Executive Decision Making in Green Building

HUD GREEN ACADEMY
Course 2

Funding for this educational program is provided by the U.S. Department of Housing and Urban Development

Shaun Donovan, Secretary

HUD Green Academy Training

- Course 1 — Intro to Green Building for Affordable Housing
- Course 2 — Executive Decision-Making
- Course 3 — Best Practices for Building Operations and Maintenance
- Course 4 — Financing Green Building
- Course 5 — Energy Performance Contracting for Small PHAs

COURSE SUMMARY

This course will provide an overview of the executive decisions necessary to optimize green practices in affordable housing and your organization. This course is aimed at senior staff members that are responsible for medium and high-level decision-making about the new construction, rehabilitation, operations, and maintenance of affordable housing units. Participants will be prepared to develop strategies for the integration of best green building practices into their work.

COURSE OBJECTIVES

- Define sustainability and identify the importance of sustainability in development and operations.
- Understand how to engage decision makers, staff and residents in sustainability initiatives.
- Evaluate and quantify costs and benefits of green buildings and operations.
- Explain how to measure and track building and organizational progress.

AGENDA

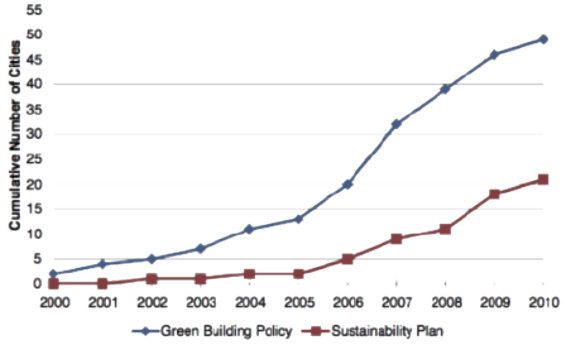
- Module 1 Framework and Assessment
- Module 2 Changing Behavior and Other Low Cost Opportunities
- Module 3 Green Building & Financing Decisions
- Module 4 Measuring and Tracking Performance
- Module 5 Organizational Development

Module 1

Framework and Assessment

Sustainability: a Guiding Principle

FIGURE 3: CITIES WITH GREEN BUILDING POLICY OR SUSTAINABILITY PLAN ENACTED BETWEEN 2000 AND 2010 PER GREEN BUILDING REGULATORY DATABASE



Source: Kontokosta, Constantine E., 2011.

Decision as Process

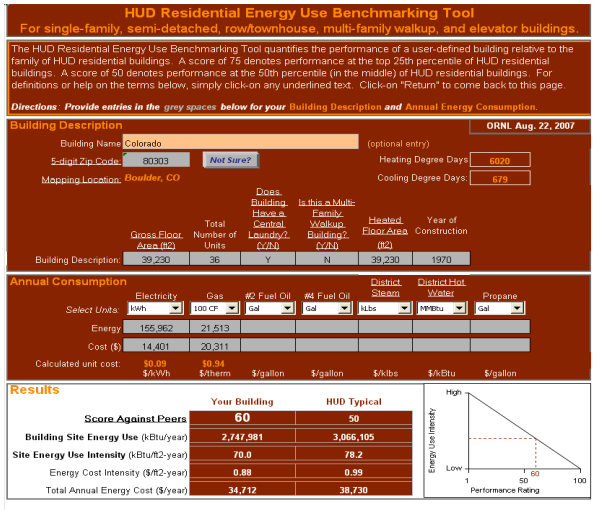
Strategies for Prioritizing Investments

- Assets and Opportunities
- Identifying Need
- Project Feasibility
- Non-Financial Considerations

Assessing Asset Performance

- Energy Data Collection
- Energy Benchmarking
- Energy Audits
- CO2 Emissions

Assessing Asset Performance



Assessing Asset Performance

HUD Residential Energy Use Benchmarking Tool

For single-family, semi-detached, row/townhouse, multi-family walkup, and elevator buildings.

The HUD Residential Energy Use Benchmarking Tool quantifies the performance of a user-defined building relative to the family of HUD residential buildings. A score of 75 denotes performance at the top 25th percentile of HUD residential buildings. A score of 50 denotes performance at the 50th percentile (in the middle) of HUD residential buildings. For definitions or help on the terms below, simply click-on any underlined text. Click-on "Return" to come back to this page.

***Directions**: Provide entries in the grey spaces below for your* **Building Description** *and* **Annual Energy Consumption**.

Building Description — ORNL Aug. 22, 2007

Building Name: Connecticut (optional entry)

5-digit Zip Code: 06106 [Not Sure?] — Heating Degree Days: 6151

Mapping Location: *Hartford, CT* — Cooling Degree Days: 677

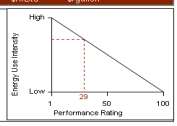
	Gross Floor Area (ft2)	Total Number of Units	Does Building Have a Central Laundry? (Y/N)	Is this a Multi-Family Walkup Building? (Y/N)	Heated Floor Area (ft2)	Year of Construction
Building Description:	6,400	8	N	Y	6,400	1984

Annual Consumption

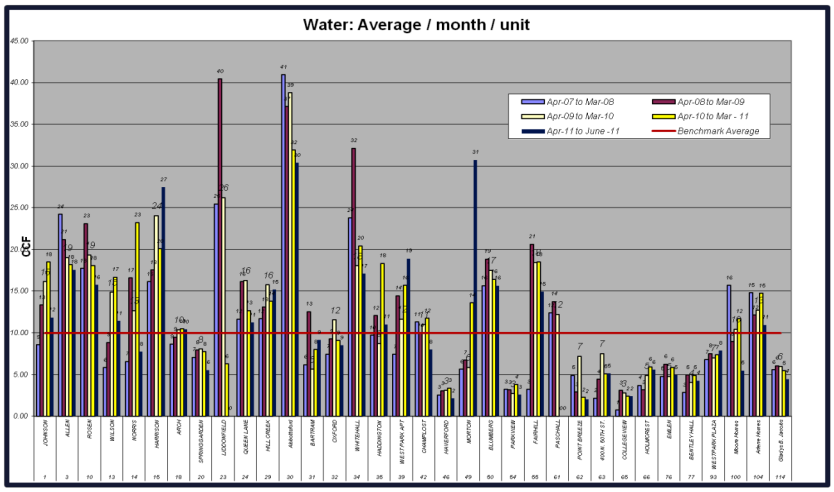
	Electricity	Gas	#2 Fuel Oil	#4 Fuel Oil	District Steam	District Hot Water	Propane
Select Units:	kWh	Therms	Gal	Gal	klbs	MMBtu	Gal
Energy	22,076	6,992					
Cost ($)	3,091	10,239					
Calculated unit cost:	$0.14 $/kWh	$1.46 $/therm	$/gallon	$/gallon	$/klbs	$/kBtu	$/gallon

Results

	Your Building	HUD Typical
Score Against Peers	**29**	**50**
Building Site Energy Use (kBtu/year)	**774,523**	**623,493**
Site Energy Use Intensity (kBtu/ft2-year)	**121.0**	**97.4**
Energy Cost Intensity ($/ft2-year)	**2.08**	**1.68**
Total Annual Energy Cost ($/year)	**13,330**	**10,731**



Assessing Asset Performance



Carbon Emissions Assessment

- Portfolio size and energy use
- Fleet size and fuel type
- Vehicle miles traveled (VMT)
- Recycling
- Locally-sourced

Carbon Emissions: Action Plan

- Kendall Foundation
- CO2 emissions in 2005: 8.5 tons per capita
- Onsite and Carbon Offset Strategies
- Carbon Neutral by 2008

Healthy Housing

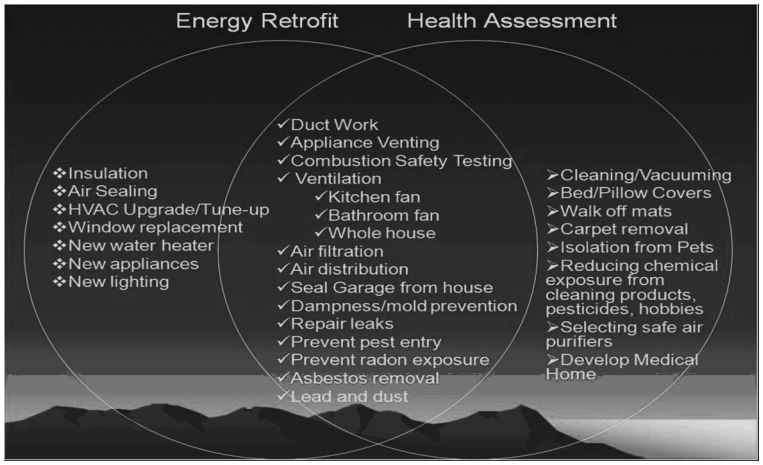
- Resident health outcomes, productivity
- Risk management strategy
- Healthy Homes Checklist

Viking Terrace Kick-Off
Worthington, MN

Case Study – Healthy Housing

- Viking Terrace, Worthington, MN
- Substantial rehab to meet Enterprise Green Communities
- Budget
- Pre- and post-rehab health assessments
- Published outcomes

Healthy Housing: How



Module 2

Changing Behavior and Low Cost Opportunities

Engagement: Residents

- Awareness and training
- Two-way communication
- Involve residents in decision-making
- Sustainable initiatives

Engagement: Staff

- Who is your “sustainability champion?”
- How many other staff members are educated and at what level?
- Is your staff inclined to support sustainable activities?

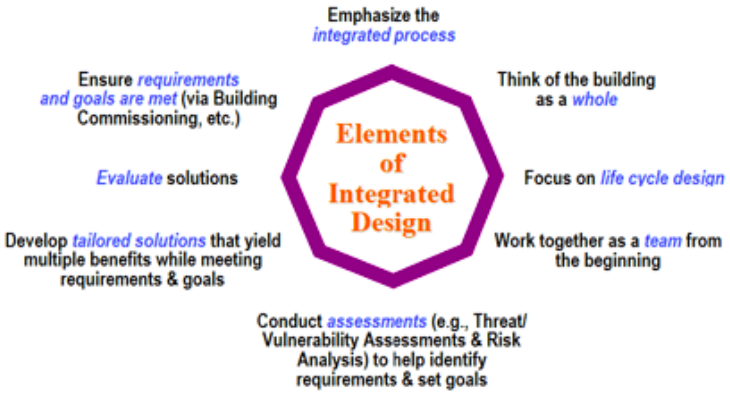
Engagement: Board

- Education
- Sustainability policy
- Sustainability pledge
- Measurable goals
- Annual report

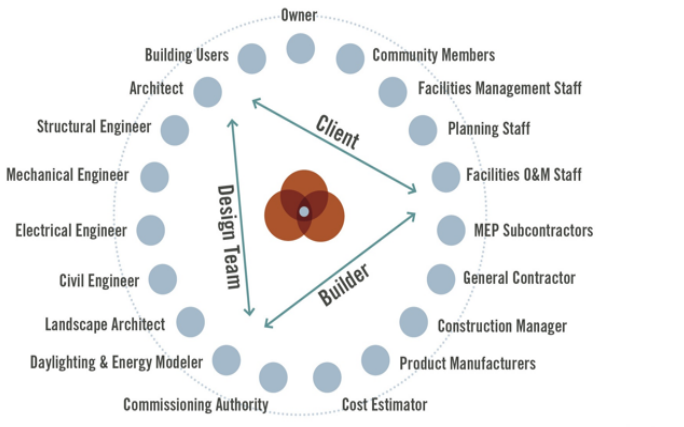
Peer to Peer Networks

- National Association of Housing and Redevelopment Officials
- Council of Large Public Housing Authorities
- USGBC National Affordable Green Homes Summit
- Building Sustainable Organizations/Enterprise
- Public Housing Sustainability Network

Integrated Design



Integrated Design



Adapted from graphic by Bill Reed

Case Study: Old Colony

Case Study: Old Colony

Administrative Operations

- Waste reduction
- Green procurement
- Tenant lease addendums
- IT efficient practices and equipment

Green Procurement

- Green Specifications
- Supply Chain Management
- E-commerce

Green Procurement

- Purchasing Partners
- Building Waste Purchasers
- Administrative Waste Purchasers

Operations and Maintenance Plan

- Indoor Air Quality Management
- Green and Healthy Housekeeping
- Indoor Pest Prevention and Control
- Waste Reduction and Recycling
- Energy and Water Conservation
- Green Groundskeeping

Operations and Maintenance Plan

- Repair/replacement record keeping
- Regularly scheduled routine/seasonal maintenance
- Operations and maintenance manual accessibility
- Accountability
- Outdoor Water Consumption Check

Module 3

Green Building And Financing Decisions

New Construction

- Choosing a Green Building Standard
- Site Selection: Energy Efficiency Opportunities
- Integrated Design
- Commissioning

Rehabilitation

- Choosing a Green Building Standard
- To Certify or Not to Certify
- Challenges and Opportunities with Existing Structures
- Integrated Design
- Retrocommissioning

Exercise 1

Site	Electric (kWh)	Gas (ccf)	Water (CCF)
Aspen	1,500,000	300,000	58,200
Bowdoin	1,500,000	300,000	70,000
Carson	2,250,000	625,000	59,000

Financing

- Asset Operations Accounts
- Capital Fund Financing
- CDBG/HOME/NSP
- Green Refinance Plus Program
- FHA Multifamily & Single Family
- Mark to Market Green Initiative
- Energy Performance Contracting

Financing

- Tax Exempt Bonds
- Low Income Housing Tax Credits
- Energy Credits www.dsire.gov
- Energy Performance Contracts
- Power Purchase Agreements
- Private Foundations

Cost Benefit Analysis: Simple Payback

- ECM Cost
- Payback Period
- Benefits
- Drawbacks

In the fall of 2011, Asociación Puertorriqueños en Marcha completed 13 new LEED Gold homes that use solar hot water systems to help residents reduce the cost of hot water.

Cost Benefit Analysis: ROI/SIR

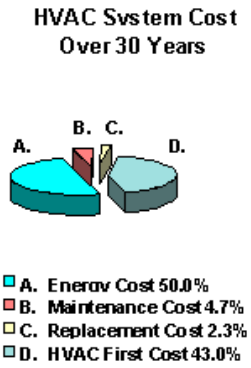
- Up front capital cost
- Projected Savings
- When will ECM pay for itself?
- Operations and Maintenance Savings

ROI & SIR: DCHA

- 31 Properties,5,444 units
- Approx 28,000 residents served
- Annual average utility cost = $16 mil
- Annual Savings =$3.9 mil
- Retrofit Cost = $21.1 million
- Less than 7 year recoupment
- O&M Savings $2,364,645

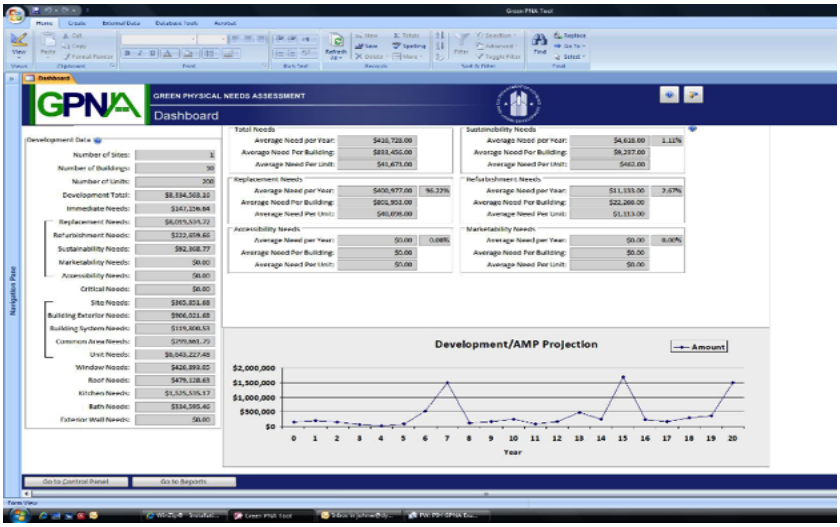
Cost Benefit Analysis: Life Cycle Costing

- Definition: Whole Building Operations
- Elements to Consider



(Courtesy of Washington State Department of General Administration

Green CNAs/PNAs



Green CNAs/PNAs

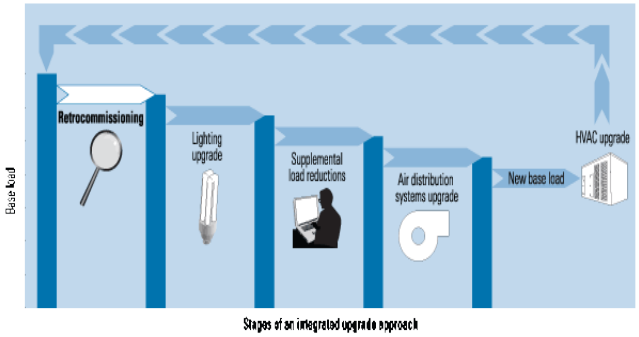
- Proposed Rule requirement for PHAs
- Fannie Mae Green Refinance Plus and Mark to Market
- Opportunity to accelerate system upgrades
- Improve whole building performance
- Generate long term energy and water cost savings

Green CNA/PNAs

- Staff vs. Contractor
- Energy Audit Integration
- Green PNA as Management Tool

Performance and Verification

- Commissioning
- Retrocommissioning

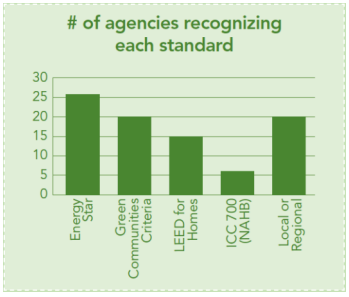


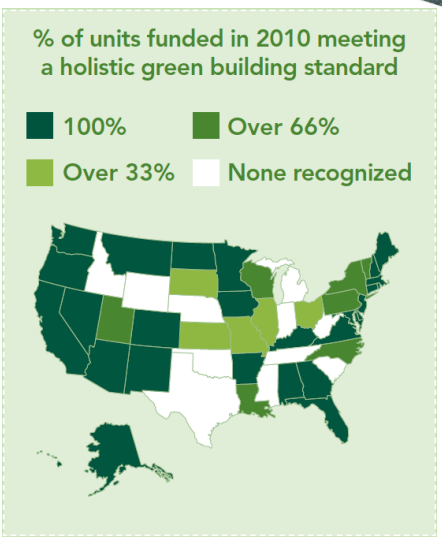
Courtesy: E source

Green Buildings Standards on the Rise

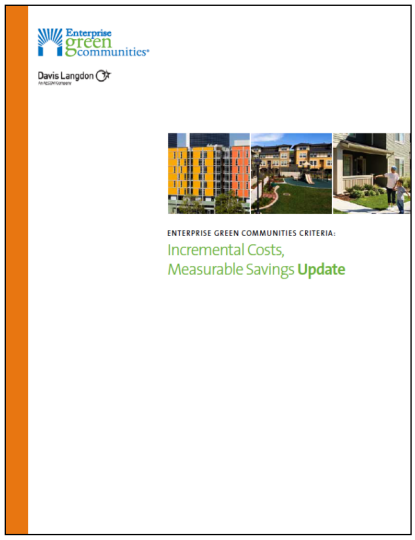
Enterprise

Nationwide, **63%** of units financed with LIHTC in 2010 committed to meet a holistic green building standard.





Incremental Costs, Measurable Savings UPDATE

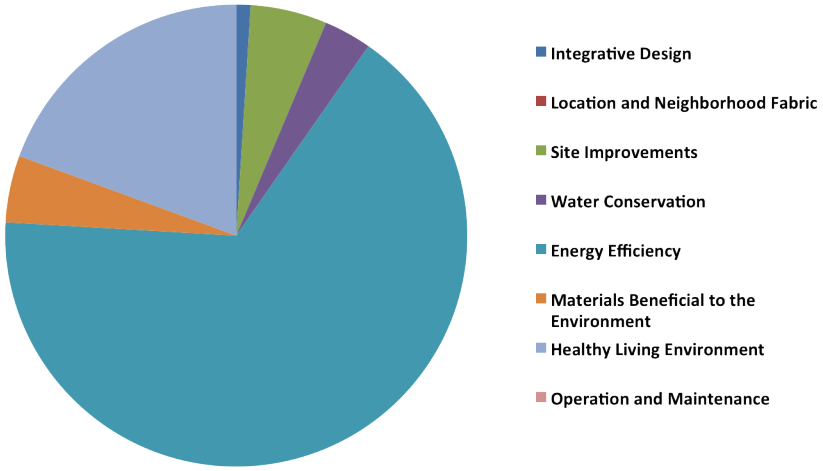


New Report Findings reinforce 2009 report results:

Lifetime utility savings exceed upfront investment to integrate the Criteria into affordable housing.

Ongoing Evaluation: 2012 Results

Median cost increment per square foot: $3.65



Ongoing Evaluation: 2012 Results

Enterprise

Financial Impacts of Green Affordable Housing

Median Cost of Meeting Green Communities Criteria	
Green premium per ownership/rental unit	$3,546
Green premium per square foot	$3.65
Percent added to total development cost	2%

Median Lifetime Savings from Energy and Water Conservation Measures	
Utility savings per home/rental unit	$3,709
Utility savings per square foot	$3.87
Internal rate of return	16.8%
Simple payback period (years)	5.59

Davis Langdon
An AECOM Company

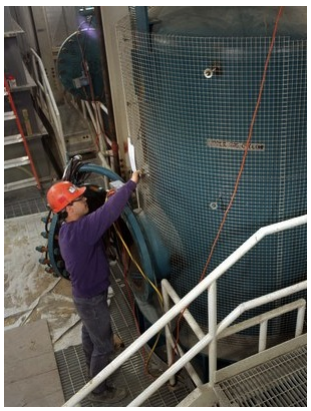
Module 4

Measuring and Tracking Performance

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

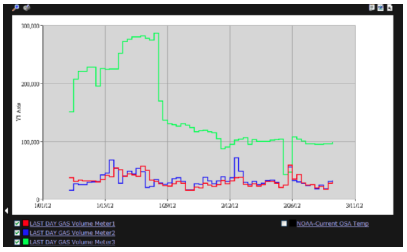
Energy Management

- Performance and Fuel Costs
- New Technology
- Checks and Balances



Energy Management Tools

- Facility Energy Management Assessment
- Smart Meters
- Energy Monitoring System



Resource Development

- Phased Technology Upgrades
- Partnerships with Local Utility and Educational Institutions
- Tour Peer Organizations with Best Practices

Module 5

Organizational Development

Organizational Sustainability Plan

- Review how organization has already implemented sustainable practices
- Develop a plan for additional practices and policies that support your mission
- Identify potential funding sources and external partnerships
- Define metrics to measure success

Organizational Sustainability Plan

- Employee Interviews
- External Partner Interviews
- Resident Leadership Interview
- Board/Executive Leadership
- Data Collection

Organizational Sustainability Plan

- Connect environmental sustainability with social and economic sustainability
- Improve employee and resident quality of life
- Support sustainable profile of your organization locally
- Institutionalize sustainable principles

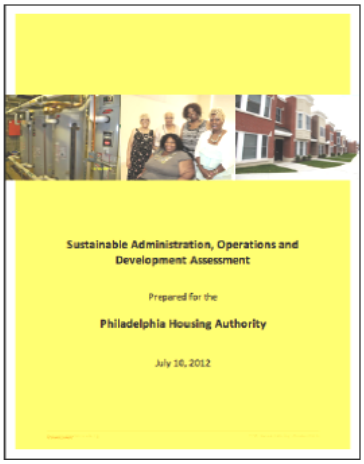
Staff Training

Professional Certifications/Accreditations

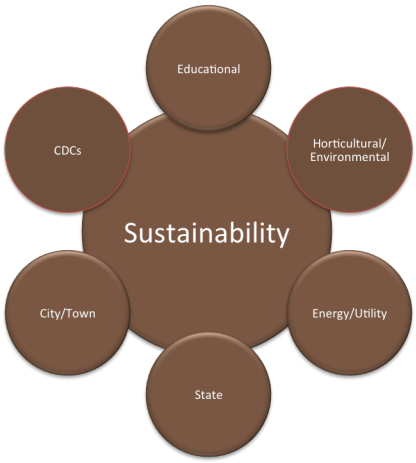
- LEED AP, LEED Green Associate
- Certified Sustainable Property Management
- Affordable Green Academy
- Building Performance Institute
- Neighborworks

Case Study:
Philadelphia Housing Authority

- Assessment
- External Partner Collaboration
- Recommendation Review
- Board Adoption of Sustainability Policy
- Implementation

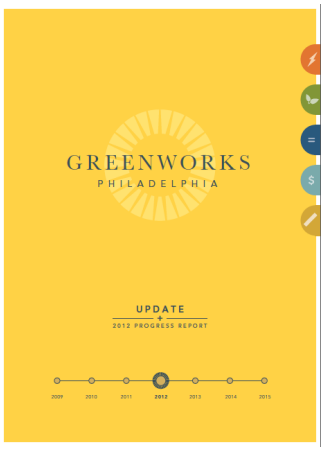


Case Study:
Philadelphia Housing Authority



Case Study:
Philadelphia Housing Authority

- Immediate Targets
- Short Term Goals
- Long Term Initiatives
- Implementation



Case Study:
Philadelphia Housing Authority

PROFILE: The Philadelphia Housing Authority Embraces Sustainability

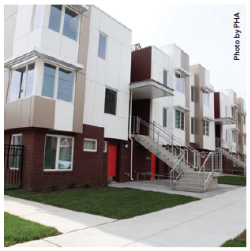


Photo by PHA

[ABOVE]: The Philadelphia Housing Authority's Norris Apartments, built to the LEED Gold for Homes standard, was completed in May 2012.

[OPPOSITE PAGE]: White roofs cover the entire block of 1200 Wolf Street, winner of the 2010 Retrofit Philly Coolest Block Contest.

The Philadelphia Housing Authority (PHA) provides homes to more than 80,000 people in Philadelphia. PHA acts as both a property manager and a developer on projects ranging from single-family homes to neighborhood-scale redevelopments. With such a large portfolio of buildings, PHA can create a significant impact by integrating sustainability into its operations. In 2012, PHA will publish its first sustainability plan to establish a comprehensive framework of goals and strategies across the agency and to formalize reporting on initiatives that are already under way.

Energy Efficiency and Green Building at PHA

In 2008, PHA received $126 million in federal funds to support energy efficiency projects. Over the past four years, PHA has completed construction on 533 new EnergyStar-rated homes and renovated an additional 300 homes to the EnergyStar standard.

In May 2012, PHA opened Norris Apartments in North Philadelphia, the first LEED-certified project in its portfolio. The new development replaces a 1950s high-rise building and features 51 units, and a pilot project that will use the park to manage stormwater from the newly constructed townhomes as well as surrounding streets. Norris Apartments is one of several new transit-oriented developments in the area, all of which are adjacent to both Temple University and the North Broad Street commercial corridor.

PHA and Drexel Partner on Healthy Homes Initiative

To improve the health and safety of its residents, PHA partnered with Drexel University to participate in the Asthma Intervention and Reduction (AIR) program funded by a U.S. Department of Housing and Urban Development Healthy Homes Demonstration Grant. The AIR program provides families with young children who suffer from asthma with indoor air quality assessments and help mitigating environmental hazards. As of March 2012, PHA and Drexel have completed 985 home visits across the city.

Five Key Decisions

- Develop a Sustainability Plan
- Appoint a Sustainability Manager
- Connect with Local Partners
- Budget for Staff Training
- Engage Residents

Next Steps

Summary and Course Evaluation

Thank You!