



**U. S. Department of Housing and Urban Development  
Office of Public and Indian Housing**

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Special Attention of: Notice: PIH-2009- 43 (HA)

Public Housing Agencies; Issued: October 16, 2009

Hub Directors of Public Housing;

PIH Program Center Coordinators; Expires: October 31, 2010

Public Housing Division Directors;

Resident Management Corporations;

Regional Environmental Officers;

Field Environmental Officers;

Regional Energy Coordinators

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**Cross References**

24 CFR 85.36

24 CFR part 965

24 CFR part 990

Notice PIH-2009-16(HA)

Notice PIH-2009-15(HA)

Notice PIH-2009-9(HA)

**CORRECTED VERSION**

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**SUBJECT: Renewable energy and green construction practices in Public Housing**

1. **PURPOSE** This Notice strongly encourages Public Housing Agencies (PHAs) to use solar, wind, geothermal/ground coupled heat pumps and other renewable energy sources, and other “green” construction and rehab techniques whenever they procure for maintenance, construction, or modernization. This Notice defines green building principles for construction practices in Public Housing, identifies the benefits of green construction and rehabilitation practices and products, and identifies expertise that is available to provide valuable assistance for implementing such practices.

Properly incorporating green building techniques supports the goals of the President’s National Energy Policy by reducing the burden of public housing energy costs while increasing comfort and reducing health risks to public housing residents, and minimizes life-cycle costs. Additionally, on February 17, 2009, President Obama signed the historic American Recovery and Reinvestment Act (Recovery Act). An unprecedented \$4 billion will be invested in public housing for retrofitting, including energy retrofits, renovation and greening its aging inventory.

2. **APPLICABILITY** This Notice applies to PHAs operating public housing.
3. **BACKGROUND** Nationwide, for PHA fiscal years ending between June 30, 2007 and March 31, 2008, PHA-paid utilities totaled \$1.5 billion annually or 24 percent of the costs to operate public housing. The Office of Public Housing and Voucher Programs

estimates that \$452 million in utility costs are paid by residents; in turn these are paid indirectly by PHAs in the form of utility allowances that reduce resident rents.

Green building, which is related to ecological design and sustainable building, not only embraces energy efficiency, but also sustainability, recycling, and indoor air quality, and incorporates the “Healthy Housing” approach pioneered by HUD. By properly implementing green building practices—including renewable energy—into the process, PHAs can significantly reduce energy consumption and maintenance expenditures, while improving the residents’ comfort and health, and minimizing the overall environmental impact of the project.

4. **DEFINING GREEN BUILDING** For the purposes of this Notice, green building is a systems-based approach to achieving sustainable buildings that incorporates environmental considerations into every phase of the building process – design, construction, operation, maintenance, renovation, and deconstruction/demolition. Green building can provide the following advantages over conventional building:

- Lower utility bills resulting in more affordable homes;
- Better indoor environmental quality;
- Higher resale prices;
- Preservation of natural resources;
- Less national reliance on fossil fuels and reduced greenhouse gas emissions; and
- Durability of building materials and structures.

#### **New Construction and Modernization Techniques:**

The following features are all part of green building and should be incorporated into a project during its design and construction or rehabilitation.

**Low Impact Development** involves conscious decisions regarding site design, construction practices, building integration and location to maintain and enhance watersheds, especially surface water management techniques that naturally control storm water and minimize storm water runoff. Costly storm water collection and drainage systems and water treatment can be avoided by planning for terrain, vegetation, green roofs and soil features that handle storm water on site and by harvesting rainwater for landscape irrigation.

**Energy Efficient System Integration** is a comprehensive, whole building, systems-based approach to properly sealing, insulating, heating and cooling a building and the residences in that building, and providing lighting and power. This systems integration would include the appropriate use of ENERGY STAR<sup>®</sup> design standards for new construction and ENERGY STAR qualified products as covered in Notice PIH-2009-9 (HA), *Using Energy Star to Promote Energy Efficiency in Public Housing*; energy efficient domestic water heating, day-lighting and passive solar design; other renewable energy sources such as solar photovoltaic systems and wind; and other efficient energy sources such as combined heat and power (CHP).

**Recycling and Waste Management** means using fewer materials and other resources, and using and disposing of fewer hazardous materials to achieve the end result. This includes using resource-efficient materials such as engineered wood, fast-growing wood substitutes and non-toxic stains and finishes; resource-efficient building practices such as advanced framing techniques; resource-efficient building systems like panelized walls, insulated concrete forms and frost protected shallow foundations; and pre-finished materials on products such as windows, siding and trim. Durability is a big part of resource and waste management because the longer something lasts and the less maintenance it needs, the fewer resources are necessary to replace or rehabilitate it.

Minimizing the use of hazardous materials, controlling the generation of hazardous materials and hazardous wastes, and disposing of hazardous wastes in accordance with regulations and best practices, is protective of the environment and reduces PHA liability. Reusing and recycling materials appropriately, and incorporating materials that are made with recycled resources, are very important to resource management, and often account for significant savings.

**Water Conservation and Efficiency** saves water and the energy required to pump and heat the water. Resource efficient plumbing includes low and low-low flow fixtures, high efficiency toilets, ENERGY STAR dishwashers and washing machines, efficient plumbing manifold designs and grey water reuse when possible.

**Good Indoor Air Quality** means minimizing indoor pollutants. This includes actions such as installing direct vent combustion equipment and fireplaces; providing for optimal, controlled, filtered ventilation and designing for mechanically controlled exhaust from kitchen ranges and baths; controlling moisture and dust accumulation during construction by masking ducts in residences and storing stockpiled materials out of the weather; and air sealing between living areas and garage or mechanical areas.

Materials selection should favor non- or low-Volatile Organic Compounds (VOC) paint, adhesives, finishes and non- or low-formaldehyde-releasing materials to reduce the amount of indoor air pollutants. For more information refer to HUD's Healthy Homes Initiative at [www.hud.gov/offices/lead/hhi/index.cfm](http://www.hud.gov/offices/lead/hhi/index.cfm).

Good indoor air quality also means controlling mold and moisture. Mold and moisture problems in housing are not a new development. Concerns in recent years have turned to the relationship between mold exposure and allergies, asthma, and other respiratory conditions. Avoiding moisture problems also provides the added benefit of helping to prevent infestation by insects that are sources of important allergens (i.e., asthma triggers), such as dust mites and cockroaches. Keeping moisture out of buildings and controlling moisture is essential in new construction and renovations.

For more detail and for a description of specific resource-efficient building products that can be used to incorporate energy efficiency and green construction practices, please see HUD's Partnership for Advancing Technology in Housing (PATH) Web site, [www.pathnet.org](http://www.pathnet.org).

5. **IMPLEMENTING GREEN IN PUBLIC HOUSING** PHAs can use green building products and principles effectively in both existing and redeveloped public housing.

### **Green Building Maintenance**

In existing housing, PHAs can introduce no- and low-VOC paint, adhesives and finishes into the maintenance schedule and replace materials, equipment or appliances with ENERGY STAR qualified products, *WaterSense* qualified products or other products that are more sustainable than equivalent conventional products.

One of the more energy-efficient products that a PHA can use is compact fluorescent light bulbs (CFLs). CFLs can provide a substantial reduction in energy costs for a PHA; however, since CFLs contain trace amounts of mercury, they cannot be disposed of as incandescent light bulbs can be. Instead, PHAs will be required to dispose of them separately. Many local jurisdictions have specific waste disposal procedures for CFLs. PHAs will have to determine what disposal options are either required of them by their local jurisdiction or are otherwise open to them such as the CFL disposal programs run by many large home supply stores. In addition, PHAs may have to educate residents on the proper disposal methods for CFLs, and actions to take if a CFL breaks.

As part of a green maintenance approach, PHAs are encouraged to adopt Integrated Pest Management (IPM) as a pest control strategy. Pests may adversely impact health and contribute to worsening some diseases, and IPM methods can minimize the use of pesticides and help reduce the amount of pesticide residue in apartments. This reduces exposure to chemicals which may be associated with health and/or environmental risks. Therefore, IPM offers the potential of ensuring efficacy of pest elimination while protecting the health of residents and staff. HUD's Office of Healthy Homes and Lead Hazard Control are currently working with the U.S. Department of Agriculture to develop IPM training for PHAs. For additional information, see <http://www.stoppests.org>.

A key component of green maintenance is active participation by residents. This can be encouraged by providing resident information on actions the PHA is taking, and why these are beneficial, such as replacing lighting with CFLs, or using integrated pest management. The PHA can also provide information or training on actions that the resident can take in their home to promote indoor environmental quality. Examples include using green cleaning materials like vinegar or biodegradable laundry detergent, or stopping smoking.

## Green Modernization and New Construction

For a more permanent commitment—in both existing housing and for redeveloped sites—to sustainable housing and savings that improve residents' well-being and return energy and water savings many times longer than the life of a specific product, PHAs can comply with the requirements of any of the shade-of-green programs listed below. In redevelopment, PHAs can specify that the house/unit be built using any of the green building techniques listed above and/or below. Purchase of related products, services and equipment, as with all procurement transactions, must be consistent with the standards set forth in 24 CFR 85.36, and 24 CFR 965 and 24 CFR 990 if an Energy Performance Contract (EPC) is used to implement the improvements.

6. **“SHADE” OF GREEN BUILDING** PHAs are encouraged to minimize the life-cycle costs of all housing, and should specify the level or “shade” of green accordingly, remembering that energy and water efficiency and waste reduction save money and are very important components of green building and sustainability. Several national, regional and state green building programs are available for new buildings and gut rehabilitation. The major national programs, beginning with energy- and water-savings programs and ending with comprehensive green building programs, include the following:

*Home Performance with ENERGY STAR* contains standards and specifications that encourage and facilitate whole-house and whole-building energy improvements in existing homes. The program operates in approximately 25 locations and is primarily designed for energy efficient remodeling of single family homes. This program is described in Notice PIH-2009-9 (HA). Click on “Home Performance with Energy Star” under “Home Improvement” at <http://www.energystar.gov>.

The *ENERGY STAR Indoor Air Package* provides a variety of construction practices and technologies to decrease the risk of poor indoor air quality in new homes, and is intended as a supplement to *Home Performance with ENERGY STAR*.

*WaterSense*<sup>®</sup> is a partnership program sponsored by the U.S. Environmental Protection Agency (EPA). The WaterSense program <http://www.epa.gov/owm/water-efficiency> lists water-efficient products and product providers.

The EPA's Indoor Environments Division ([www.epa.gov/iaq](http://www.epa.gov/iaq)) has a “Green Indoor Environments” webpage <http://www.epa.gov/iaq/greenbuilding/index.html> with links to many documents and tools for designers and managers of multifamily housing; for example, the *Indoor Air Quality Building Education and Assessment Model* (I-BEAM), a Web-based guidance tool for building professionals on improving and managing indoor environmental quality in large buildings ([www.epa.gov/iaq/largebldgs/i-beam/](http://www.epa.gov/iaq/largebldgs/i-beam/)).

The American Lung Association's *Health House*<sup>®</sup> program ([www.healthhouse.org](http://www.healthhouse.org)) promotes good indoor air quality through proven building systems in order to provide a comfortable living environment that is more durable and energy efficient, better performing and requires less maintenance.

The *Leadership in Energy and Environmental Design (LEED) for Homes Initiative for Affordable Housing* ([www.usgbc.org/leed/homes/](http://www.usgbc.org/leed/homes/)) advances sustainable building practices specifically for affordable residences by promoting the design and construction of high-performance green homes that use less energy, water and natural resources; create less waste; and are healthier and more comfortable for the occupants. This initiative recognizes and rewards the intrinsic resource efficiencies of affordable housing within the LEED for Homes Rating System.

*Green Communities* ([www.greencommunitiesonline.org/](http://www.greencommunitiesonline.org/)) is sponsored by Enterprise Partners. The program provides grants, financing, tax-credit equity and technical assistance to developers for creating new and rehabilitating existing low-income housing according to specific green criteria. Its green criteria are closely aligned with the LEED ratings system.

The National Association of Home Builders *Green Home Building Program* (<http://www.nahb.org/generic.aspx?genericContentID=56077>) highlights the ways a mainstream home builder can cost-effectively weave environmental solutions into a new home while providing a tool that local associations can use to create their own green home building program.

7. **PURCHASING COST EFFECTIVE GREEN EQUIPMENT/PRODUCTS** PHAs are encouraged to purchase green products and equipment, including renewable energy sources, when economically feasible. The incremental additional costs for the more sustainable choices must be recoverable from savings over the expected life of the equipment and the equipment must be cost-effective to maintain. Incentives to ameliorate the costs of implementing these upgrades are discussed later in this Notice.

If resulting savings are insufficient to pay for any additional costs, the upgraded equipment and materials should not be purchased unless there are compelling circumstances such as energy, water or specific building materials being in short supply, or health and safety or emergency conditions that must be considered when making the selection.

PHAs should use life-cycle costing analysis to calculate the effective cost of equipment when maintenance is reduced and savings are accrued over a specific amount of time. Utility costs have a large impact in calculating the effective cost of equipment.

As stipulated in Notice PIH-2009-9 (HA), PHAs are encouraged to purchase ENERGY STAR qualified products such as windows, and ensure that any new buildings are built at least to ENERGY STAR standards, unless the PHA performs an

economic analysis that finds the incremental cost of the ENERGY STAR product or building yields a negative life-cycle cost savings. You can identify green energy efficient products by visiting the Department of Energy's website at <http://www1.eere.energy.gov/femp/procurement/index.html>. Green products can also be identified by purchasing products that have been certified as green by a reputable third party, such as products that have been certified by GreenGuard Environmental Institute.

8. **APPLICATION TO ASSET MANAGEMENT** In accordance with 24 CFR 990, HUD is shifting the focus of the public housing program from the "agency" to the "projects." In addition to the reduction of utility bills to the resident or the PHA, the installation of the renewable energy and energy efficiency equipment may reduce maintenance costs. HUD permits PHAs to retain maintenance cost savings under the current project expense level calculation. While the maintenance cost savings are not considered utilities, and therefore not eligible for use in calculating savings realized through EPCs, any maintenance savings do represent reduced operational costs.

9. **INCENTIVES TO PURCHASE GREEN PRODUCTS AND RENEWABLE ENERGY**

Many incentives exist to encourage and promote green practices, especially energy efficiency and renewable energy. Most Federal, state and local green- and energy-related incentives are listed by state in the Database of State Incentives for Renewable & Efficiency (DSIRE) at [www.dsireusa.org](http://www.dsireusa.org). Additionally, Notice PIH-2009-9 (HA) includes information about special offers, rebates and streamlined bulk purchasing of ENERGY STAR qualified products. Local utilities also sometimes provide financial support for renewable energy projects and CHP.

PHAs should explore, or have their representatives or agents explore, all incentives available nationally and locally to help support greening efforts, such as any possible insurance or mortgage options and benefits associated with green construction, operation and maintenance.

**The Enterprise Partner's Green Communities Initiative** provides help locating and using applicable incentives in addition to providing grants, financing, tax-credit equity and technical assistance for new buildings and substantial rehabilitation of existing low income buildings, both multifamily and single-family.

**Energy Performance Contracts (EPCs)** can be used to purchase and implement green products, green construction and renewable energy sources in accordance with the provisions of 24 CFR 965 and 24 CFR 990. Green power purchase agreements can also be arranged in conjunction with EPCs. Further information on EPCs can be found in PIH Notice 2009-16. Information on using EPCs in conjunction with Recovery Act funding can be found in PIH Notice 2009-25.

**Power Purchase Agreements (PPAs)** are available in many areas. The supplier of the renewable energy system pays most or all of the system's installation and maintenance costs and the manager or owner (the PHA) of the property on which the

energy-generating equipment is located pays reduced rates for electricity. PPAs can be negotiated to lead to lease/purchase agreements, where the PHA would take over ownership—and the associated full benefits and maintenance duties—of the renewable energy system. If a PHA takes ownership of the renewable energy system, the PHA would become an energy supplier for the renewable energy system installed and become subject to inspections and licensing requirements. Check with your local and state agencies for compliance. PHAs should explore, or have their representatives or agents explore, all incentives available nationally and locally to support greening efforts.

10. **COMBINED HEAT AND POWER FOR PHAS** HUD provides a screening tool for multifamily building owners or managers to do a preliminary assessment of the potential for CHP in their projects.  
[www.hud.gov/offices/cpd/library/energy/index.cfm](http://www.hud.gov/offices/cpd/library/energy/index.cfm)
11. **CONTACTS** Questions regarding this Notice should be directed to Leroy Ferguson at (202) 402-2411 or Dina Elani, Director, Office of Public Housing Management and Occupancy Division at (202) 402-2071. For additional information on energy issues for public housing, contact the PIH Environmental Conservation Clearinghouse through its website at [www.hud.gov/offices/pih/programs/ph/phecc](http://www.hud.gov/offices/pih/programs/ph/phecc) or by telephone at (800) 955-2232. You can contact Brian Ng, Affordable Housing Coordinator for Energy Star with EPA at (202) 343-9162 or at [ng.brian@epa.gov](mailto:ng.brian@epa.gov). If you are a hearing- or speech-impaired person, you may reach the above telephone numbers through TTY by calling the toll-free Federal Information Relay Service at 1-800-877-8339.

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