



# Environmentally Sustainable Affordable Housing



**N U M B E R 7**

# **Environmentally Sustainable Affordable Housing**

**The 2007 ULI/Charles H. Shaw Forum  
on Urban Community Issues**

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## **ABOUT ULI—the Urban Land Institute**

The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is committed to

- Bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs;
- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem solving;
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development;
- Advancing land use policies and design practices that respect the uniqueness of both built and natural environments;
- Sharing knowledge through education, applied research, publishing, and electronic media; and
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges.

Established in 1936, the Institute today has more than 40,000 members worldwide, representing the entire spectrum of the land use and development disciplines. ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

Richard M. Rosan  
President, ULI Worldwide

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CATALYST REPORTS**

ULI is influential in the discussion of and debate on important national land use policy issues. To encourage and enrich that dialogue, the Institute holds land use policy forums that bring together prominent experts to discuss topics of interest to the land use and real estate community. The findings of these forums can guide and enhance ULI's program of work. They can also provide ULI district councils, ULI members, and others addressing land use issues with information that they can use to improve quality of life, advance community values, and—in the words of the ULI mission statement—“provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.”

*ULI Community Catalyst Reports* are intended to make the findings and recommendations of ULI land use policy forums relevant, accessible to, and useful for practitioners at the community level, where land use decisions are made and their consequences most directly felt.

*Community Catalyst Reports* can be downloaded free of charge from ULI's Web site ([www.uli.org](http://www.uli.org)) or ordered in bulk at a nominal cost from ULI's bookstore (800-321-5011).

**IN MEMORY OF CHARLES H. SHAW SR.  
(March 1, 1933–January 4, 2006)**

ULI gratefully acknowledges Charles H. Shaw—former ULI chairman, chairman of the Shaw Company, and developer of Homan Square, a mixed-income neighborhood on Chicago's West Side—for his endowment of the annual ULI/Charles H. Shaw Forum on Urban Community Issues. The forums seek to bring issues related to the viability of urban neighborhoods to the forefront of ULI programs.

Charlie Shaw was a leader in the truest sense of the word. He had a tremendous influence on ULI's transformation into an organization that has successfully expanded at both a global and a local level. Few in the industry could match his energy, his enthusiasm, and his ability to keep coming up with good ideas. He packed a lot of experiences into a very full, rewarding life.

Richard M. Rosan  
President, ULI Worldwide

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# Introduction

The 2007 ULI/Shaw Forum on Urban Community Issues addressed a topic of increasing interest to the affordable housing community: What can be done to make environmentally sustainable affordable housing the standard practice of the day?

Green building has drawn considerable attention over the past several years for a variety of reasons. First, the built environment has a profound impact on our natural environment. In the United States alone, according to the U.S. Green Building Council, buildings account for

- 65 percent of electricity consumption,
- 36 percent of energy use,
- 30 percent of greenhouse gas emissions,
- 30 percent of raw materials use,
- 30 percent of waste output (136 million tons annually), and
- 12 percent of potable water consumption.

Second, interest in reducing carbon emissions has increased dramatically in just the past year as concern about climate protection has moved to the top of the public agenda. Seven hundred and seventy mayors have signed the 2030 Challenge, endorsed by the U.S. Conference of Mayors, which calls for new construction to achieve carbon neutrality over the next two decades.

Third, pairing green building with affordable housing is a natural fit. With oil prices skirting \$100 per barrel, it simply makes sense to build green. Yet, beyond reducing residents' energy bills, green development also offers healthier living environments and more efficient, durable buildings with a lighter environmental impact and lower costs of operation.

However, taking green building from niche to mainstream—particularly in the realm of affordable housing—remains a work in progress. Challenges to green building include the need for lower costs, improved technology, competitive products, and skilled professionals with expertise in green development and design. To realize the benefits on a widespread basis, it is also important to identify ways to make existing housing stock sustainable. Green building stan-



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The rehabilitation of the Galen Terrace Apartments with energy-efficient technologies and green building techniques is an example of incorporating environmentally sustainable elements in an existing affordable housing complex.

### GLOBAL WARMING, THE 2030 CHALLENGE, AND GREEN BUILDING

According to leading scientific research, we must substantially reduce global greenhouse gas emissions within the next decade in order to avoid disastrous climate change. Curtailing the increase of greenhouse gas emissions and then decreasing emissions over the next ten years is the key to keeping global warming under one degree centigrade above today's level.

The construction and operation of buildings are a prime source of demand for oil, natural gas, and coal for heating, cooling, and lighting, which in turn produce global greenhouse gases. In recognition of this fact, Architecture 2030 has issued the 2030 Challenge, which seeks to lead an effort to significantly reduce the greenhouse gas emissions produced by buildings. Architecture 2030 is a nonprofit organization founded in 2002 by architect Edward Mazria in response to global warming. The U.S. Conference of Mayors, the American Institute of Architects, and others have adopted the 2030 Challenge and agreed to undertake to meet its goals.

Mayors who have signed on to the 2030 Challenge have committed their cities to meet the following standards:

- All new buildings, developments, and major renovations shall be designed to meet a fossil fuel, greenhouse gas-emitting, energy consumption performance standard of 50 percent of the regional (or national) average for that building type.
- At a minimum, an equal amount of existing building area shall be renovated annually to meet a fossil fuel, greenhouse gas-emitting, energy consumption performance standard of 50 percent of the regional (or national) average for that building type.
- The fossil fuel reduction standard for all new buildings shall be increased to
  - 60 percent in 2010
  - 70 percent in 2015
  - 80 percent in 2020
  - 90 percent in 2025
- Carbon-neutral in 2030 (using no fossil fuel, greenhouse gas-emitting energy to operate). These targets may be accomplished by implementing innovative sustainable design strategies, generating renewable power on site, or purchasing (20 percent maximum) renewable energy or certified renewable energy credits.

dards have been developed by the Enterprise Community Partners and U.S. Green Building Council. These standards are useful benchmarks for keeping development on track and helping to measure results upon completion.

Despite these challenges, the forum concluded that the future for green affordable housing is promising. The market demand for green projects will only increase as consumers become more informed about the individual and environmental benefits of green affordable housing. This demand will only accelerate investment and innovation in green building practices, which will be available to for-profit and nonprofit developers.



# Recommendations for Environmentally Sustainable Affordable Housing

The ULI Shaw Forum examined the challenges that currently hinder the widespread implementation of green building practices by developers of affordable housing. The forum group of 25 experts and practitioners reviewed four outstanding green affordable housing projects in Washington, D.C., southern California, Seattle, and New York City. Participants also discussed lessons learned that will make it easier and more cost-efficient for both for-profit and not-for-profit developers to build green affordable housing.

Forum participants agreed that the development of green affordable housing can be viable with

- strong leadership and skilled professionals,
- a vision of the end product and its benefits,
- a public policy commitment to green building,
- education for professionals, residents, and property managers, and
- the need for underwriters willing to factor green into affordability.

This report summarizes the forum's observations and recommendations for increasing the supply of green affordable housing.



Complying with environmentally sustainable building criteria can help justify including certain green features in a project. Adhering to certain green standards can also make a project eligible for additional grants or financial subsidies.

ROGER WILLIAMS PHOTOGRAPHY

# 1. Design the Project to Be Green from the Start

When building a green affordable housing project, it is most efficient to set clear goals and start thinking green as early and comprehensively as possible. It is more expensive to add green elements later in the process and the project is less likely to achieve the energy efficiency and reductions in carbon emissions desired. Moreover, it is important to

ensure that greening is not simply an upgrade that is seen as an expendable item that adds to the project cost, but rather an integral part of the design and construction. Going green incrementally is often less effective and more expensive than simply committing to green development from the start.

## **ENTERPRISE COMMUNITY PARTNERS GREEN COMMUNITIES INITIATIVE**

In 2004, Enterprise Community Partners launched its Green Communities Initiative to provide developers with funds and expertise to build or rehabilitate healthy, efficient homes for low-income households. The effort is a partnership between Enterprise, the Natural Resources Defense Council, Global Green USA, the American Institute of Architects, the American Planning Association, Southface, the National Center for Healthy Housing, and major corporate, financial, and philanthropic institutions. Enterprise's five-year commitment seeks to bring green affordable housing into the mainstream and develop more than 8,500 sustainable homes with \$555 million in grants, financing, and equity investments. Green Communities also offers assistance to state and local governments to ensure that their housing and economic development policies are environmentally friendly.

City- and state-based public/private partnerships have been created to advance Green Communities in Florida, Massachusetts, Michigan, Minnesota, Ohio, and San Francisco. Under the Green Communities Initiative,

more than 9,200 sustainable homes in 25 states are complete or in development in 220 projects; more than 2,800 affordable housing professionals have received training in sustainable design and development practices; and more than 20 cities and states have revised their housing policies to support green affordable development.

### **Green Communities Criteria**

The Green Communities Initiative has also produced Green Communities criteria, which outline sustainable building standards for both new construction and rehabilitation of affordable multifamily and single-family housing. The criteria, developed by Enterprise in partnership with several national organizations and experts, are designed to be compatible with the LEED Green Building Rating System®. The criteria address eight areas for green projects, including an integrated design process, the location and neighborhood fabric, site improvements, water conservation, energy efficiency, use of materials beneficial to the environment, a healthy living environment, and operations and management.

Forum participants recommended that developers entering the green building field consider guidelines established by professional associations, environmental organizations, and federal, state, or local agencies. Developers can seek to have projects comply with the guidelines offered by one or more of these programs and apply for certification to authenticate sustainability. Certification can help justify including certain green features in a project; it may also make a project eligible for additional grants or financial incentives to help subsidize green elements. At the national level, these programs include the *Green Communities*

*Initiative*, the first national green building program designed for affordable housing (see sidebar), and the LEED (Leadership in Energy and Environmental Design) Green Building Rating System, developed by the U.S. Green Building Council. Forum participants observed that standards will need to evolve with technology and are likely to change rapidly as measures are imposed by local governments to reduce and ultimately eliminate all carbon emissions from the operation of properties. Other programs include Enterprise's Green Communities Criteria, Green Globes, and EarthCraft Houses and Energy Star Homes.

Solara is the first fully solar-powered apartment community in California.



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## 2. Include All Members of the Development Team in the Planning Process

Successful green development projects bring together all development team members from the start. This practice is commonly known as an integrated design approach or an integrated team approach. All members need to be able to work together toward a common vision that meets the desired green criteria for the project while maintaining the cost-efficiency considerations for affordable housing. Team members should not only be prepared to undertake green design but also have expertise in good building science, construction, and site planning.

In addition to the core design and development team, it is equally important to ensure that subcontractors are well informed and trained about green design and construction and involved with the development team, because they may be unfamiliar with green building techniques and wary of applying them. Forum members warned that an untrained subcontractor can undermine the effort.

However, the availability of skilled professionals in green design can vary widely around the country. Measures may include selecting team members who already have a good working relationship with each other and training them in green design, or reducing the learning curve for the project by hiring a new face with proven green design experience. Forum members noted that as green building becomes more mainstream, the need for specialty consultants will decline.

### **GALEN TERRACE APARTMENTS, WASHINGTON, D.C.**

The Galen Terrace Apartments is the first rehabilitated property in the city to meet all the green criteria established by the Enterprise Green Communities Initiative. Located in the Anacostia neighborhood in Southeast, the 83-unit Section 8 apartment complex is in one of the lowest-income parts of the city. Units are reserved for households earning 0 percent to 50 percent of the area median income. The site is in a historic district near the Frederick Douglass home and has access to many nearby community resources, including schools, churches, stores, public transportation, and parks.

A partnership made up of the Galen Terrace Tenant Association, the National Housing Trust/Enterprise Preservation Corporation (NHT-E), and the Somerset Development Company acquired the property, which consists of three three-story structures on two separate parcels, in March 2006. Construction began in April 2006 and was completed in June 2007. Somerset Development Company, based in Washington, D.C., is a real estate development company specializing in multifamily and mixed-use commercial development in urban areas. The NHT-E is a national nonprofit organization created to preserve and improve multifamily homes for low- and moderate-income households. The Galen Terrace Tenant Association holds a 15 percent share in the general partnership, NHT-E holds 43 percent, and Somerset Development holds 42 percent.

The full renovation included the addition of energy-efficient technologies and appliances and the use

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of green building techniques. The process started with a comprehensive energy audit to identify and help incorporate cost-effective energy improvements with a payback period of ten years or less. These applications included the installation of a high-efficiency heating and air-conditioning system and individual fuel meters in all 83 apartments. Previously, the property owner paid for all utilities; now residents receive a utility allowance and pay for their own utilities. Other energy-saving measures that reduce utility costs include the addition of Energy Star kitchen appliances, hot water heaters, and clothes washers; double-paned windows with low-E glass (which reduces heat loss and gain); low-flow plumbing fixtures; light fixtures and daylight sensors on all exterior lighting; and a new roof with a reflective surface. Renters receive a Green Home Guide and orientations to explain and review green building features, operations, and maintenance.

Other green features of the renovation included the use of paints, primers, and sealants low in volatile organic compound emissions; formaldehyde-free wood cabinets; pipes wrapped to prevent leakage (which could cause mold); and rain barrels to collect and distribute water for landscaping.

The project financing included using \$5.66 million in tax-exempt bonds, \$4.67 million in equity from the sale of 4 percent low-income housing tax credits through the D.C. Housing Finance Agency, a \$3.25 million loan from the federal HOME affordable-

**The Galen Terrace Apartments is the first rehabilitated property in Washington, D.C., to comply with all the green criteria established by the Enterprise Green Communities Initiative.**



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housing block-grant program, administered locally by the D.C. Department of Housing and Community Development, a \$50,000 grant from Enterprise Green Communities, and housing assistance payments from the U.S. Department of Housing and Urban Development (HUD). As part of the project, HUD also extended the Section 8 contracts for 20 years.

Galen Terrace now has an on-site property manager, a full-time resident services coordinator, and a new community center with ten networked computers. Support services for residents include after-school and summer programs, workforce development programs, personal finance training, and organized activities for senior citizens. A portion of the Galen Terrace Tenant Association's development fee, as well as a percentage of the partnership administrative fees, is set aside to support resident services and activities.

### 3. Support Public Policies for Green Building

Some cities have adopted green building regulations that mandate minimum green building standards for public or publicly subsidized development projects including affordable housing. Other cities have taken action to remove regulatory barriers and obstacles in building codes that hinder the implementation of green design. According to forum participants, such public policies for affordable housing have the effect of leveling the playing field for developers. In addition to facilitating green construction, considerations that are central to the production of cost-effective affordable housing, such as site location and density, also require public policy support.

Examples of public policy support for green development include:

- Requiring a calculation of a project's carbon footprint as part of environmental impact statements, such as in California and King County in Washington state.
- Revising state utility regulations to allow net metering.
- Mandating recycling of construction site waste for projects over a certain size.
- Providing for protection of solar access by limiting the amount of permitted shading by new construction.
- Requiring specified types of private and public developments to meet green building standards, such as in New York City and Washington, D.C.

**Rooftop photovoltaic panels produce approximately 90 percent of Solara's electricity. Some days, the apartment complex generates surplus electricity.**



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## HIGH POINT, SEATTLE, WASHINGTON

The 120-acre High Point mixed-income development in West Seattle, Washington, is a project under the federal HOPE VI housing program that provides a model for building green affordable housing. The redevelopment of a World War II housing project, High Point has incorporated many features aimed at providing a healthy, sustainable environment. At buildout, the project will have 1,700 houses, townhouses, condominiums, and apartments, 796 of which are reserved as affordable rentals for households earning 30 percent to 80 percent of the area median income, 744 for market-rate for-sale units, and 160 for market-rate rental units for senior citizens.

High Point is one of Seattle's most diverse neighborhoods, with a significant Southeast Asian and East African immigrant population. Located in the Delridge district of West Seattle, its name comes from the site's position at one of the highest points in the city. The

neighborhood was constructed as government housing during World War II and continued to provide housing for low-income households through the 1990s. In 2003, the Seattle Housing Authority (SHA), the landowner, launched a six-year project to redevelop the site into a mixed-income community. The SHA is the project's master developer and produced the master plan and design guidelines with Mithun, a Seattle architecture and planning firm. The SHA is building the affordable rental portion of the High Point housing, infrastructure for the site, and public amenities, including a public library and health clinic, community gardens, a neighborhood center, park space, and recreational paths and trails. Private developers are producing the market-rate units.

Green features for the development include the following:

- An extensive 120-acre (34 square block) natural drainage system designed to clean and mitigate stormwater runoff and protect the local watershed.
- A tree preservation plan that protected more than 100 of the largest, healthiest trees on the site.
- Deconstruction and recycling of 22 of the old public housing units.
- Energy Star ratings for all SHA rental housing units, as well as construction that meets the highest standards for Seattle's BuiltGreen criteria for multifamily housing. Residential units contain efficient heating systems, on-demand hot water, whole-house fans, moisture-resistant drywall, energy-efficient windows, high-efficiency washers and dryers, and floors made from recycled materials.
- Sidewalks and parking areas with porous pavement and the only public street in the state with porous pavement.
- A total of 60 "Breathe Easy" homes designed to meet the needs of families with children with asthma by minimizing the presence of potential triggers for the disease.

To manage the project budget, the SHA and Mithun reviewed decisions for green building and evaluated their cost impact. Some choices created minimal or no



The developers and architect evaluated the cost impact of various green building options for the High Point project budget. The total cost of green elements was estimated to be about \$1.5 million, or about 3 percent of the \$43 million rental housing budget.

additional cost, such as the use of paint low in volatile organic compounds, native or drought-resistant plants, airtight drywall, and modified advanced framing. Other possibilities—such as retaining mature trees and installing windows with a higher R value, energy-efficient compact fluorescent lights, and Energy Star appliances—were accepted as costing more, although in some cases subsidies or reimbursements helped mitigate the greater expense. Some options that the team considered but rejected as costing too much for the project included solar hot-water heating, integrated photovoltaics, and graywater reuse.

The total cost of green elements was estimated to be about \$1.5 million, or about 3 percent of the \$43 million Phase One rental housing budget. They produced benefits such as lower utility expenses (estimated at 20 percent less, or a savings of \$371 annually for a three-bedroom unit) and a healthier environment for tenants.

The planning process commenced in 2001 and included the participation of a wide array of stakeholders, including the original neighborhood residents as well as city officials and planning staff. The redevelopment was undertaken in two phases. Phase I was completed in May 2006 and Phase II is scheduled for completion in 2009.

Funding for the redevelopment comes from a wide range of public and private sources. Development costs are estimated at \$528 million, including \$217 million in public investment and \$311 million in direct private investment. A variety of sources helped fund many of the green features in the development, as well as other amenities such as the public library and the neighborhood community center. Some \$1.8 million in funding for scientific studies and for construction of the “Breathe Easy” homes came from grants from the U.S. National Institutes of Health and HUD. The National Institute of Environmental Health Sciences supported programs to help residents keep allergens out of their homes. The city contributed \$2.7 million through Seattle Public Utilities to underwrite the difference between the natural drainage system and a conventional system.

## 4. Factor Green into Affordability

Green affordable housing units are by definition energy-efficient and significantly reduce the amount of electricity and natural gas consumed by the occupants. Homeowners can afford to pay more for the green units because it costs less to operate them. More data need to be collected so that the energy savings can be estimated more accurately. At the moment, it is difficult to calculate the short-term costs and the long-term benefits of each component of a green building. The payback period is usually estimated to be between seven and ten years. Forum participants noted that these kinds of data would also be useful on the lending side, because underwriters want confidence that their investments in green affordable housing projects are sound.

## 5. Rehabilitate Existing Buildings

Forum participants discussed the importance of rehabilitating existing structures to be more energy-efficient and refining the available methods and techniques to do so. Structural issues can be challenging and, in some circumstances, there may be a temptation to tear down an older, inefficient structure to start over with a new building that can readily incorporate the latest technologies. Forum participants called for recognition of the false economy of demolition, because it can take 20 to 30 years of energy savings to offset the energy used in tearing down an old building and constructing a new building. Many opportunities exist to rehabilitate current housing stock with green features. Renovating existing housing also helps to conserve development costs by removing demolition expenses from the budget.



## 6. Consider the Availability of Green Products

Incorporating green design into a development often requires specialized products, which are often not readily available. Although Energy Star appliances and low-E windows are commonly available, other products can be limited in their availability or may vary widely by market. These limitations can translate into delays in delivery that can in turn have a significant impact on the timeline for completion of a project.

In addition, the quality of green products varies. Forum participants noted the need to fight against greenwashing campaigns—marketing efforts to promote products that sound green, but produce little, if any, savings in energy use, water use, or waste. Forum participants lamented the lack of an equivalent of *Consumer Reports* for green materials.

The supply of green products is expected to increase as local adoption of green building standards spreads and home buyers and renters become more aware of the benefits of living in green buildings. With more demand, the market will attract more suppliers which, in turn, will result in more competitive pricing.

Dedicated grants helped subsidize the cost of special features in the construction of the David and Joyce Dinkins Gardens apartments that were more expensive, such as the green roofing system.



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### SOLARA, SAN DIEGO, CALIFORNIA

Solara, located in the San Diego suburb of Poway in southern California, is the state's first fully solar-powered apartment community. The property consists of 56 affordable apartment units of one, two, and three bedrooms and a 2,100-square-foot community center. Resident households must have incomes of no more than 30 percent to 60 percent of the area median income, and pay rents of \$388–\$1,075 per month, including utilities. Solara's green design and reliance on solar power avoid the production of 1,800 tons of carbon dioxide each year that it would generate with traditional fuels—95 percent less than a conventionally powered community. The property is unique in the United States among affordable and market-rate multifamily properties in that Solara already meets the 2030 Challenge of carbon neutrality.

The developer is Community HousingWorks (CHW), a San Diego-based nonprofit organization that provides affordable housing, training, and support. CHW has developed and operates 1,500 affordable apartments in 28 properties throughout San Diego County. For Solara, CHW selected Global Green USA, a Santa Monica-based environmental organization that seeks to slow global climate change by creating green buildings, to be the project's adviser on green building. Global Green provided CHW with technical assistance on solar power, energy efficiency, and green building design as well as on energy tax credits and incentive programs.

Rooftop photovoltaic arrays of 142 kilowatts produce approximately 90 percent of Solara's electricity. Some days, the apartment complex even generates surplus electricity for the region's power grid.

Forum participants recognized the need to consider longer-term costs in a project budget for developing green affordable housing. A seven- to ten-year payback period is a common horizon to use when evaluating which green design elements to include in a project.

In addition to solar power, the project has other green features:

- Energy-efficient materials and appliances such as Energy Star windows and appliances, SEER 13 and 14 air conditioners that use Puron coolant, and high-efficiency, gas-fired tankless boilers that provide hot water and hydronic (central air) space heating.
- Widespread water conservation, including low-flow, dual-flush toilets and the use of a high percentage of California native plants that are drought tolerant and flourish in the local climate and ecosystem.
- Use of recycled materials throughout the building and in public art.
- Building siting to maximize southern exposure
- Design to support healthy indoor air quality, including green-label carpet, recycled fabric carpet padding, linoleum in kitchens, bathrooms, and entryways, and formaldehyde-free insulation and cabinet fronts.
- Energy efficiency in the building envelope, including a radiant barrier and low E double-pane windows with U35 rating.
- The installation of pin fluorescent lighting in nearly all electrical fixtures inside and out, as well as a utility lightbulb exchange for residents to exchange incandescent bulbs for compact fluorescent bulbs.



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- Shopping carts supplied to all residents, to encourage walking to shopping and services

- Resident green education programs, including an innovative green curriculum provided in the Learning Center for children and adults, and a mandatory green orientation training of all residents before they move in.

Completed in March 2007, Solara is the first project produced as part of the California Energy Commission's Zero Energy New Homes program. As part of an effort to create a viable example of cost-effective green construction for developers, the energy commission provided a rebate of \$409,000 toward the \$1.103 million cost of the photovoltaic panels in the \$18.4 million project. The developers estimate that they will recover the added cost of the solar panels in seven years. Other than the cost of the panels, the overall cost of the development was in line with costs of other properties in the area.

## 7. Promote Education for All Involved

Forum participants noted that making green building a mainstream practice in the United States, especially as it applies to affordable housing, will require widespread education. Education in green design and technology is essential for architects, construction management professionals, and others in related fields. At the ground level, property managers, building superintendents, maintenance staff, and tenants need to be educated about the proper maintenance of green buildings.

In addition, forum participants stated their support for a serious initiative to educate the next generation of consumers about the benefits of sustainability and the role of green buildings. Education should start early, with a green curriculum in primary schools. This education would include new definitions of the quality, characteristics, and size of “decent housing.” It would also increase awareness of the fact that sustainability goes beyond green building to include connecting green affordable housing to transit, job growth, and other land uses and amenities such as parks and recreation.

### DAVID AND JOYCE DINKINS GARDENS, NEW YORK CITY

The David and Joyce Dinkins Gardens is one of the first Enterprise Green Communities projects in New York City and a pilot project for the program. It is a seven-story apartment building in Harlem near Frederick Douglass Boulevard with 84 affordable units, 24 of them reserved for youth aging out of foster care. Affordable for households earning less than 60 percent of the area median income, Dinkins Gardens is the only green building in Harlem developed exclusively for low-income residents. The property includes community and educational space, as well as outdoor space and a community garden. The project is in a walkable, urban neighborhood with transit access, nearby employment hubs, and other amenities.

A unique in-plank ventilation system, sun shading, and rain barrels are among the green elements at David and Joyce Dinkins Gardens.



COURTESY OF JONATHAN ROSE COMPANIES, LLC.

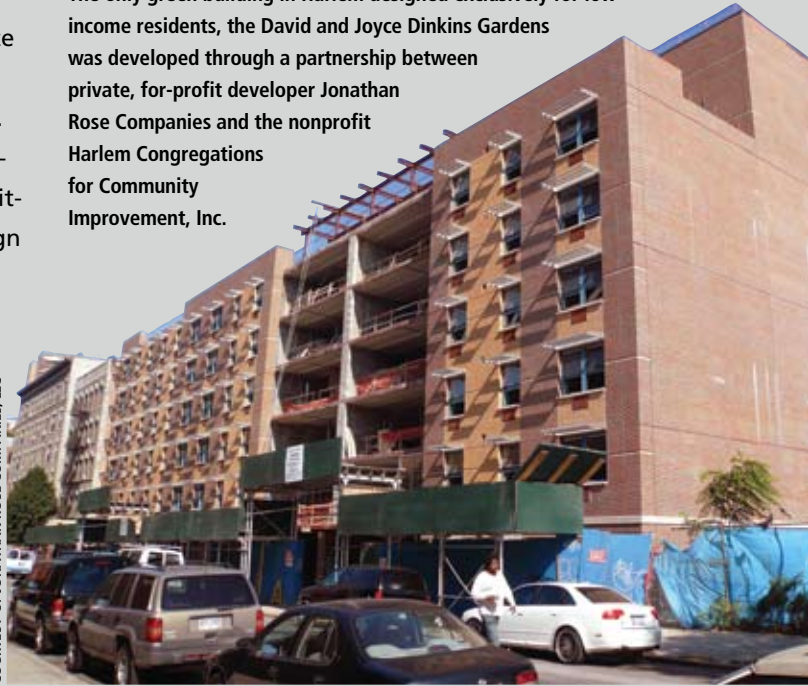
The project was developed through a partnership between Jonathan Rose Companies, a private development firm, and the nonprofit Harlem Congregations for Community Improvement, Inc. (HCCI). Jonathan Rose Companies plans and develops diverse, mixed-use, mixed-income, transit-accessible projects that incorporate green design and construction methods. HCCI is a diverse interfaith consortium of more than 90 Harlem congregations that has extensive development experience, through the production of more than 2,000 units of low- and moderate-income housing. New York City is seeking to foster the development of green building in the city. The City Council recently adopted a requirement that all city-funded projects meet LEED Silver standards.

The project made use of an integrated green design process with a team approach that included the architect, engineers, general contractor, cost estimator, and several green consultants. Working together, the team was able to include several environmentally responsible features at little or no additional cost. Dedicated grants helped subsidize the cost of certain special features, such as the green roofing system, that were more expensive.

The green features of the property are incorporated throughout the site, including the building's location and orientation; integration of the building and landscape; optimum design of building envelope, mechanical systems, and ventilation systems; Energy Star appliances and lighting; individual utility metering; and sustainable material choices. Other major green elements are a rainwater-harvesting system, photovoltaic site lighting, a Green Grid roof, and a unit-controlled ventilation system.

The only green building in Harlem designed exclusively for low-income residents, the David and Joyce Dinkins Gardens was developed through a partnership between private, for-profit developer Jonathan Rose Companies and the nonprofit Harlem Congregations for Community Improvement, Inc.

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The total project budget was \$19 million. The city sold the land for the development for a nominal fee of \$7 to maximize affordability. Funding sources for construction included \$8.5 million in tax credit equity from Enterprise Community Partners, in addition to a \$50,000 Enterprise Green Communities grant. Some \$13 million in bond proceeds and a low-interest mortgage from the New York City Housing Development Corporation (HDC) also financed construction. JPMorgan Chase Bank provided a \$10 million letter of credit to underwrite the HDC bonds during the construction and lease-up phase. The New York City Department of Housing Preservation and Development's Mixed-Income Rental Program provided \$2.5 million in gap financing. A \$50,000 grant from the Home Depot Foundation supported the installation of the Green Grid roofing system.

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