



Improving Energy Performance in Low-Income Housing

There are many reasons for seeking energy efficiency improvements in low-income housing. The Federal government's Partnership for Home Energy Efficiency (www.energysavers.gov) estimates that in many households, cost-effective energy

HUD's annual utility bill for its roughly 5 million units of affordable housing is above \$4 billion.

The energy use in most of these units could be reduced by 20–30 percent.

efficiency improvements could save 20 to 30 percent of the energy bills. Low-income housing has a particularly high potential for energy efficiency improvements because of the often poor condition of buildings in this sector. Improvements such as better boilers, geothermal heat pumps, and energy-efficient windows would benefit low-income homeowners and considerably reduce HUD's annual utility bill. The funds thus freed could be used for further housing improvements.

Success Story: Asheville, NC

In 1999, the Asheville Housing Authority initiated the rehab of a 100-unit multifamily building (McCormick Heights). The energy efficiency measures included energy-efficient windows and doors, heat pumps, efficient lighting, efficient appliances, and water fixtures. These improvements lowered the building's energy consumption by about 30 percent.

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Efficient Windows Collaborative

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This information sheet by the Efficient Windows Collaborative (EWC) aims to help decision makers in the low-income housing sector find options for financing and implementing energy efficiency measures. The EWC encourages public housing authorities (PHAs) to look into different financing mechanisms for reducing energy consumption and providing residents with healthier and more comfortable homes. The following pages give an overview of financing options for energy efficiency improvements in low-income housing.





Financing Mechanisms

To implement energy conservation measures in low-income housing, Public Housing Authorities (PHAs) have several financing options. An overview of available mechanisms is given below.

(Much of the information below is based on the article “How to Finance Your Energy Program” from Rebuild America’s Solution Center: www.rebuild.gov)

Financing

- **Internal Funds**

Energy efficiency improvements are financed from PHA’s own operating budget. See page 3.

- **Debt Financing**

Energy efficiency improvements are financed with capital borrowed directly from private lenders. See page 3.

- **Lease or Lease-Purchase Agreements**

Energy-efficient equipment is leased with no up-front costs, and payments are made on an annual basis. See page 3.

- **Energy Performance Contracts**

Energy efficiency measures are financed, installed and maintained by an energy service company (ESCO). The ESCO guarantees savings, based on which it receives payments during the contract period. See page 4.

Incentives

- **Utility Incentives**

Rebates, grants, or other financial assistance are offered by an energy utility for the design and purchase of certain energy-efficient systems and equipment. See page 4.

- **State and Federal Assistance**

Financial assistance is available from the U.S. Department of Housing and Urban Development (HUD) and from several state governments. See page 5.

The Housing and Community Development Act of 1987 (HCDA)

The HCDA provides PHAs with the means to use the funds saved by improved energy performance and invest them in other building upgrades. The act determines the terms according to which PHAs can finance energy performance improvements, including options such as financing with available operating and capital funds, debt financing and energy performance contracts. The Act also outlines several energy incentives by the Department of Housing and Urban Development (HUD).

For detailed information on the provisions of the HCDA, view www.globalgreen.org/pha-energytoolbox/financing.htm or contact Rebuild America for assistance (www.rebuild.gov).



Internal Funds

The most direct way to pay for energy-efficiency improvements is to allocate funds from internal operating budgets.

Advantages of utilizing internal funds are:

- The full benefits of lowered energy costs can be retained
- Administrative burdens are kept to a minimum

The resulting cost savings may be used to decrease overall operating expenses or to support additional energy efficiency improvements from internal funds.

Problems are:

- Internal funds may be too limited for effective measures, or bound up by other priorities

Alternatively, however, internal funding can be used in combination with one or more of the other options discussed below.

Debt Financing

Direct borrowing can make funds available from private lenders or public bodies.

Advantages of debt financing are:

- The full benefits of lowered energy costs can be retained (less only the cost of financing the debt)

The debt can be repaid with the savings from reduced energy consumption.

Problems are:

- Debt financing is administratively more complex than internal funding
- Debt financing may be restricted by formal debt ceilings imposed by municipal policy, accounting standards, and legislation

Lease and Lease-Purchase Agreements

Leasing and lease-purchase agreements provide a means to reduce or avoid the up-front capital costs of new, energy-efficient building components.

These agreements are offered by commercial leasing corporations, financial institutions, investment brokers, or equipment manufacturers. The time period of a lease can vary significantly.

There are several different types of leasing agreements. Specific lease agreements vary according to lessor policies, the complexity of the project, whether or not engineering and maintenance services are included, and other factors.

Types of Leasing Agreements

Operating Leases

- Short term
- For accounting purposes, the lessor, and not the lessee, is considered owner of equipment and can claim tax benefits for its depreciation

Financing Leases

- Lessee essentially buys the equipment in monthly installments (usually during 5 to 10 years)
- Lessee is considered owner of equipment for accounting purposes and can claim tax benefits for its depreciation

Municipal Leases

- Available only to tax-exempt entities such as municipalities
- Lessor does not pay taxes on interest from payment
- Lower interest rate
- Lease must be renewed annually because of municipalities' restrictions against multi-year liabilities

Guaranteed Savings Leases

- Lessee is guaranteed annual energy savings that at least equal the annual lease payment
- If energy savings are worth less than payments, lessee receives credit for difference



Energy Performance Contracts

In an energy performance contract, an Energy Service Company (ESCO) installs and maintains retrofit measures and typically also provides the financing. The ESCO guarantees a specific amount of energy savings and in return is paid from the energy costs saved during the contract period, which usually lasts between 5 and 15 years.

Advantages of energy performance contracts are:

- ESCOs specialize in finding the best opportunities for improving energy efficiency
- The ESCO can provide the financing and does not have to be paid up-front

Problems are:

- The ESCO's responsibilities and the methodology for verifying the guaranteed savings must be clearly establishing in the contract. This requires administrative diligence.
- The PHA can only profit from the full energy cost savings once the contract period has passed and the ESCO has received its payment.

For more information on energy performance contracting, contact the National Association of Energy Service Companies (NAESCO): www.naesco.org.

The HUD Public Housing Energy Conservation Clearinghouse also helps with advice on energy performance contracts: www.hud.gov/offices/pih/programs/ph/phecc.

Utility Incentives

Several utilities offer incentives for residential energy efficiency improvements, particularly for energy efficient appliances. Many of these programs are specifically designed for the low-income sector.

Advantages of utility incentives are:

- They reduce the cost of energy efficiency improvements.

Problems are:

- Utility incentives provide only partial financing.
- Utilities concentrate their incentives on reducing peak-demand. This may have limited effects on overall energy efficiency.

A list of utility demand response programs, including several energy efficiency incentives, can be viewed at: www.eei.org/industry_issues/retail_services_and_delivery/wise_energy_use/programs_and_incentives/progs.pdf

Success Story (New York): Rochester Housing Authority

Through an energy performance contract with an ESCO (Siemens Building Technologies), the Rochester Housing Authority implemented energy performance improvements at 3,200 dwelling units in 2005. The effort required a \$6.5 million investment and resulted in guaranteed savings of about \$630,000 per year. The New York State Energy Research and Development Authority provided \$571,610 toward the program. The period of the contract between the housing authority and the ESCO is 12 years, after which the investment cost will have been repaid and the housing authority can fully profit from the guaranteed savings.

The improvements include new boilers, insulation, new refrigeration equipment, elevator upgrades, replacement of electric dryers with natural gas dryers, efficient lighting, and low-flow toilets and showerheads. Together, these changes save about 3 million kilowatthours of electricity, 40,000 therms of natural gas and 60 million gallons of water annually.



State and Federal Assistance

Financial assistance is available from the Federal government through the Department of Housing and Urban Development (HUD) or the Department of Energy (DOE), and from several state governments.

DOE and HUD also provide energy conservation guidance, outreach, training and technical assistance to PHAs and residents.

Some Examples of State and Federal Assistance Programs

For HUD's incentive programs please view: www.hud.gov/offices/pih/programs/ph/phecc/funding.cfm

View information on DOE's Weatherization Assistance Program at: www.eere.energy.gov/weatherization

View the choice of incentives by NYSERDA (New York) at: www.nyserda.org/incentives.asp

The Housing Partnership Program by the Texas State Energy Conservation Office: www.seco.cpa.state.tx.us/hp.htm



Energy-Efficient Windows for Low-Income Housing

Energy-efficient windows have a great potential to contribute to improving the energy performance of American homes, and of low-income homes in particular. Over their lifetime, energy-efficient windows bring significant energy savings and resident comfort. Yet window replacement costs more and has a longer payback period than measures such as weather-stripping and efficient lighting.

To encourage PHAs to invest in thorough home energy performance measures such as window replacement, heating system replacement, and wall insulation, the Energy Policy Act of 2005 includes the following provision: Subtitle D – Public Housing, Section 151 adds a new paragraph (iii) to Section 9(e)(2)(C) of the United States Housing Act of 1937. This paragraph extends the total term of a contract described in clause (i) to a maximum of 20 years to enable longer payback periods for energy conservation measures (ECMs), including the installation of energy-efficient windows.

HUD offers information on windows as part of energy conservation measures at: www.hud.gov/offices/pih/programs/ph/phecc/strat_B2.cfm

In its Public Housing Authority Toolbox, Global Green USA offers great advice for PHAs interested in more energy efficient windows: www.globalgreen.org/pha-energytoolbox/tech_windows.htm

Success Story (Canton, Ohio): Housing Authority increases senior citizens' comfort and reduce energy costs through combined financing

To improve living conditions and save energy costs at Cherrie Turner Towers, a 150- unit, 8-story building in Canton, the Stark Metropolitan Housing Authority chose to undertake a major overhaul of the building envelope, and the heating, cooling and water supply system. The whole project, which also included a complete renovation of several rooms, cost \$5 million. In order to finance this ambitious project, the housing authority referred to a combination of financing sources: a loan, a municipal community grant, sponsorship by the Ohio Office of Energy Efficiency for a Rebuild America energy audit, and an energy performance contract involving HUD, which picked up the amortization costs for the loan.

The implemented improvements included new roofing, energy-efficient windows, compact-fluorescent lighting, low-flow toilets, additional insulation, and a geothermal heat pump. In addition to increasing the comfort of the residents through this building overhaul, the housing authority also significantly reduced its energy costs. In 2000, after the completion of the improvements, the Stark Metropolitan Housing Authority received the Ohio Governor's Award for Energy Excellence for its achievements.

www.rebuild.gov/attachments/partnerupdates/NovDec2001.pdf

Useful Links

Energy Efficient Rehab Advisor

The Advisor presents HUD's guidelines for energy efficient housing rehabilitation.
<http://rehabadvisor.pathnet.org>

Energy Efficiency Makes Homes More Affordable

This is a great resource by the Southface Institute for advice on how to save energy in low-income homes.
[www.southface.org/web/resources&services/publications/factsheets/sav_nrg\\$.pdf](http://www.southface.org/web/resources&services/publications/factsheets/sav_nrg$.pdf)

The Campaign for Home Energy Assistance

By the Low Income Home Energy Assistance Program (LIHEAP). Part of the campaign is directed at supporting weatherization efforts.
www.liheap.org/program.html

Global Green USA

Explains different energy efficiency funding types for PHAs.
www.globalgreen.org/pha-energytoolbox/financing.htm