEED® Silver<sup>4</sup> certification for green construction of a multifamily residential development. The organization's twin apartment buildings were part of Denver's massive redevelopment of the former Stapleton Airport, a planned community stretching across 4,700 acres, subject to extensive, carefully spelled-out criteria for environmental sustainability. Yet by reaching LEED's Silver status, Northeast's apartment buildings ended up exceeding even Stapleton's environmental requirements.

The LEED program for homes was barely in its pilot stage when the project's design team met for the first time. (The Green Communities® Criteria were not yet published, but would become available some months later as the project was taking shape.) At that point, Gete Mekonnen, Northeast's executive director, had imagined that the new development might at best be able to qualify for LEED's most basic certification. Even so, his design team set out, from their first discussions, to "think creatively and see what we might be able to do."

"We assembled our team very early on," he explains, "and simply challenged ourselves, asking where we could push the envelope, what might we want to do—ground-source heating, solar energy, fairly ambitious things. And we set the goal of trying to get LEED certification, even though we didn't know exactly how much we would have to do to get there. We kept going over the checklist, but a lot of things were a function of how much money we could raise. We knew what the baseline was [at Stapleton], for insulation, energy efficiency and so on. We knew we could get there. But to get to a LEED certification, you've got to do a little bit more than that. And that means coming up with a premium for things that cost more up-front to build. So the challenge of the design phase was: How much of it do you decide now, and how much can you decide as you go? That was the critical issue."

By then, in 2006, Northeast was already an experienced—in fact, award-winning—green developer. But in some ways, the quandary it would face in shooting for a LEED certification would be similar to that faced by less experienced organizations with more modest ambitions: It wasn't clear, at the outset, which of the many possible combinations of features would be both economically realistic and sufficient to reach the goal. And it was far from clear where any additional money that might be needed would come from. As time went on, **well beyond the initial design and planning sessions, new information would continue to raise possibilities and pose obstacles** to some of the group's original plans. But because the development team had set a minimum green standard, placed a high priority on meeting the LEED threshold, and collectively sifted through a wide range of options, it was possible to adjust plans later to accommodate unexpected problems—

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<sup>4</sup> LEED® (Leadership in Energy and Environmental Design) is a rating system for green construction created by the U.S. Green Building Council. The system was launched in 1994 with a set of standards for new commercial buildings, and has been gradually refined and expanded since then. A LEED rating system for homes (LEED-Home) was launched in 2006. Buildings are LEED certified for meeting basic, requisite green standards. Those that exceed these standards receive Silver, Gold, or Platinum recognition.

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including fundraising roadblocks—or seize new opportunities. As the project at Stapleton took shape, Northeast ran into both the problems and the unforeseen possibilities.

“In our early design,” Mekonnen recalls, “we wanted ground-source heating, which is ultra-efficient. But we very quickly determined that ground-source heat wasn’t going to work. You need space for it, and we were on a very small parcel, less than an acre. And you need more density than we could fit on that parcel. Plus the cost was so high, we basically scrapped the idea. After a lot of back-and-forth, we then went to the next level of efficiency: an Aqua-Therm radiant heating system. It was not until we got almost to construction that we got hit by a city review that said that a certain vent, the way we had to design it, would not meet code requirements. And because we were hoping to install solar panels, or at least the infrastructure for solar, we didn’t want to go up and ventilate through the roof. All these factors are interrelated, of course, so a decision on one thing has the potential to affect something else. That meant we had to go back and change the heating again—this time, to a 95 percent efficient gas furnace. These are the kinds of things you can’t anticipate very well until you get into the project.”

That is the reason, Mekonnen and other developers repeatedly say, why a close, regular consultation among members of the design and construction team is so important: **A sound, beautifully integrated plan at the design stage may have to be revised several times along the way, often under tight time pressure, with ripple effects that no one professional or contractor might fully understand or be able to anticipate.**

The close consultation among professionals, contractors, and subcontractors led to another change of plans at Stapleton—this time, a change that greatly improved the project’s efficiency. During the initial design charrette, Mekonnen explains, “the subcontractor for the insulation said, ‘I like what you guys are doing. In fact, I have this product that’s going to give you even a higher level of insulation.’ It was something I’d never heard of, but it’s the kind of insulation you blow in. We hadn’t anticipated that for the walls, but by the time we went through his proposal, we saw we could get better insulation for the same amount of money. He isn’t a green expert, he’s just the insulation contractor the GC brought on.

“Now, it was a relatively new product; that’s where there’s a risk. But you have to be open about it. Because in green building today, we’re always constantly coming up with new things. There’s no hard-and-fast recipe to follow. You have to be open and also be careful of the risk, too. We were careful to review the specs and the content—we have a matrix we go through with new products—but it turns out it was all water-based material and it passed all the requirements. And

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**GREEN TIP:** In your early design discussions, be sure to set your sights high. Keep a list of “stretch” items that might require a little extra money or effort. These items often turn out to be feasible later in the process, but they’ll be forgotten if ruled out too early.

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in the end, we had highly efficient walls. We got a 5-Plus Energy Star rating on each of these units, meaning we exceeded even the top level 5 on the insulation and windows and air leakage. There were some challenges in the application, though. There was some extra work for our superintendent to make sure it was applied right, because you can get gaps or air pockets if you don't thoroughly go back and make sure it's filled in properly. But luckily we had a good superintendent with a lot of experience."

## Process varies, but integration is key

The need for early planning and thorough integration is a subject of wide consensus among green developers of all kinds, including developers of commercial buildings and upper-income housing. Still, it can have somewhat different meanings in different circumstances.

Edward Connelly, an established green consultant and president of the consulting firm New Ecology, Inc., in Boston, has seen considerable variety in the way developers choose to organize their integrated process: "A lot depends on the size and complexity of the project. On smaller projects there tends to be less meeting time in general. And sometimes you can't do it collaboratively: bidding requirements sometimes mean you can't choose a builder until you have a design. Sometimes you have a property manager at the table if you know who that's going to be—not everyone does at first. You can always have the owner, green consultant, architect, and the major subs, and maybe even people from the utilities or from city planning. But the model varies a lot in terms of who's at the table when, and how well they know each other, and how long they've worked on green development together. **The key is the continual networking; how it's organized depends on the project and the people involved.**"

In San Francisco, where Mercy Housing is a well-established affordable housing developer in a city known for its commitment to sustainable construction, many green-building challenges have long ago ceased to be novel or prone to unforeseen twists and turns. So Sharon Christen, Mercy's developer on an 84-unit supportive housing project jointly developed with Community Housing Partnership of San Francisco, says that her approach to integrated design is more relaxed and flexible than that of some developers elsewhere. The reason is that many of her team members have worked together before on at least some aspects of green development, and both the techniques and many of the latest green products are well known and widely available in or around the Bay Area.

All the same, she says, once the team embarked on a Green Communities project, with its explicit checklist of standard green

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## **The Essex**

*San Francisco*

On April 17, 2008, Mercy Housing–California and Community Housing Partnership formally opened the Essex, a seven-story former hotel renovated and converted to permanent supportive housing for 84 formerly homeless adults. The intense need for supportive housing and the superior quality of the Essex’s green design all but eliminated the challenge of renting up the units. It took little more than two weeks to move 84 new residents from emergency shelters into new efficiency apartments with Energy Star appliances, highly efficient heat, water, and light, and a **rooftop solar energy system\***, among many other features.

For residents burdened by chronic illnesses, disabilities, and the hard life of homelessness, the durable, healthy environment of the Essex is doubly valuable. Quality ventilation, green-certified carpets and hard flooring that resist dust and allergens, and low-VOC paints and adhesives that don’t release harmful gasses, all contribute to an environment that is as healthy as it is safe and permanent. Like the best supportive housing, the building also integrates supportive services, including counseling, case management, and job training, into the day-to-day management of the property.

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features, the members found real value in starting with a fully integrated charrette and maintaining some form of regular contact among the team members from there on.

“We have integrated green elements into our past developments,” she explains, “so we didn’t find the process of thinking through green elements as new. What was new was the really defined structure to it, using the Green Communities program, with a checklist to follow and a consultant to work with throughout the process. We did our charrette early on to identify the elements we wanted to incorporate and figure out how they would fit together, and then just monitored that throughout the process. Where we weren’t sure whether we could do something early in the process, we kept on checking back to see whether we could.”

Whereas some developers prefer to hold meetings of all team members on a fixed schedule, Christen’s colleagues have a solid enough network among them so that their familiar, less formal structure for coordination still worked well. “But the charrette was not what we usually do,” she adds. “Normally, we’re focused in the early development stages on the program [that is, the population and services for which the housing is being designed] and how we incorporate that into the project. Then later we get interested in materials. But it’s really good to start earlier. It’s good to have a green checklist and bring everybody to the table and say, ‘This is a priority.’ So if you identify early on the green and most energy-efficient elements, then you are giving the contractors and consultants directions, how to design the boiler or the plumbing lines, and they understand why those directions are important to adhere to, even when complications turn up at later stages.”

It’s important to note that the charrette and the early deliberation over green elements didn’t diminish the priority Mercy places on program issues in the first stages of planning. Given that the Essex is supportive housing, being operated by Community Housing Partnership for formerly homeless adults with disabilities or special needs, the design of the building had to accommodate services and other special provisions and yet still look and feel like standard permanent housing. All of that took considerable advance planning—at the same early stage as the green features. On at least one issue, in fact, program considerations and energy efficiency became part of a single decision.

“Normally,” Christen says, “we always individually meter each apartment. It creates a positive incentive for conservation, and lets residents know how their decisions affect their energy usage.” But in supportive housing for very recently homeless people, some of whom have mental illnesses and few of whom can handle major fluctuations in their monthly budgets, the question of individual utility meters was an important program matter. As Jeff Jewel, a developer of supportive housing in Portland, put it, “Individual metering can just set up another

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way for people to fail.” The charrette and early decision-making sessions provided the development team a way of working through not only how various aspects of the design affect one another, but how they affect the residents and the program as well.

## Job One: The right development team

Although the development of David and Joyce Dinkins Gardens in north Harlem, N.Y., included an impressive array of green features—including a planted green roof, rainwater harvesting, porous pavement, and a unique ventilation system—it proceeded with no more complications than any affordable housing development in New York, green or otherwise. Asked for examples of how the development team overcame its green challenges in bringing the building to completion, co-developer Paul Freitag, director of development at Jonathan Rose Companies, answered simply, “There really weren’t any green challenges.” The main reason, he says, was the development team.

“For a lot of projects,” he explains, **“the root of all the problems that arise during design and construction is not having started with the right team. A project is going to win or lose depending, number one, on the people you assemble at the beginning.** You can have maybe a couple of professionals on the team who are ‘learning green’ on the job. But you can’t do that with most of them. Above all, you’ve got to have an architect with strong green credentials, and engineers who are familiar with the features and systems you’re using, and committed to getting them right.”

Many times, Freitag says, developers complain to him that they had set out with what seemed like a realistic green vision, only to encounter resistance from an architect who complains of excess complexity or cost. In those cases, Freitag’s conclusion usually is that the problem is neither complexity nor cost. The problem is the wrong architect.

Likewise, structural and systems engineers are critical elements of a successful green design and can’t be chosen simply through long-standing relationships. Deciding to build green, Freitag says, “can mean you have to change relationships and make tough choices. Really good people who served you well in the past may simply not be right any more. People who were great on a conventional building may be an impediment now. Many nonprofits don’t really know who their engineers are—they were selected by the architects. But we insist on picking our engineers ourselves. That’s a very important member of your team—especially if your architect doesn’t have extensive green experience.”

It’s not essential, Freitag points out, to choose architects with dozens of prior green projects on their résumé. But it is necessary for

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**GREEN TIP:** Integrated consultation among all the key participants needs to continue all the way through the post-construction stage. Important green issues can arise during or after construction—and these issues may have implications for several different contractors and systems.

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them to be familiar with the sustainable features being considered for the current project, to be committed to making it as green as possible, and to be willing to explore new or unusual ideas. And, he adds, “You’ve got to have a really strong relationship among the contractors, the architect, and the engineers to make the whole project succeed.”

At Dinkins Gardens, Freitag says, the earliest conversations with the principal contractors and professionals included particular discussion focused on “the ways the building is going to be different from a normal building. We literally had one meeting where we talked only about that, feature by feature, everything that was going to make this project different. **We said to the general contractor, ‘You’re the one who’s going to have to do this. So think now about everything that’s going to be different, everything that’s going to call for different materials and methods and how you’re going to do it.’** They have to think it through, because they go from job to job doing pretty much the same things most of the time. They’re going to build your building just like they built their last building, unless you point out to them everything that’s got to be different.”

At Dinkins Gardens, nearly all the green elements—including some highly innovative and unusual ones—ended up adding little or nothing to the total cost of a conventional affordable apartment development. (The major exception, the cultivated green roof, was funded separately through a grant from the Home Depot Foundation. Even that, however, amounted to just one-half of 1 percent of the \$19 million total cost of the project.) But the reason for this economy, Freitag believes, is the same factor that he earlier described as Number One: the right team. The various contractors installing these systems were either already familiar with them and knew how to incorporate them economically, or else were diligent about researching and learning about them.

As an example, Freitag describes the bidding process to select a company to supply and install the rainwater harvesting system. All the bidders received the same detailed information on it, but one company took a particular interest and already knew something about the system. That contractor’s bid, around \$30,000, was both the best and the lowest. Another bid, however, came in at \$100,000. “So it was clear that that [second] company really didn’t know what this thing was, and to protect themselves, they just put a very high price on it. There was a fear factor for them. They hadn’t done it before, and they were going to be conservative rather than get stuck. That’s understandable, but it’s not what we needed.”

Other developers of Green Communities projects have sometimes been caught in the same bind: suppliers or contractors overcharging for unfamiliar items either out of a lack of familiarity with how to get

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materials inexpensively or out of a general expectation that the feature is going to be difficult, time-consuming, or complicated to install. One developer was surprised by an up-charge for using low-VOC paint, even though it actually costs the same as conventional paint. Another was needlessly dissuaded from using linoleum flooring because of a badly inflated estimate from a contractor unaccustomed to linoleum. Architects and green consultants should normally be policing these estimates, Freitag concludes:

“Three or four years ago, low-VOC paint really did cost more than regular paint. But not now. On linoleum, the price has been plummeting, and it’s becoming a standard item. Anyone who hasn’t looked at the price of these things in the last couple of years might think it’s much more expensive than it really is. But if there’s no one on your team who’s focusing on these things, you can easily be talked out of perfectly affordable things, or overcharged for doing them.”

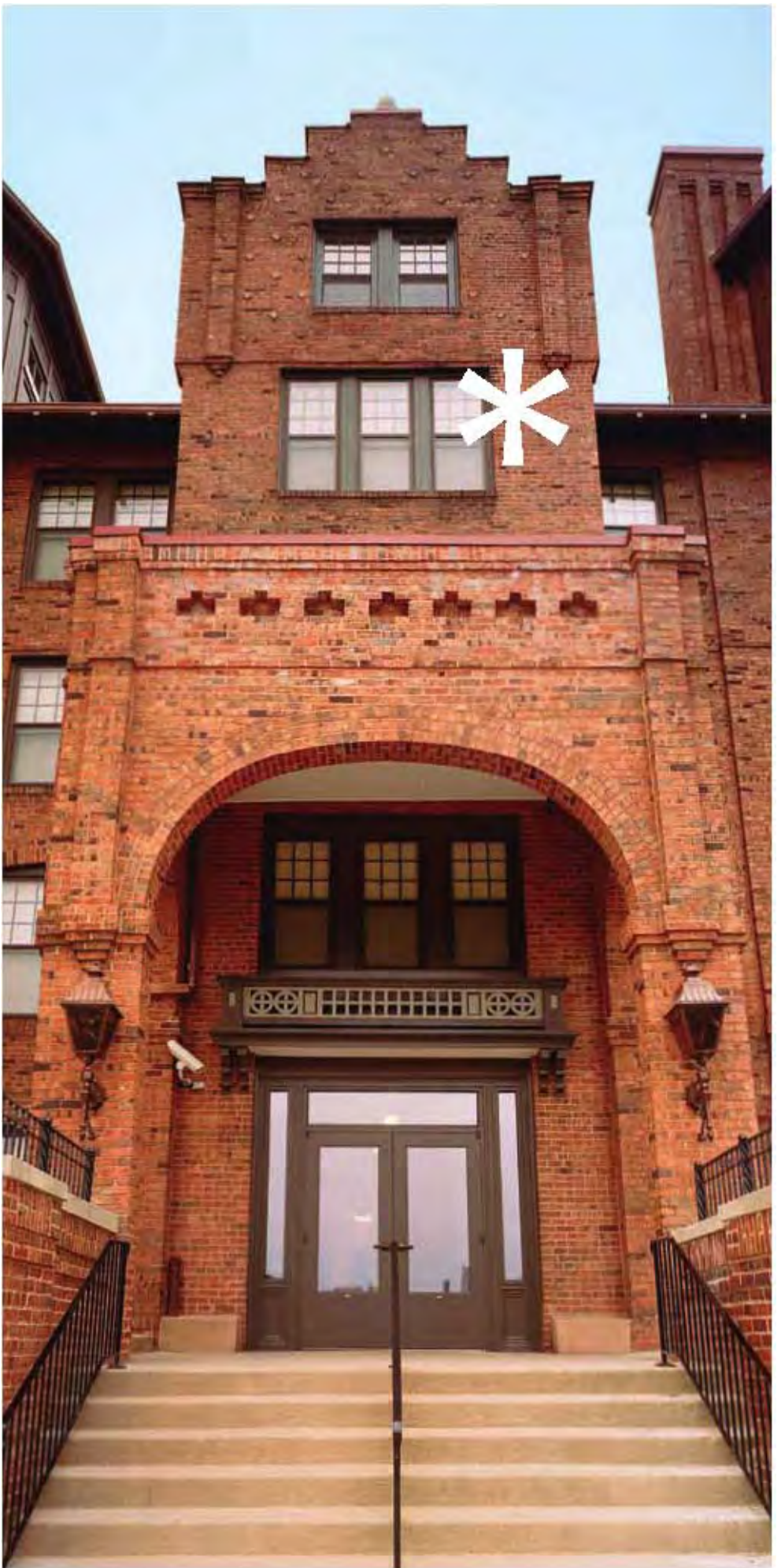
Lucille McEwen, president of Harlem Congregations for Community Improvement, which co-developed Dinkins Gardens with Jonathan Rose Companies, confronted many of these same outdated ideas in raising money for the project. Green design, she says, “is a much more widely known type of development in 2008 than it was six years ago. When we first began the discussions with funders, we were seen as doing something almost frivolous at that time. Nobody said that exactly, but there was this sort of suspicion that we were trying to take things too far, or piling on a lot of unnecessary expenditures. Whenever you’re developing affordable housing, there is always a concern about creating the maximum number of units at the minimum [initial] cost, and a lot of people looked at every one of these green features and saw money that could otherwise have been going for more units.”

Thanks to a careful, independent energy modeling analysis at the beginning of the project, McEwen was able to demonstrate not only that the initial cost was not as high as some funding authorities assumed, but that these costs would quickly be recovered in lower operating expenses. Even so, it was a slow process of persuasion—one that McEwen believes is now becoming easier.

“Nowadays,” she says, “it is all very popular, and everybody wants to say that they’re doing something that’s sustainable, that will help reduce the impact of building operations in New York. But it has taken some time to get to that point. With oil above \$110 a barrel, the same people who used to say, ‘We can’t finance green building because we’re concerned about affordability’ now say, ‘we need to fund green building because we’re concerned about affordability.’ But of course, that’s not where we were a few years ago.”

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**GREEN TIP:** Early in the process, have a detailed conversation with the general contractor focusing on every aspect of construction that is likely to be different from a typical job. This is a way of reinforcing the message that this project won't be like most others.



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## The New Holland Apartments

*Danville, Ill.*

The historic Holland Apartments is a 100-year-old Dutch Revival gem near the center of Danville, a city of some 34,000 people about 120 miles south of Chicago at the eastern edge of Illinois. Developed by the county's premier mental health organization, the building has been renovated to provide 46 apartments for families of various sizes, including units from one-bedroom to three-bedroom. One additional apartment will be for a Crosspoint resident manager who will also coordinate the provision of supportive services on-site.

It was a turn-of-the-century project involving two turns of two successive centuries. Because the Holland is on the National Register of Historic Places and the renovation was financed partly with Historic Preservation Tax Credits, the project took place under strict design and construction rules that required meticulous re-creation of a classic early-20th-century building. Yet Crosspoint was also determined to create a cutting-edge 21st century green environment, with ultramodern features that included a geo-thermal heating and cooling system.

The two goals, historic and green, didn't always mesh. For the sake of authenticity, for example, **historic wood-frame windows\*** on the two most visible sides of the building couldn't be replaced by greener, more durable materials. (*"We had to pull all those windows out, strip off all the lead-based paint, and refinish them and put them back in their holes," says Crosspoint's executive director, Thom Pollock, with a wince. "I'll tell you, the cost per opening—I don't even want to know."*) In other cases, though, history and sustainability proved to be more than compatible. During construction, as contractors were ripping up old carpeting, they were surprised to find an ivory-porcelain floor—an antique marvel that also provides a durable, healthy, and easy-to-clean hard surface, far superior to carpeting.

In the end, the Holland not only satisfied the demands of two centuries, but won honors in both categories. Besides earning a LEED® Gold certification, the project won the 2006 Preservation Award from Illinois' landmarks council.

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**‘YOU’VE GOT TO HAVE  
A CONTRACTOR WHO’S  
REALLY INTERESTED.  
NOT JUST, “SURE, SURE,  
I KNOW ALL THIS,”  
BUT REALLY COMMITTED  
TO TAKING AN EXTRA  
STEP ON THINGS THEY  
MAY NOT HAVE DONE  
BEFORE.’**

— William D. Jones, Enterprise Home Ownership Partners (formerly)

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**T**he green renovation of the ornate Holland Apartments in Danville, Ill., was a dream project in many respects: the rescue of a unique architectural treasure, an opportunity for a large number of affordable apartments, and a chance to produce a showpiece of clean, sustainable construction on a site long burdened with brownfields. But each of these opportunities posed its own set of corresponding difficulties—a combination that ended up presenting a trifecta of development challenges to the project’s owner, Crosspoint Human Services.

Admittedly, one set of challenges was self-imposed, and for good reason. Early in the design process, the project’s mechanical engineer made a suggestion that piqued the imagination of Thom Pollock, Crosspoint’s executive director. The engineer, Alan Chalifoux of ETA Engineering in Champaign, had recently become a LEED® Accredited Professional and suggested that Pollock try to renovate the Holland as a LEED-certified green building. Because LEED-Home was still in its pilot stage, neither of them was sure exactly what that would entail. But on a site that had long been derelict, polluted, and crime-ridden, the prospect of creating the city’s first fully green-certified apartments struck Pollock as close to irresistible.

Fine, but that would mean striving for the latest in efficient design and construction in a building whose design had been set 100 years earlier and was, for preservation reasons, not eligible for major alteration. Could a venerable antique also be cutting-edge green? Perhaps—but that then raised a third set of challenges: The property was to be financed with Low-Income Housing Tax Credits (as well as Historic Preservation credits) and thus had to remain affordable for people earning not much more than half of Danville’s modest median income. The natural tensions between preserving the past and building for the future would not be able to be solved with much added expenditure.

In the end, the Holland wove solutions to all three issues into a historically distinguished, affordable, and healthy building that earned LEED’s Gold certification. But getting there called for careful orchestration from all the major professionals and contractors. It also called for expert help on funding, which came courtesy of a financing consultant who remained a fixture on the development team from the first charrette onward.

For Thom Pollock, the best example of the complex interplay among historic preservation, green construction, and affordability came in the most elementary feature of the building: the bricks.

“We’re talking about a building over 100 years old,” he explains, “and one-half of it is brick. At one point, I think we needed the equivalent of maybe 11,000 more bricks. Well, we couldn’t get them to save our lives. Or we would have had to give our left lung to buy them.”

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Now, we didn't know that until we were already in the middle of several brick projects. But the cost per unit was just astronomical."

Not just any brick would do. Preserving the aesthetic of a century-old brick building meant finding bricks of "like kind"—a color and finish that would blend seamlessly with the old-tech, softly aged look of the current material. "We couldn't get it. We tried, as much as possible, to re-claim from various parts of the building that we were taking apart. And we did that pretty well. But there were some significant, big parts that needed additional bricks—for instance, there was a patio wall, about 6 by 20, that had completely crumbled out onto the street and had long since been hauled away. Well, that's a lot of brick."

Other parts of the building—a crumbling parapet, two decorative arches that were missing entirely, and a few other spots—also called for new (or rather, old) brick. Luckily, Danville is a city with many old buildings, not all of which are salvageable. One day, Pollock noticed that the city was preparing to demolish some nearby industrial-age brick buildings, and suddenly a light bulb was lit.

"We went off to talk to our good buddy—that's the nice thing about a small town: everybody's got a buddy in City Hall—and said, **'Instead of carting your old brick to the dump, why not bring it to our site and dump it here?'** Now, that saved him dumping fees, so he was thrilled. And we got the equivalent of about two buildings' worth of brick—of comparable size, comparable age, comparable finish. So, problem solved, right? Well, not so fast. We then had to clean it so it could be used. That alone became a major recycling and reclamation process: cleaning palettes and palettes and palettes of brick. But instead of going into the landfill, it ended up back in our building."

In the elaborate dance of historic, green, and affordable requirements, it is interesting to note that a prime environmental goal—keeping Danville's old brick out of the landfill—was achieved not so much because of any green impulse, but because of a landmarks mandate. Yet in the end it was a highly efficient, eco-friendly use of materials. Nonetheless, it also introduced a significant detour in the project's work plan. Suddenly, Crosspoint and its contractors were going to have to master the art of cleaning historic brick.

At this point, however, a fourth set of goals took their place alongside preservation, sustainability, and affordability. Crosspoint's primary mission is to serve people with mental illnesses and developmental disabilities, including providing employment and training opportunities for those who want them. Cleaning brick, though a relatively uncommon manual skill, was nonetheless an excellent opportunity to teach what workforce development specialists call "soft skills": punctuality, self-discipline, teamwork, and other workplace essentials. Participants were not only paid for their work

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but had the opportunity to make a visible, lasting contribution to the community. “It became a program asset,” Pollock concludes, “as well as a very efficient use of brick.”

Then there were the brownfields. On one lot immediately west of the Holland there had once been a gas station. Although its storage tanks had long since been removed, there was a reasonable chance it would pose a remediation problem. And in any case, the vacant hulk was a blight on the landscape that needed to be removed. Likewise the crumbling former auto dealership and repair shop just to the south, where years of garage work hinted at even more contamination. The two abandoned businesses were separated by a blacktopped city alley. It all added up, in Pollock’s words, to “this huge slab, running all the way from the front sidewalk, covering virtually the entire lot” next to the historic building. Trying to create a showcase green residence next to Gasoline Alley was, as Pollock puts it, “a little lesson for us in Brown as a shade of Green.”

Luckily, the initial environmental tests on both sites came back clean, so Crosspoint was spared the high cost of full-scale remediation. Still, there was the problem of the giant slab—both the unwelcome aesthetics and the unpleasant environmental effect of such a sweeping expanse of cement and blacktop.

After buying the alley from the city of Danville, the Holland team started removing the hard surfaces. “We tore up all of the asphalt, tore up about two-thirds of the concrete slab, and then brought in God knows how many truckloads of dirt and created a park. The small portion of the slab that remains is a kind of patio. It’s got a wrought-iron fence, and during the summer there are benches and chairs and tables and umbrellas and two barbecues.” Surrounded by landscaping, a remnant of one of the neighborhood’s greatest eyesores had become an amenity—a brown liability transformed into a green asset.

## Integration carries over from design to construction

Twenty years ago, the waters of Dorchester Bay, along the coast of Boston, were another brown liability—a smelly, opaque embarrassment that ultimately induced a court to order a cleanup of Boston Harbor. Because much of the murk was the result of overloaded sewers spilling into the bay and rivers, the city was forced into a sweeping water-management plan that continues to this day. That is one reason why, among dozens of sustainable-building features at Olmstead Green, the vast new mixed-use development near the heart of Boston, some of the most striking are, figuratively speaking, not only green but blue.

The project is a much-heralded example of cutting-edge water and soil conservation, carried out in an urban setting where high density

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and complex infrastructure make such projects especially challenging. Yet thanks to the availability of skilled contractors, a well-integrated design process, and some dedicated public and private funding, the blue features (like the green ones) have placed relatively little strain on the development budget. Instead, the real challenge has been in implementation: integrating a number of innovative technologies—while simultaneously protecting mature trees and wetlands on the site—throughout a long, multi-phase construction process. The development team has thus far managed, through close coordination among many players, to hold together a web of intersecting timetables and specifications, ensuring that the various ground and water elements are installed correctly, work properly together, and can be maintained effectively over time.

The 42-acre Olmstead Green, formerly the campus of a state mental hospital and now Boston's largest residential development in two decades, will eventually contain more than 500 apartments and townhomes, of which roughly 150 will be subsidized under the Low-Income Housing Tax Credit program. It is being developed jointly by the nonprofit Lena Park Community Development Corporation and New Boston Fund., a for-profit real estate development and investment firm. As this is written, the first phase, containing 100 market-rate condominiums and townhouses and 51 Tax Credit apartments, is under construction and scheduled to open in 2008.

The entire project, like most new development in Boston, has been designed to high green standards. But because of the special economics of the subsidized units and certain issues related to the site, the low-income component presented its own set of planning challenges, which were resolved partly with the help of an Enterprise Green Communities® grant. Among other things, says Edward Connelly of New Ecology, Inc., the project's green consultant, "the challenge on denser developments is often the parking." The market-rate townhomes, with lower density, don't require as many cars in a single place as does an apartment complex. But with land at a premium—especially given the commitment to preserving vegetation and wetlands—it can be hard to incorporate sufficient parking without sacrificing too much of the natural surroundings.

Still, as Connelly also points out, **the challenges were not, in the main, the result of building green. They were simply challenges of good planning**—design, use of space, balancing aesthetics and convenience—that were slightly complicated by the demands of multi-family subsidized housing. "This was a very complex project overall," he says, "next to a nature sanctuary, very high-profile in Boston, with a lot of political and media attention. There was environmental remediation, new roads and infrastructure, extensive demolition. The non-green challenges have been vastly greater than the green ones."

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Yet one set of green challenges—or perhaps blue ones, given the prominence of water management—did pose their own set of demands, beginning in the earliest stages of planning and intensifying as the project has moved into construction. To meet the city’s water-management requirements and to create a nature-friendly community, the developers adopted the principles of Low-Impact Development, which aims at maintaining the natural hydrology as much as possible within the limits imposed by the site. It entails minimizing impervious areas, maintaining natural slopes and depressions in the landscape, infiltrating and storing rainwater, and carefully selecting materials for maximum benefit to the ground and water with minimal harm. But the Low-Impact model has thus far been more popular in suburban or exurban greenfield developments than in denser urban settings. That means that contractors tend to be less experienced with the special demands of a central-city site like Olmstead Green, with its space limitations, high-water table, and far greater volume of pedestrian and vehicular traffic.

The development team’s advance planning led to an ambitious, striking combination of specifications aimed at natural preservation and enhancement. “There was some very innovative drainage and infiltration on the site,” says Connelly, “rain guards and infiltration swales, a lot of the pavement is porous so it’s infiltrating on site. Preserving the old, mature trees is not only an aesthetic benefit and a source of shade canopy in warm weather, but it goes a long way to reducing runoff.”

Although the addition of so many unusual conservation technologies may seem like a high-cost approach, Connelly points out that at Olmstead Green, conservation was not an optional feature. “These things were chosen not because someone wanted to win an innovation award—they were all good, strategic decisions. They were maybe not the cheapest possible, but they were certainly in the ballpark. And for the most part, it wasn’t really adding cost to the project, because they already had to infiltrate water on the site anyway,” due to Boston’s water-management mandates and other environmental requirements. Although those mandates did not demand quite the degree of far-reaching conservation that Olmstead Green will eventually achieve, Connelly argues that the extra environmental improvements the developers chose don’t add dramatically to the cost of what the city and state did require. And some additional fundraising was able to cover the cases where costs exceeded the available budget. **“That’s really good integrated design, when you can come up with a strategy to make the project greener by not costing yourself a lot more money.”**

Yet whatever the challenges of designing and funding, the greatest demands have come with construction and installation. Technical specialists were required to oversee and coordinate installation

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## **Olmstead Green**

*Boston*

The sprawling, \$140 million development of low- and middle-income housing now under way between Boston's Mattapan and Dorchester neighborhoods is one of the nation's more celebrated recent projects in green housing—both because of its scale and because of the originality of many of its green components.

Yet for all the innovative natural conservation features running through the site, the core achievement of Olmstead Green is a mixed-income community, including what will eventually be **150 apartments for low-income families\***, that integrates the most fundamental green requisites of smart siting, walkable mixed-use communities, easy access to transit and green space (including an Audubon sanctuary), and careful attention to efficiency, durability, and health.

The 51 low-income apartments in the development's initial phase of construction were designed in careful accordance with the Green Communities Criteria. In fact, the decision to go green even predated the final release of those criteria. In the group's earliest discussions, the project's green consultant, Ed Connelly, introduced the developers to what was then a new sustainable-design scorecard developed by a Vermont organization, Building for Social Responsibility. The "Vermont Builds Greener" criteria were among the source materials for the Green Communities checklist a year later, so Olmstead Green was already on track to participate in the program even before it was launched.

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of each of the complex technologies on-site, ensuring communication among specialized crews who, despite solid expertise in their own systems, may have been largely unfamiliar with other systems being installed or prepared at the same time. Seldom-used methods of erosion control and soil enhancement—including the installation of long “compost socks”—involved on-site procedures that many contractors, carrying on other aspects of the development, had probably never seen. Among other out-of-the-ordinary specialists on site was an arborist responsible for flagging, inspecting, and treating the preserved trees, while guiding contractors to make sure the trees weren’t harmed.

Yet as daunting as this process might seem, much of the complexity was managed or eliminated well before construction. Early assessments of the site’s hydrology and soils, careful sorting of the geotechnology options, and a painstaking approach to coordination among technical experts, contractors and design professionals all led to a well-orchestrated sequence of work as the development engine started to roll. In that respect, the bluing of Olmstead Green may have involved a lot of unusual technology, but it relied on **a fairly standard tenet of smart green development: early, thorough integration of design and planning, with constant communication among members of the team.**

“In traditional design,” Connelly explains, “the building performance and the materials chosen are not discussed often, and goals are not set often, in a group setting. They’re parceled out to people to figure out within their own fields of expertise. Here, the architect was still responsible for design, and the developers were still making the major resource decisions, and so on. But decisions about layout, heating systems, landscaping and draining, health issues, water issues—none of those were decided in silos. Everybody knows what everybody else is doing. And that results in a better project.”

## Taking construction from green to greener

Like Boston, more and more cities and states are applying green standards to most or all new development, as part of their overall planning and building requirements. Where that has happened, developers have found that the availability of green materials and the general level of green expertise in the construction industry have risen quickly. That fact alone has given many affordable housing developers a boost in adopting sustainable design without jeopardizing the affordability of their projects. Competition among skilled professionals, contractors, and suppliers—combined with a growing ease in finding and using green technology—has resulted, in many places, in a steady decline in the “green premium” developers once had to pay for efficient, healthy housing.

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**GREEN TIP:** When using some new or unconventional technology, the design team usually needs to plan, well in advance, for making certain that all contractors and employees on site are aware of any unfamiliar procedures and how these may affect their own work.

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Even so, the green rules that governments adopt don't always keep up with the rapidly changing technology and standards of the industry—with the result that, even in many green-friendly jurisdictions, mandatory levels of performance still fall short of what most sustainable developers today consider basic, good practice.

In California, for example, the state's groundbreaking Title 24—effectively a statewide energy code for both residential and non-residential new construction—was last updated in 2005, as a result of a process stretching back to the previous year. At the time this was written, in 2008, a new set of standards has just been issued, but in the meantime, rules based on the methods and practices of 2004 had been governing the energy efficiency of most new construction in California. Those rules still put the state well ahead of the rest of the country. But they meant that developers seeking to follow the Green Communities Criteria, or those of LEED or other up-to-date sustainable guidelines, needed to find contractors who are not only committed to green construction, but prepared to exceed statewide norms, in some cases by a significant degree.

“Title 24 goes a long way toward meeting the Green Communities Criteria for energy efficiency,” says William D. Jones, formerly director of Enterprise Home Ownership Partners in Los Angeles, “but not far enough. We still have to exceed that by 20 percent. It's the same with water retention, the same with a lot of the other Green Communities items. The state standards get you halfway there, or a little more than half. But then you still have some distance to go. Going ‘full-green’ is certainly not as onerous for us as for someone in a state that's totally unregulated, or where the regulations don't seriously account for sustainability. But we're still essentially saying to our contractors, ‘We need you to stretch, we have to go beyond.’”

In places like California where sustainable-development ideas are widespread, it is now increasingly likely that professionals and contractors will regard themselves as proficient in green technology, simply by virtue of following state guidelines. On one hand, that makes the discussion about methods and materials somewhat easier—at least the basic terms are mostly familiar, and the underlying values of sustainable development no longer come across as fanciful or alien. On the other hand, as several Green Communities participants have learned, contractors familiar with older, more minimal green principles may still feel that the standards of 2008—not to mention the still-emerging newer ideas—are excessive or overly ambitious. One participant at the Green Communities Summit expressed a common frustration: “I've had contractors tell me, ‘I know green construction. I know what an efficient building looks like. But what you're talking about is way, way over—it's going to cost a fortune.’ And then we bid

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out the work, and everything comes in fine. We're learning that not everyone who thinks they're a green expert actually knows what's going on out there in the market."

"First of all," says Bill Jones, "you've got to have a contractor who's really interested. Not just, 'Sure, sure, I know all this,' but really committed to taking an extra step on things that they may not have done before, or not have done in the same way. For instance, making sure they manage the job site correctly so we don't waste materials, so we sort and recycle everything properly. In our case, they have to know there are requirements that go above and beyond Title 24, which they're used to, and they have to be interested in stretching that limit. Going that extra 20 percent still causes problems for some contractors, especially the smaller ones."

On scattered sites across the city of Los Angeles, Enterprise Home Ownership Partners is developing 100 townhomes for sale—half of them for low-income buyers—as part of the Green Communities initiative. The effort is part of the organization's ongoing development and renovation of homes for sale across the city, though this phase will be EHOP's greenest by far.

Dating back several years, its residential rehab program had placed an emphasis on energy efficiency in construction, fixtures, and appliances. Gradually, it began to include the infrastructure for solar panels, and even the panels themselves when additional funding allowed for it. Next came tankless water heaters, which provide hot water on demand without the standby heat losses that come with storing water in a tank. "We gradually added things as we went along," Jones says, "and we got greener and greener. As new technology became available, we kept incorporating it." As a result, EHOP's regular, major contractors were familiar with the organization's commitment to sustainable building and were prepared for a gradual expansion into new features when the program signed on to Green Communities.

But reaching that level of comfort and commitment took some time. At first, the organization's general contractor balked at the idea of voluntarily exceeding state mandates—especially when doing so would add to the sales price. "He has a long reputation of building quality homes," says EHOP's senior rehab manager, Mark Surdam, "and he just thought we were going too far. He didn't see the point of spending more for something that wasn't required and that customers weren't clamoring for. But once we got him involved in building green, and he started reading about it—and about how homeowners would actually pay more for it, how it's the coming thing—he started to come around. He has a social conscience anyway, so the closer he looked at it, the more he was sold on it, even in the rest of his business."

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Still, the contractor's initial hesitation is not uncommon—even among those who are concerned about sustainability. Many homebuilders argue that the economics of for-sale housing is different from that of rental buildings. Unlike landlords managing multiple units with longer time horizons, buyers tend to reckon the cost of their home on the day they close the sale. Longer-term economics might be especially hard for some low-income families to appreciate when confronted with the daunting cost of the initial purchase.

Bill Jones has little trouble rebutting those kinds of reservations—though it's a debate he still has to engage in from time to time. “People who buy a home, whether low-income or not, aren't just looking to buy the cheapest thing they can find. They want quality for the price, and they understand that **they're going to be paying for this home, in most cases, for 30 years. So if you tell them the house will save them money over that period of time, they don't have any trouble understanding that it's a more affordable house, and a better house.** They're going to reap the benefits—whereas in a rental, the owner reaps some or all of the benefit. I've never heard an argument that would make me believe that it's good economics for an affordable housing developer not to go green.”

Thanks to recent action by the City Council, the question of whether to settle for state standards or to pursue more comprehensive green design is quickly becoming moot in Los Angeles, at least for large projects. The city has adopted a rule that developments of 50 or more residential units, and commercial developments of 50,000 square feet or more, must be designed to qualify for a LEED Silver rating in order to receive a building permit. Although projects do not have to obtain LEED's independent certification, they must be designed to satisfy its requirements. In this new environment, contractors on all big jobs will soon have to be familiar with LEED specifications and able to perform up to its green standards.

“But what about small projects like ours?” asks Bill Jones. “Ten or 12 units at a time, or even 25? The city says that small projects that voluntarily meet the LEED Silver standards will get an expedited plan check and a faster city review, but that's not a huge benefit. It may take a week or two off of a 14- or 16-week process. It doesn't fundamentally change anything. So I'm still in the position of saying to the city, ‘regulate us!’—which probably isn't something they hear every day.

“I'm saying that to them not because we need to be coerced, or because they would make us do anything we're not doing already. I'm saying that because **the best way to bring down the price of building green, and to bring up the level of green expertise all over the industry, is to have everybody building this way from now on.** We're heading in that direction. But we're not there yet.”

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## Where design becomes reality

More than anything else, people with experience in green development emphasize that **careful and imaginative design are indispensable, but a project isn't truly green unless the designs and specifications are carefully and expertly applied on the site, throughout the construction process.** Finding contractors and professionals who know or can master the relevant technology, who can train and supervise less-experienced employees in implementing it, and who recognize the value of testing the soundness of their work as they go along is the critical challenge in this phase of work.

Picking experienced, dedicated contractors is important, but in some cases even that may not be enough. Rebecca Warntz, construction director at Enterprise Homes in Baltimore, learned firsthand that expertise may not count for much without diligent supervision.

“Having a contractor who knows what has to happen in the field, and having all the contracts awarded in accordance with that understanding, is one thing,” she says. “But making sure that each of those things actually happens in the field is quite another matter. It’s a difficult thing to take a set of plans and specs and make sure that every carpenter, every electrician, every plumber is executing properly. Even the most diligent site manager may miss something depending on the day. It’s a lot to coordinate and coordinate well. Technology moves at such an incredible rate. Things are ever-changing and getting better. So even if you carefully train all the contractors in each new method and product and system, expecting that training to make it to the field, to the people doing the work on site, is asking a lot.”

Warntz’s colleague Chickie Grayson, president of Enterprise Homes, is continually looking for ways of ensuring that contractors and subcontractors are aware of the special responsibilities of building green and are taking adequate care to get the technology right. One recent idea, still untested, is to use the contracting process as a way of raising the awareness level:

“I’m trying the idea of requiring general contractors to incorporate language into their subcontracts to protect us in case features aren’t installed properly, something we’re trying to negotiate with our GC now. I want an additional term at the end of the contract that jumps out at you: ‘You’re going to meet this requirement or there’s a penalty for it.’ Because contractors will see that and pay more attention to it. It’s not something I’d ever hope to use—but I want them to be thinking about it. Our contract with the GC already says, ‘We have to meet these criteria,’ but having that guarantee added in to the subs’ contracts is another step. Their contracts already say they have to meet code, plans, and specs, which includes the green specs. So in

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**GREEN TIP:** Green features won't add up to a green building if they're not properly built or installed. It's important to ensure that contractors take extra care in training and supervising the people who will execute the green design.

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a way, the extra language is redundant, technically. But if you point this out in some other place to subcontractors, it could cause a sort of lightbulb to go on: I have to pay attention to this.”

But the most experienced green specialists generally agree that no procedural or contractual guarantee can provide the kind of reassurance that comes from an independent test of performance on each component system. Preferably these tests should be conducted at intervals throughout the construction process, but certainly before the whole project is completed. The tests and verifications can be costly, and some find the price tag prohibitive. But others suggest that a botched installation—or even just a small technical error in a complex system—can end up costing a good deal more in repairs, replacement, or lost efficiency. The next section provides some examples of why they believe this is so.

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## Lincoln Woods

*Portland, Ore.*

The “woods” in Lincoln Woods are literal. They include a **stand of eight giant fir trees\*** along the sidewalk in front of the complex and a sprinkling of other mature shade trees across the site. Site plans were drawn specifically to preserve them—requiring a deeper setback in front and an adjustment to the original quadrangle layout of the four buildings, among other things. A consulting arborist worked on-site throughout construction to protect the trees from damage and to nourish them during a brief but ill-timed drought. But the results were unquestionably worth the effort: The general shade and tranquility of the yards and gardens are part of an overall vision for the development that includes both the environmental (*like native landscaping and water conservation*) as well as the psychological.

Lincoln Woods is home to a global mixture of races, ethnicities, and cultures. Its large units accommodate very low-income families with many children (*even with one family not yet moved in, the remaining 69 units still housed nearly 160 kids in early 2008, with some 30 pregnancies adding to the total*). Several of the residents are coping with difficult backgrounds, disabilities, or other recent hardships. In these circumstances, an environment that radiates permanence, stability and care is not just an aesthetic benefit, it's an asset to the human-services program of the buildings' owner, Human Solutions, Inc.

The cheerful, quiet atmosphere of Lincoln Woods—even in the comparatively dense environment of East Portland—illustrates another aspect of careful, integrated green design. It incorporates the natural surroundings into the overall mission of affordable housing: providing a healthy, stable platform on which families can build a better future for themselves and for their children.

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**‘WE FOUND THAT SOME COMPONENT WAS BAD, AND FORTUNATELY OUR TEST WAS DONE BEFORE THE SYSTEM WAS OUT OF WARRANTY — THAT’S WHEN YOU WANT TO FIND THIS KIND OF THING OUT. WITHOUT THAT TEST, I’M NOT SURE ANYONE WOULD HAVE NOTICED THAT WE HAD A PROBLEM.’**

— Jeffrey Jewel, Human Solutions, Inc.

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**T**he four modern, four-story buildings that make up the Lincoln Woods apartment complex in east Portland represent a high end of sustainable design even in highly green-savvy Oregon. Yet the project's many green features—including floor-to-ceiling thermal windows, above-code insulation, and a whole-building ventilation system that maintains a constant flow without mixing air between units—added only marginally to the development cost, after figuring in the state's green subsidies. That was crucial for Lincoln Woods, whose apartments are all rented to large families on very small incomes. One-third of the 70 units are for families living on 30 percent of the area's median income; the remainder are for families below 50 percent. Given those constraints, even the most desirable long-term efficiencies would have to be financed without high initial expenditures.

But the need for stringent cost control also means that the developer, Human Solutions, a nonprofit housing and family-service provider, had to be certain that the new technologies were working properly well before contractors left the site. And it needed to be sure that these same systems, some of which are new and relatively unfamiliar, would continue working properly, without extraordinary maintenance costs, to achieve the long-term savings that justified their purchase. When testing the ventilation system, for instance, the development team discovered a defect in one building that managers and residents might never have discovered on their own, but that would have significantly reduced the system's economic and health benefits in that part of the complex.

"The technology of these systems is still relatively new," says Jeffrey Jewel, housing development coordinator at Human Solutions and project manager on the development of Lincoln Woods. "And it can seem a little black-boxy to contractors who aren't used to it. It's supposed to pull air through the whole building at something like 30 CFM [cubic feet per minute], but to get to that, you first have to go through a really difficult calibration. It takes a lot of balancing."

So, soon after the new ventilation equipment was installed, the green consultants and contractors conducted a performance test and found one building where the air wasn't moving as it should. "We found out that some component had gone bad," Jewel recalls, "so we got it replaced, and got it all balanced again. But it's a little bit more of a mystery than you'd like it to be. Fortunately, our test was done before the system was out of warranty—and that's when you want to find this kind of thing out. Without that test, I'm not sure anyone would have noticed that we had a problem, or they might not have noticed before the warranty expired."

Melissa Peterson, Enterprise program officer in Portland, believes the additional cost of thorough third-party tests and verification,

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both during construction and afterward, is readily justifiable. “It’s really valuable to double-check, at various stages of construction, that the insulation that was specified is actually being installed, and installed correctly, before the sheet-rock goes up. That the duct work is actually finding the most efficient pathway to that wall vent. **Those details that often get handed out to subcontractors have to be brought back in to be double-checked, to ensure that all the work the development team put into the design and planning and construction documents is actually followed through** and is going to achieve the efficiencies that the main contractors and designers agreed on.”

The monitoring and diagnostic challenges don’t end with the installation and testing phase. From there on, as a routine matter, the building’s management needs to be able to check on a system’s performance and respond effectively when problems arise. As Jewel explains, “The maintenance guy at Lincoln Woods, who’s had a lot of formal training on how to run a building, a sharp guy, told me frankly, ‘I have no earthly idea what to do with this [ventilation] system.’ Now he’s been trained and he’s up to speed on it, and I know a lot more about these systems than I did when we put in our first one. But if I were to leave Human Solutions and someone came in who didn’t understand this system, he might never know if something wasn’t working. He’d just conclude, ‘This isn’t worth it; it’s not saving me any money.’ Or he’d decide that it was saving money and that was good enough, never knowing that part of the system could be saving a lot more, or isn’t working as it’s supposed to. I’m sure that happens all the time, because these systems are really complex.”

Developers who choose new or unusual technology may not realize, at first, the importance of training maintenance and operations staff—not only in the specifics of a given piece of equipment or material, but in the overall green design, the way its parts work together, and the reasons why it’s important to maintain them in efficient working condition. Even less obvious is the need to train residents to use the building’s green features to greatest effect, to maintain the green surfaces and fixtures in their dwelling, and, to the extent possible, to apply green practices of their own in keeping up their home. “Ultimately,” says Jewel, “these features are for the tenants, but they may need some explanation and encouragement to get the full benefit from it all. And when you’re dealing with a lot of kids, as we are, it’s important for features to be tamper-proof.”

Lincoln Woods was designed for large families. Fifteen of the 70 apartments have four or five bedrooms, and another 29 are three-bedroom units. As a result, the buildings and grounds are routinely full of children (the school system reserves a whole bus just for Lincoln Woods). The importance of tamper-proof features in such an

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environment became clear to Jewel thanks to an experience at an earlier housing development for families.

“We had done a few unusual things, like a drip-water management system that was pretty cool. In place of gutters, there are these drip panels that cause water to be dispersed around the grounds. But it didn’t take long for some of the children to discover that you could knock those down with a well-propelled Barbie doll. That system is not set up to withstand 10 bored kids wandering around looking for something to do. We think very carefully about that now before we choose anything.”

Explaining sustainable design features to tenants usually isn’t difficult, but it poses some unusual challenges at Lincoln Woods. Many of the project’s residents are recent immigrants, from backgrounds as disparate as Eastern European, Somali, and Latin American. So to help families become familiar with the green features of their apartments, it’s first necessary to navigate a sea of different languages, cultures, and family compositions. Some Human Solutions staff members are available to translate, and residents also interpret for one another. But even when language isn’t a barrier, background sometimes can be.

“Eastern Europeans are used to very cold winters,” Jewel points out. “So when they saw these tall windows, their first inclination was to hang big, heavy curtains on them and keep the curtains drawn all winter. They probably figured that was a good way to save energy. But of course, it completely defeats the purpose of the big thermal windows, which keep the cold air out but let the sunlight in during the day, so there’s less demand on the furnace. I would say to some of the tenants, ‘Here, try this: Put your hand flat against the glass. See? It’s warm. It’s not letting any cold in. But that sunlight feels nice, doesn’t it?’ It can take a little time for them to get used to, but the explanation really helps.”

At Lincoln Woods, in accordance with Green Communities’® standard requirements, all residents get a resident manual and an initial orientation session that cover the buildings’ basic green features. But as Resident Manager Kathy Floyd points out, “In the crush of moving in, which is stressful enough, it’s probably not the best time to give people a lot of new information.” So the staff takes care to interject information about green technology and sustainable practices into various service programs throughout the year.

“We deliberately do things that encourage the tenants to come together,” Jewel says. “Not just for training, but overall. That’s especially important in this building because of the multi-cultural tenancy. We provide a lot of services to families, where we try to sneak in some subtle information about green lifestyles and environmentally responsible practices. We have cooking classes, for example, and we’ll include some little things like the value of opening the windows and controlling moisture”—a crucial consideration in Portland’s ultra-humid climate.

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Still, Jewel sees a lot of room for improvement in the information provided to residents. “Our manual isn’t yet everything I would hope for. It’s one of those things that, in the crush of getting your Certificate of Occupancy, don’t get the attention they deserve. And there are more events we could probably be doing with the tenants. But everyone here takes this seriously, on an ongoing basis. So we’re going to be getting better and better at it.”

After nearly 18 months of operation, the benefits of both the green design and the management and tenant training were visible in an apartment that had just been vacated by a large family. Stopping in for a tour, a visitor asked what the now-immaculate walls had looked like when the residents first moved out, before re-painting. “You’re seeing it now, just as we saw it,” Jewel answered. “We haven’t repainted anything yet. The no-VOC paint, the ventilation, the great moisture control all mean that these walls look as good now, after a year and a half with a big family full of kids, as they did the day we opened. The durable Green Label carpets still look brand new.”

**“That’s the thing about green development,” he summed up. “It’s not just better for the environment, it’s better quality, pure and simple.** One reason a super-quiet bath fan is so quiet is just that it’s built well. Nothing cutting-edge about it, just better manufacturing. It’s just better. So when you install an extra-quiet bath fan, yes you’re improving your tenants’ quality of life. But you’re also putting in a fan that probably has four times the life span.”

## Keeping green alive

Jeff Jewel is far from alone in his desire to focus harder on ways to inform and orient residents to green living. Like the owners of Lincoln Woods, the Baltimore developers of New Shiloh Village, a mixed-use development centered around 80 apartments for low- to moderate-income seniors, took care to prepare a tenants’ manual and hold an orientation to acquaint residents with the green systems and amenities of their new apartments.

New Shiloh’s “Living Green Manual,” which the first residents received when they arrived in December 2007, starts by explaining one-by-one the advantages of living in a green building—describing features that reduce moisture, ensure cleaner air, eliminate unhealthy fumes and gases, last longer, provide better heating and cooling, and save on utility costs. It describes broader benefits, too: aspects of the building that are friendly to the surrounding environment, like the re-use of vacant inner-city land, the installation of a light-color roof, and the efficient irrigation of the grounds.

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It then goes on to encourage residents to “live green,” explaining and promoting “environmentally healthy products and practices.” For example, the manual urges residents to try natural air fresheners such as boiling orange rinds, and to be sure laundry machines and dishwashers are full before running them. The booklet’s lively design<sup>5</sup>, with colorful illustrations and short blocks of text, and an upbeat style (“many of these things are easy to do and all of them are worth the time and effort”) tries to inspire residents to take part in the green vision that inspired the building’s design.

After lease-up, managers also held an orientation session that covered much of the same information, but in a more personal and interactive way. Joanna Pi-Sunyer, associate director of rental housing at Bon Secours of Maryland Foundation, a co-developer of New Shiloh, explains that “in our resident education, we need to emphasize why living here is, in fact, different—why this is a good thing to be building on in-fill land. We tried to present our manual, which we developed from examples that Enterprise gave us, and then we ran through the green features of the building.” Yet like many other green developers, Pi-Sunyer isn’t sure these efforts really accomplish as much as they should.

“People were just not that interested,” she acknowledges. “We had low turnout at the training event, and although the people who attended seemed pleased with it, I doubt it made a big difference in most people’s day-to-day lives. Maybe in the way they think about the building, but beyond that I’m not sure.” A subsequent interview with residents confirmed Pi-Sunyer’s doubts: Most residents didn’t remember anything about the training session.

One question that Pi-Sunyer and others raised was whether the early weeks of occupancy are really the best time to conduct these sessions. Unless there are systems or appliances that require special training to use properly (which is not the case at New Shiloh, or at most Green Communities developments), some wonder whether later training sessions or events might be more effective—after the stress of moving in and acclimating to a new home has passed.

There may also be particular hurdles to overcome in introducing seniors or disabled residents to green features so soon after moving in. Residents with special needs often have enough things to learn and grapple with when they move into a new residence, without also immersing themselves in the details of green living. Combining green information with other services and events for tenants throughout the year, some developers have suggested, is both more effective and more engaging for the residents.

The early weeks of occupancy are also a difficult time for developers. “It was one more thing I needed to do, among a million

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<sup>5</sup>The “Green Living Manual,” along with many other useful examples and suggestions, can be found at the Green Communities website: [www.greencommunitiesonline.org](http://www.greencommunitiesonline.org). Click on “Information Resources” for publications and other material to help in understanding and meeting all of the Green Communities Criteria.

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other things,” says Pi-Sunyer, “as the building was being finished, we were dealing with last-minute punch-lists, people were moving in, and there’s a ton of paperwork going on with all of that. So we held a resident meeting; we advertised, but we didn’t go above and beyond. We didn’t hold three sessions at different times of the day and week, or think of any special incentives for attendance. There are probably a lot of things we could have done better—but not at that moment.”

Still, many developers believe there is a right moment, and an effective method, for green education in affordable housing. Chickie Grayson, president of Enterprise Homes, a co-developer of New Shiloh, suggests that a single session, no matter how well designed, probably won’t make much of a difference by itself. But a continuing flow of information, particularly tied to utility savings or other material benefits, probably will have a welcome cumulative effect. “The initial training you can assume people are going to forget,” she concedes. “They’re in the midst of a move, and they’re excited. But although most of the green features just take normal operation and don’t need special explanations, there are some practical things we can still show them, like how to use the heat and air conditioning efficiently, steps to take so you’re using them as little as possible. If people are given some information on how to save utility bills, they’ll respond.”

The question of how to involve residents in maintaining a green building and building a green community is a subject of widespread discussion, increasing experimentation, and even some debate among affordable-housing developers. On one hand, most agree that **the way residents use and maintain their dwellings determines a great deal about how green those buildings will be over time**. Some add that learning the advantages of green design and equipment is also highly useful for families in choosing a future home, in managing their budgets, in staying healthy, and in gauging the health effects of their surroundings. In that respect, several people suggest, information and training for residents is at least as much a benefit for them as for the building.

Others, however, caution against taking the education mission too far. One developer, preferring to speak anonymously, raised private concerns about some ideas for resident training that he had encountered. A natural desire to make sure residents are informed, he pointed out, can sometimes lead managers to take aggressive measures that might strike residents more as proselytizing than as useful information. “If training means a practical orientation on how to use and maintain surfaces and appliances and so on,” this developer said, “that’s good and necessary. If it means periodically posting a notice or taking time at a house meeting to remind people why it’s important to use their ventilation fans to control moisture, or how much they can save by keeping their A/C use down, great. But for those of us who really believe green living

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is important, there's a temptation to forget that our audience is, in a sense, captive, and to try to push our beliefs on them every chance we get."

Developers seem to agree that the key to effective green training is balance, imagination, and a light touch. "You can offer some inducement for people to come," Grayson suggests. "Do a demonstration of some appliance or system—so people can look at a feature and see what the benefit is. Invite them to operate it while you're there, maybe hold a small session in someone's apartment, serve refreshments. That's bound to be better than summoning a group of people into a community room and lecturing to them. It's got to be hands-on to be effective. And it has to be repetitive. With a multifamily building, you have lots of ongoing ways to keep reminding people. With homeownership, of course, it's trickier. You have only one shot, during the sale, so doing it early and effectively is much more important."

Alongside the discussion and improvisation about resident education, many developers likewise are searching for better ways to train property management. Like Jeff Jewel in Portland, Joanna Pi-Sunyer feels that the current management staff is well versed in the special features of her Baltimore development, but a need for future training still looms: "There are so many things the management staff still needs to sort out that the green items, which are all working fine, are easy for them to drop down on the priority list for now. There aren't any green systems they don't understand, but to have the maintenance and manager be able to articulate what's green, and why it's important to the residents, would be useful. That is something I'm still hoping to do."

Rebecca Warntz, head of construction at Enterprise Homes, sees the issue of staff training becoming more important as each year goes by: "it's important for us to make sure in the long run that management and maintenance staff knows enough to continue the green features. They need to know that they repaint with low-VOC paints, that they replace the carpets with Green Label carpets, that they don't replace the roof someday with a black roof. **There should be a checklist for the property manager and maintenance on maintaining the green features.** Managers and maintenance personnel will change frequently. And it's a lot to remember. The greenness of the building can deteriorate pretty fast, if nobody is thinking about it after the completion of construction."

Fortunately for the developers of New Shiloh, maintenance staff were alert to one last-minute problem that surfaced during a final project assessment (sometimes called a "green audit,") just as the building was about to open. Enterprise funds these assessments, in many cases, for projects that can't afford a full commissioning or a complete third-party verification, but still need to be sure that their green design has resulted in a properly functioning, well-integrated building where all

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**GREEN TIP:** Training residents and staff in how to preserve green aspects of the building isn't just a one-time task. Regular reminders in different forms—meetings, social events, flyers, posted notices, and so on—are essential for maintaining awareness over time.

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the features work together seamlessly for the best possible result. To perform these assessments, Green Communities has retained Advanced Energy, a national building-science consultancy whose expertise includes a specialized practice in affordable housing. At New Shiloh, Advanced Energy took favorable note of the building's native, drought-tolerant landscaping, pest protection, and other elements of green design, but discovered some leakage in the apartments' temperature-control system.

Even before the assessment, on-site personnel at New Shiloh were reporting a small amount of cold air coming in through the heating ducts—a potential drain on efficiency and heating costs. After the Advanced Energy survey confirmed and located the problem, contractors returned to the site and attempted a repair. The issue remains partly unresolved as this is written, roughly six months after the building opened, but is under further study. “This was our only third-party verification” of the building's efficiency, Warntz explains, “and it was extremely helpful, to help us identify something we can do better the next time. And other than that one particular item, we did very well. Our goal is to make it perfect. But it's still a far tighter, better building than any building that wasn't built to green specifications. The building is highly efficient, and may yet get even more so.”

The benefit of whole-building assessments like Advanced Energy's is not only to ensure that each building delivers the efficiencies that were intended. They also help developers make choices for their next project, as well as informing the industry overall about issues of performance, maintenance, and cost-effectiveness. “The first completed projects have been done by the leaders,” says Dana Bourland, senior director of Green Communities. “These are the pioneers who are going out into sometimes unfamiliar territory and drawing the map for everyone who follows. So the assessment is one way to help them improve and learn, and sometimes we can help them fix issues that turn up in the assessment. But **even when something can't be made perfect, everyone still learns from the test. And the projects that follow—all over the country—gain something from that information.**”

## Value in the long term

After the crush of work in the design and construction phases of green development, the ongoing requirements for operating and occupying a green building may seem considerably lower key—“easy to drop down on the priority list,” as Joanna Pi-Sunyer puts it. Yet a fundamental premise of green design and construction is that it lowers the cost of ongoing operations and makes for a superior quality of life for residents year after year. In order for those long-term goals to be met, designing, building, and installing green aren't enough. Verifying that everything

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has been installed in working order, and then training residents and management personnel in keeping the building green, are both indispensable steps in bringing to fruition what the original design intended.

Independent, third-party verification of green features—as distinct from the general contractor’s own testing of new systems when they are installed—can be expensive, as some advocates have acknowledged. Most affordable housing developers who have benefited from extensive third-party testing during and after construction have generally used specially raised funds—including some support from Green Communities—for this purpose. Crosspoint Human Services, owner of the historic Holland Apartments in Danville, Ill., provides an interesting case in point. The organization won a grant from the Illinois Clean Energy Foundation to pay for a cutting-edge geo-thermal heating and cooling system, but the grant came with an unexpected requirement (along with a grant to pay the extra cost): The building would have to be “commissioned” when it was completed, to ensure that the geo-thermal system, as well as all the other green features of the building, were working as intended.

Thom Pollock, Crosspoint’s executive director, was stumped. “I had never heard of such a thing. I assumed that when the general contractor was done and we paid him his last payment and he gave me the keys, figuratively speaking, then everybody would be done. But now we were required to do something called a commissioning study. The way it works is that you do a full rent-up, every apartment occupied, and then they test the building as an organism—all of its systems, its breathing capacity, its ventilation, everything.”

In the end, although the test came out mostly clean, it detected one pump that was malfunctioning. The pump was supposed to cycle on and off but was running continuously. “It was a major pump to a major system,” Pollock reports, “so that repair alone would have paid for the commissioning study. From what we learned in that study, we figure the pump wouldn’t have lasted a year. That means, after one year, when it broke down, we’d have said, ‘It must have been a defective pump,’ and we’d have installed a new one. Then a year later we’d have had the same problem. Now you’ve spent a lot of money, and all the inconvenience of the down-time, and you’re still spending more. The problem turned out to be just basic electronics and programming that needed to be adjusted, so the pump would know when not to run. It was a small adjustment, and it all happened while we were still under warrantee. So **the commissioning study was an incredibly eye-opening experience for us. We’d definitely do it again.**”

Ed Connelly, president of the green consultancy New Ecology, Inc., in Boston, cautions that inspections and verifications, while potentially highly valuable, can have fiscal consequences. In weighing

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the possibility of various kinds of inspections, the developers of Olmstead Green, where Connelly was the green adviser, chose not to pursue third-party verification on the affordable housing, valuable as it might have been. “We’re seeing between 50 cents and a dollar a square foot, just for commissioning,” Connelly explains. “That’s why it’s not done very often yet: It’s real money. That’s just for basic commissioning, not any level of enhancement. If you go for a LEED®-Home certification, the cost is based on the size of the project and it’s a negotiated fee with the rater. You have to have a USGBC-authorized rater do it, and we’re seeing numbers like \$30–\$50,000 on a project like ours. So you could easily add \$75,000 by commissioning and doing LEED.” Lately, however, the U.S. Green Building Council, which oversees the LEED program, has found ways to mitigate the certification cost for some affordable housing projects, and is seeking financial support to expand that effort. A LEED rating is therefore likely to become much less of a financial obstacle in the near future.

Other decisions that come at the end of the green development phase, or during long-term operations, are less complex or costly, though they continue to call for further discussion. Ways of training residents and staff, and generally maintaining a green environment for the long term, are topics that will get more and more attention in the coming years as the current generation of green affordable housing ages and matures.

One piece of overall helpful advice for living and managing green comes from Jeff Jewel of Portland’s Human Solutions: **Pick a management company that “gets the mission, that understands the kind of building you built and want to run, someone that is open to doing some things a little differently.”** Despite the increasing availability of building contractors who understand sustainable construction and are mastering green techniques, such experience can, in some markets, be less widespread among real-estate management firms. Yet even managers with limited experience can be effective in a green development, Jewel believes, “if they recognize what’s special about it and do a fairly good job of seeing that their site managers get the information and training they need.”

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**GREEN TIP:** The best way to be sure that you’re getting your money’s worth from green features and systems is to test their performance—both as the features are being installed and after completion.

**‘IT’S IMPORTANT TO MAKE SURE IN THE LONG RUN THAT MANAGEMENT AND MAINTENANCE STAFF KNOWS ENOUGH TO CONTINUE THE GREEN FEATURES. THE GREENNESS OF THE BUILDING CAN DETERIORATE PRETTY FAST IF NOBODY IS THINKING ABOUT IT AFTER CONSTRUCTION.’**

**—Rebecca Wartz, Enterprise Homes**



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## **New Shiloh Village**

*Baltimore*

Even compared with soaring energy costs nationwide, the utility rate increases that hit the 1.1 million customers of Baltimore Gas and Electric in mid-2007 would qualify as dramatic. Following the expiration of a longstanding rate cap, Baltimore area residents saw a 50 percent jump in their utility bill in a single month. Within a year, bills had climbed more than 88 percent above the levels at the start of the decade. Seen in that light, the value of a highly efficient, green home would be hard to overstate.

As it happens, the sponsor and developers of the 80 affordable apartments for seniors at New Shiloh Village were already determined to build green before the massive rate increases hit. New Shiloh Baptist Church, Bon Secours Baltimore Health System, and Enterprise Homes were among the first participants in the Green Communities program in 2005, with a development that integrates all the essential features of sustainable design — Energy Star appliances, **double-pane low-E windows\***, low-VOC paints and sealants, Green Label carpeting, and efficient heating, plumbing, and electrical fixtures, among other things. The site, on a former parking lot in densely developed West Baltimore, is the classic in-fill urban location, with access to infrastructure and transportation, reclaiming empty blacktop with affordable homes and attractive landscaping.

But at least for now, the green features that are most likely to stick in residents' minds are the ones that conserve on energy usage. "Everyone's bills are rising," says Joanna Pi-Sunyer, rental housing director with Bon Secours, "even factoring in the energy-saving features of the building. But here, we're pretty sure they'll be rising a lot less." As developers collect utility bills from residents and calculate actual usage over the next several months, evidence of significant energy savings is likely to resonate even more loudly across Baltimore than it would have just a few years ago.

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**‘IT’S NOT THE GREEN  
BUILDING THAT’S HARD;  
IT’S THE COMPLICATED  
FUNDING DANCE YOU  
HAVE TO DO THAT MAKES  
THIS A CHALLENGE.’**

— Gete Mekonnen, Northeast Denver Housing Center

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In developing affordable housing, more than almost any other kind of real estate, the direction of government policy and funding sets most of the limits on what is possible, and on the odds that any new idea will eventually take hold. It's encouraging, then, that many branches of housing, finance, and environmental policy seem to be converging around a more ambitious vision for green affordable housing in the coming years.

It's worth noting that most of the developments profiled in these pages have benefited, to one degree or another, from policies and funding programs that expressly favor sustainable design. In some places—notably New York, Los Angeles, San Francisco, Boston, and Portland—current or pending rules on housing and construction expressly mandate some form of green development, not only for affordable housing but for many kinds of buildings. In Denver, all affordable housing projects applying for City of Denver funding will be required to meet the Green Communities® Criteria as of January 2010.

In other places—even where developers feel their local policy falls behind the trend—momentum seems to be gathering. For example, although Baltimore's green-building rules are not as stringent as some of the cities' just mentioned, the City Council in 2007 enacted a green-building ordinance that sets sustainable building requirements for many commercial and multifamily residential buildings. Even before then, Maryland's Tax Credit allocation process required many energy-efficient features in the projects selected for support.

## Green rules without the greenbacks

Still, in many cities and states, policy still tends to be bifurcated: An ambitious green vision underlies much of the rulemaking for design and construction, but a narrow focus on initial per-unit development cost (rather than lifetime operating cost) limits the green options that developers can finance. Gete Mekonnen of Northeast Denver Housing Center worries that the pressure for sustainable development, absent a corresponding adjustment in the way subsidies are allocated, can amount to an unfunded mandate to create green features “off the books.”

“I'm a strong proponent of green building, and we've shown that it can be done even on the most affordable housing,” he says. “But we have had 10 years' experience, and we know where to go and how to find things [like extra funding and green materials and expertise]. Not every organization is at the same level of preparedness to do these things. For a nonprofit that has not done this yet, following the checklist means you have to be prepared to raise the money. You're going to have to be doing things off the pro-forma”—that is, with a basic development budget that's eligible for public funding and a supplemental budget

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**GREEN TIP:** An energy modeling study can sometimes supply powerful evidence to local authorities and funders that supporting green development pays real dividends over time—in reduced operating costs, higher quality, and increased affordability.

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that is used to seeking additional green support. “It’s not the green building that’s hard; it’s the complicated funding dance you have to do that makes this a challenge.”

Northeast Denver Housing Center has had particular success raising capital for solar co-generation from its local utility, Xcel Energy, which provides a rebate to consumer/producers who generate some of their own electricity. In Northeast’s development at Stapleton, Mekonnen points out, “it cost us around \$180,000 to equip all the units with photovoltaics, including the infrastructure and the metering, and the rebate paid about \$120,000. So that put us almost there in terms of nearly paying for itself. I raised most of the difference, so by the time I sold the Tax Credit authority on solar, we were out-of-pocket maybe \$30,000. That’s a heck of a win-win. But you do need to know how to do it.”

Not all public authorities are yet ready to be “sold.” Many still either impose a fixed limit on per-unit development costs, with no allowance for later economies. Others rank Tax Credit applications according to their initial per-unit cost, thus advantaging the developments that cost the least to build—even if they cost much more to own and operate. For example in Maryland, according to Joanna Pi-Sunyer of Bon Secours of Maryland Foundation, “the state said that under no circumstances could we spend more than \$75 a square foot. So if we have to add \$18,000 for [Green Label] carpet, then that’s money we can’t spend on a fireplace in the common room. So it was a continual process of cutting things out—you have an extremely finite amount of money, and so for every feature I add in, I have to cut something out.”

Other government requirements, although perfectly reasonable, may also have the unintended effect of complicating the green-funding equation. Pi-Sunyer gives the example of Maryland’s requirements for eligible contractors. “To be competitive in the Tax Credit allocation process, you have to have a contractor with experience doing Tax Credit housing of this size and type. You lose points otherwise. The process really favors those who are already in the business—but they may not be the green experts, or even have much interest in green development. A contractor with real green credentials may not have worked on subsidized housing before.”

Mostly, **though, the greatest obstacle developers face in financing green affordable housing is the reluctance of funding agencies to spend an extra dollar or two per square foot for a more durable, efficient, and cost-effective design**—even when other government agencies, at the same moment, are actively encouraging just such designs. “There’s this conflict of purposes,” says Enterprise Program Officer Melissa Peterson. “Yes, we want to be green. But as soon as it costs a little more money up front, we put you at risk of losing the Tax Credits.”

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## The economics of ecosystems

As data on green savings in operations and maintenance become more widely collected and analyzed, the case for more flexible funding will continue to become stronger. Already, some housing agencies have begun to take such savings into consideration, when presented with a persuasive energy-modeling study or, better still, actual savings data from a given system or design feature. Yet some forms of green design—including many forms actively favored by government buildings and environmental authorities—aren't intended mainly to produce direct economic returns to the individual building where they're installed. Some features, such as green roofs, sustainable-forest lumber, or storm-water retention, produce their greatest benefits for the surrounding environment, by reducing the heat-island effect, conserving woodlands, or reducing stress on municipal water and sewer systems. Boston-based green consultant Ed Connelly, whose home town mandates some of these external green benefits, has had to grapple firsthand with the problem of raising money for features whose returns aren't easily or neatly captured on a pro-forma.

“Adding drainage, soil, and plantings is just extra cost,” he concedes. “You don't earn it back, at least not quickly. The savings are very long-term and they're mostly off-site. Storm water retention is a regional issue, not a building-specific one. Likewise the heat-island effect. The benefits go not to the building but to the local ecosystem. So that becomes the ultimate challenge in affordable housing. These things are beautiful and make the building more of a living building. But how do you get funding when the benefits don't mainly go to the project? That's one of the big challenges for all the big-picture environmental issues: **As an industry, developers are making all these individual decisions where we each decide what's best for our individual project, but we know they're not always best for the whole environment.** And anything that costs a lot more, like green roofs, don't get done, absent a special push from a willing funder.”

Among the farther-reaching solutions to this problem is an idea now brewing in Portland, Ore.: a local variation on cap-and-trade carbon-emissions systems. In Portland's plan, developers would pay a fee for buildings whose carbon footprint is not much better than the code requires; the proceeds would then be paid to more-efficient, environmentally beneficial projects, to offset the incremental cost of extra-green design. Jeff Jewel, housing developer with Human Solutions, sits on the Technical Advisory Group that is helping the city write specific rules for implementing the new system.

“You would be charged a carbon footprint fee if your building is up to 30 percent more efficient than code,” he explains. “So, for

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**GREEN TIP:** When trying to change affordable housing policy to favor green design, leaders outside the housing arena—such as environmental, water, or transportation officials—can often be willing and influential allies.

example, on a rather large medical building built recently, the owners would have had a \$550,000 carbon fine because their energy efficiency barely met code. Another similar-sized building, also built recently, would have had a 45 percent energy-efficiency improvement over code. That building would have had a \$380,000 carbon rebate—funded, for example, by the first building.

“What the city is talking about now is exactly where to set the limits. But basically the fine will apply to a range of code to 30 percent above, with an ever-decreasing fine as you rise in efficiency from code to 30 percent. Then there’d be a ‘dead zone’ between 30 and 40 percent, where you neither pay a fine nor receive any benefit. Then, starting at 40 percent above code, you’d actually get a rebate, based on your percentage over 40. So it is a very concrete, monetary way to encourage energy efficiency, and to provide some of the money it takes to incorporate features that don’t necessarily pay for themselves, or don’t pay for themselves quickly.”

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## City Green Residences

*Los Angeles*

Soon after Congress created the Asset Control Area Program in 1998—an effort to help struggling communities by increasing homeownership—Enterprise Home Ownership Partners became the first administrator of an ACA program in the country. Rehabilitating federally foreclosed properties across Los Angeles, EHOP upgraded the properties, made them energy efficient, enlarged some to make room for bigger families, and worked with banks to provide financing that low- and moderate-income buyers could afford for the long term. As a result, more than 500 households in one of the country's costliest housing markets became homeowners.

EHOP's newest venture involves **new construction of 100 townhomes\*** on vacant, city-owned land, half of which will be sold to Angelenos earning 80 percent or less of the city's median income. Development sites are located throughout the city, on parcels that can accommodate between two and 18 townhomes each. The units are spacious (80 percent have three or more bedrooms) and thoroughly green, eligible for a LEED® Silver rating as well as meeting or exceeding the Green Communities Criteria. The South Coast Air Quality Management District provided more than \$1 million for all the units to be wired for solar electricity, and other grant programs have subsidized the installation of photovoltaic cells on many of the units.

The project is proceeding in phases, with the first two units sold in early 2008 and 29 more expected to be completed by year's end. Over time, EHOP's former director, Bill Jones, expects the level of green technology in the townhomes to continue to rise. "As new technology has become available, we've kept incorporating it," Jones says, "and I expect that to continue to happen. The technology is going to be improving steadily, especially with appliances. So I would guess that, as things become available we like to be on the cutting edge. And some things that we can't afford to do today, as they become more popular in the marketplace, will probably become more affordable. And then we'll be able to adopt those, too."

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Conclusion: From Innovation  
to Inevitability

**‘THE OVERARCHING  
SENTIMENT IS THAT  
BUSINESS AS USUAL  
IS NOT OK. JUST  
DESIGNING BUILDINGS  
THE WAY WE’VE ALWAYS  
DESIGNED THEM, AND  
JUST CONSTRUCTING  
THE NEXT BUILDING  
THE SAME WAY WE  
DID THE LAST ONE, IS  
NOT OK ANY MORE.’**

— Dana Bourland, Enterprise Green Communities

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**A**cross the affordable housing spectrum—from advocates to developers to experts and, increasingly, to public policy-makers—a consensus is solidifying into established wisdom: Green is the right way to produce affordable housing. It is economically sensible. As a practical matter, it is readily doable. And increasingly, in more and more places, it's becoming mandatory.

As the practice spreads across regions and markets, demand for green expertise, equipment, and materials is being met with rising supply. As a consequence, the price for all the essentials of green development is trending sharply downward. At the same time, special funding for cutting-edge green innovation is becoming more common, at least in some places. All of these trends will accelerate as more data come together to demonstrate the real cost savings that result from building green—the fundamental economics of affordability that are only complete when housing is sustainable, durable, and healthy. Enterprise, along with a handful of other green programs, is compiling and analyzing such data as this report goes to press, with a commitment to using the results in pressing for better affordable housing policy and funding.

Though data will advance the argument considerably, **the essential merits of green development—both in the affordable housing market and throughout the building industry—are increasingly beyond dispute.** Nor is there anything visible on the horizon that seems even remotely likely to change that consensus. On the contrary, steep rises in energy prices have only heightened interest in conservation and efficiency. Rising health-care costs and greater awareness of residential health factors have done the same for interest in healthy, easily maintained homes. The fact that developers increasingly report few or no difficulties in adopting a green agenda means that all arguments favor the escalation of this trend, and virtually none are posing any resistance to it.

Already, as the comments and reflections throughout this report make clear, the growing popularity of green design is having a profound effect on the way projects are evaluated, and the way practitioners view their work. As Green Communities® Senior Director Dana Bourland puts it, “the overarching sentiment is that business as usual is not OK. Just designing buildings the way we’ve always designed them, and just constructing the next building the same way we did the last one, is not OK any more. Our business has a huge impact on people’s lives and their health, and has a real impact on the environment by the way we use resources. And we’ve seen that environmental damage has a disproportionate effect on low-income communities. So on top of all the economic and structural and health reasons to do this, there is the matter of environmental justice.”

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## Summing up the lessons

A consistent theme of the comments reported here is that the impediments to building green are few and dwindling, and that the marketplace is becoming increasingly supportive. In the pages of this report, Bourland says, “we are hearing from our peers that there are no longer any reasons not to do this. No matter where you’re starting from, there are specific things you can be doing, right away, to build green, improve the environment, and combat climate change. We have enough examples of ways to improve every facet of our business process, from concept to design to predevelopment, and on through construction and operation.”

In the *design and predevelopment* phase, the consistent message of everyone interviewed for this report is that integrating the development team early, and maintaining a consultative relationship among all team members throughout the project, is essential. The first step is typically a charrette that establishes the green priorities and sets the pattern of consultation among team members that will govern the rest of the process. But Bourland adds that the value of integrated planning isn’t limited just to the people who design and build the buildings. More broadly, it is also a way of spreading information and cementing wider alliances around green affordable housing.

“We focus so much on integrating the development team that we sometimes leave out other people whose commitment is important to the goals of green development in the long run: lenders, people from government agencies, foundations, service providers, tenants, all need to be part of that conversation.” Including this wider circle in the charrette and later discussions takes a little extra effort, she acknowledges, but “today, there are more and more new ideas, new resources, a willingness to think creatively. So the more people who are involved on the front end, viewing it from various angles, the better your chances are of finding new ways of doing things and building new sources of support. It’s really about education: learning the issues and finding opportunities, and in the process, bringing more and more people to a solid understanding of why green affordable housing is better.”

During *construction*, as several developers pointed out in earlier sections, the principle challenge is making sure that the building’s sustainable design is scrupulously executed, with enough supervision and testing to ensure that the end result will be as efficient and durable as it was designed to be. Even though the green elements may not be any harder to implement than more-conventional ones would have been, they often involve breaking longstanding habits, and approaching tasks in a new way. Preventing old habits from re-emerging, and reinforcing the value of new methods, remains a challenge throughout

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**GREEN TIP:** When organizing an initial charrette, consider inviting not only the people who will take part directly in the design and construction, but people whose support may prove valuable later on: residents and neighbors, public officials, funders, experts, or the media.

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the construction phase and even after the building is finished. Dana Bourland summarizes the point this way: “Green construction has a little to do with materials and methods, and it has a lot to do with making sure that specifications are followed and there’s accountability.”

Yet being meticulous about testing and quality control are obviously not uniquely green concerns. “The phrase ‘green construction’ has had kind of a mystery about it,” Bourland adds, “when in reality, green construction really is just *good* construction—taking note of the science behind buildings, and building them the way they should be built, so they’re as good as they can be, with less of an impact on the environment.”

Recalling the construction of the New Holland Apartments in Danville, Ill., Bourland illustrates the point by noting the multiple advantages—economic, environmental, aesthetic, and historic—of re-using brick from local demolitions. The search for re-usable brick arose, in that project, not because of any green-building requirement, but because historic preservation demanded it. It simply created a better, more attractive building and a more authentic turn-of-the-century landmark.

A conventional construction process would not have called for this extra step, Bourland notes, but “decreasing the amount of construction waste, using fewer resources and being careful about what we throw away is fundamental to a more responsible use of the environment. Land is so valuable that if we can reduce what we throw away, and make it profitable to re-use these things—for example, by not having to pay dumping fees—we can save money as well as be responsible.”

After construction is completed, practitioners emphasized that the *operation and maintenance* of green buildings continue to call for vigilance about quality and performance. Ensuring that systems function as they should, and that residents and management personnel are trained to operate them (and, in the case of for-sale housing, that buyers understand and can maintain their green homes), are all easy steps to overlook amid the pressure of completion and occupancy. But developers counsel that the long-term value of sustainable construction, including the economic savings, heavily depends on residents and managers preserving green materials and keeping systems in good working order.

Green Communities, as well as some other funders, provides financial support for independent testing and verification and helps developers find effective ways of training residents and managers. Yet in all these areas, Enterprise and most developers agree, there is still considerable room for improvement, experimentation, and sharing of experiences. Unlike many of the technical aspects of green design and construction, ongoing maintenance issues are not yet well documented, given how recently most green affordable housing projects were built.

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So, despite assistance from Enterprise and others, the current generation of developers has had to learn some aspects of this work by trial-and-error. Their experiences, Bourland believes, are laying a foundation for a body of professional practice that will take firmer shape over the next several years:

“Even though third-party verification isn’t a Green Communities requirement, we decided to pay the cost in a number of cases, going to sites alongside property management to determine how things worked out. Were the criteria actually implemented? Is the building performing? Do residents actually know that they’re in a green building? The point isn’t to scrutinize or judge anyone, but for all of us to learn from these experiences and improve. The projects that are complete are leading the way, and this first wave of developers are the leaders. This gives them an opportunity to find out what went well and what they will want to do differently the next time.”

### Building a movement—one project, one story at a time

The experience of getting started in sustainable development has led many organizations to a fundamental rethinking of the kind of housing they create and the way they create it. If green buildings are superior buildings, if they cost less to operate, and if they create a healthier environment for residents and communities—all points on which developers increasingly agree—then the case for pursuing any other kind of affordable housing development becomes much harder to make. **More and more, the question is not whether to build green, but why one would build in any other way.**

“When we started this,” Dana Bourland says, referring to the launch of Green Communities, “we had no idea that this was going to transform our whole way of doing business. But developers tell us this: Not only are they excited about the *buildings* they can deliver, they’re making their *organizations* greener, and their lives greener, and participating in other efforts around climate change and sustainable living. This transformation is really important to grasp, because that’s where we’re going to find the next wave of innovations. If we see it as a new way of thinking, we open ourselves up to all sorts of new ideas, bringing to bear everything we can to address these challenges. We know we can do it better, and the results have impact on the environment and health and the economy.”

But first, the lessons of sustainable design that affordable housing developers are now learning need to become more widely known. The challenge of communication—explaining technologies and methods, describing effective practices and their results, and

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**GREEN TIP:** The greening of affordable housing isn’t just a matter of building greener buildings. It also means creating a green culture throughout the housing field—with awareness of environmental concerns woven into whole organizations and their missions.

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overcoming the natural wariness of a field in which every dollar of investment is precious—is the next great challenge for Green Communities, its participating developers, and the growing ranks of green-building practitioners. This collection of developers’ observations and experiences is one contribution to that effort.

“We have to tell our story,” Bourland sums up. “We have to put demands on manufacturers and the industry to give us better products, and put pressure on the system to regulate and finance housing in ways that produce a more sustainable result. We have to put pressure on the industry overall, to do more than it’s now doing to provide green affordable housing. But it’s not just about the housing—the bricks and roof and materials. **By the way we approach green building, we have an opportunity to help low-income people to live in sustainable, healthy, flourishing communities.** The affordable housing industry has been quicker to see that, perhaps, because our goal has always been to improve communities and not just buildings.

“So now we’re doing more, and we’re still learning. But it’s happening. And it’s energizing more and more organizations that have figured out that this is a new day, and there’s a new way of thinking.”

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