



Saving Energy in Multifamily Buildings

Welcome to the Webinar! We will start at 11:00 AM Eastern Time
Be sure that you are also dialed into the telephone conference call:

Dial-in number: 888-324-3815; Pass code: 9996091

(If asked for a PIN #, press *0)

Download the presentation at <http://www.buildings.energy.gov/webinars>.

Date: July 26, 2011





Building America: Introduction
July 26, 2011

Stacey Rothgeb
Stacey.rothgeb@nrel.gov



- Reduce energy use in new and existing residential buildings
- Promote building science and systems engineering / integration approach
- “Do no harm”: Ensure safety, health and durability are maintained or improved
- Accelerate adoption of high performance technologies

www.buildingamerica.gov

15 Industry Research Teams



Alliance for Residential Building Innovation (ARBI)



NorthernSTAR Building America Partnership



Building America Retrofit Alliance (BARA)



Building Solutions

Habitat Cost Effective Energy Retrofit Program



Building Energy Efficient Homes for America (BeeHa)





Larry Brand is an R&D Manager at the Gas Technology Institute working in the area of building energy efficiency, product development, codes and standards, and technology deployment. He has 30 years of experience managing building systems research and product development programs for public and private companies, launching more than 20 products into the marketplace, Mr. Brand is currently the lead investigator for the Partnership for Advanced Residential Retrofit Building America team and principal investigator for the California Energy Commission Measured Home Performance project.



Peter Ludwig is the Energy Efficiency Programs Manager at CNT Energy. His primary focus is to manage the Energy Savers multifamily retrofit project. Peter has a BA in Geology and Earth Science from Wesleyan University and is a Certified Energy Manager.



The Partnership
for Advanced
Residential Retrofit

Introduction to PARR

Larry Brand

Gas Technology Institute

Larry.Brand@gastechnology.org

847.768.0968

Ryan Kerr

Gas Technology Institute

Ryan.Kerr@gastechnology.org

224.735.0264

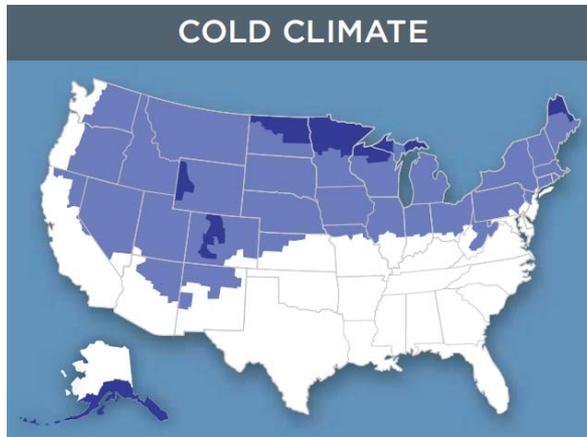
PARR Overview

> Midwest region, cold climate focus

1. Seven-state Midwest region with a Chicago “hub”
2. Systems and whole home solutions for cold climate
3. Targeting high potential building stock with opportunities for energy savings AND scalability



2.



3.



PARR Team Lead – Gas Technology Institute

- > Not-for-profit research, with 65+ year history in Energy R&D
- > Facilities
 - 18 acre campus near Chicago
 - 200,000 ft², 28 specialized labs
- > Staff of 250
- > 1000 patents; 500 products
- > Research staff with 60 + years combined experience in building systems



Offices
& Labs



Flex-Fuel
Test
Facility



Energy & Environmental Technology Center

PARR Team Members



- > Community-based organization using EE to promote urban sustainability
- > Runs largest residential retrofit program in Chicago
- > Lead author of the Chicago Climate Action Plan
- > Piloting a residential real-time electricity pricing program



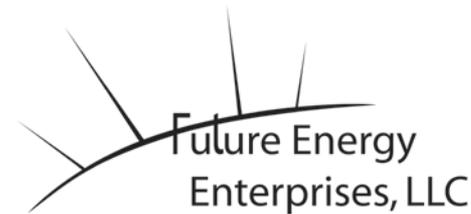
- > Nonprofit EE agency operating in 13 Midwest states
- > Training and certification
 - HVAC performance
 - Building operators
- > Residential focus areas
 - Whole home programs
 - Lighting & appliances
 - Codes & standards
- > EE policy expertise

PARR Team Members



Building Research Council

- > University of Illinois researchers focusing on building energy, HVAC, moisture, safety and IAQ
- > Over 60 years combined experience in residential retrofit including research, evaluation, monitoring
- > Illinois weatherization trainers



- > Consulting company advising on EE portfolio and program design, administration, implementation and evaluation
- > Manages large-scale EE stakeholder process (US and abroad) to build support for and optimize EE portfolios

PARR Partners



- > Over 40 industry partners (*at time of original bid, list continues to grow*)
 - Manufacturers of building materials and equipment including:
 - > DuPont, Owens Corning, Carrier, Rinnai, AO Smith, Trane, Serious Materials
 - Developers, contractors, and realtors including:
 - > DNR Construction, Checkmate Development, DNR Const, Solar Services
 - Utilities, Agencies, and Programs including:
 - > ComEd, Columbia Gas of Ohio, PG&E, Vectren, CenterPoint, DTE Energy
 - EE program implementers
 - Government agencies including:
 - > City of Chicago, City of Champaign, IL DCEO, Indiana Energy Office, Iowa Energy Center, Michigan Bureau of Energy Systems, CMAP
 - Neighborhood organizations and hybrid home owner associations
 - Universities and others

Research Areas

- > **Task 6** – Evaluation of Retrofit Delivery Practices
- > **Task 7** – Evaluation and Testing of Individual Retrofit Measures
- > **Task 8** – Evaluation of Whole House Retrofit Packages of Energy Efficiency Measures (Prototype Homes)
- > **Task 9** – Evaluation of Community-Scale Implementation of Retrofit Energy Efficiency Packages
- > **Task 11** - Other Research Activities



Energy Savers Program

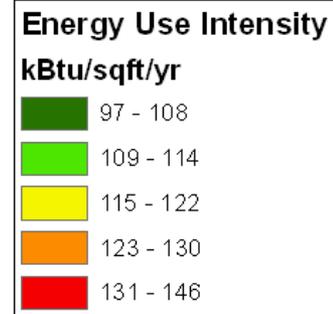
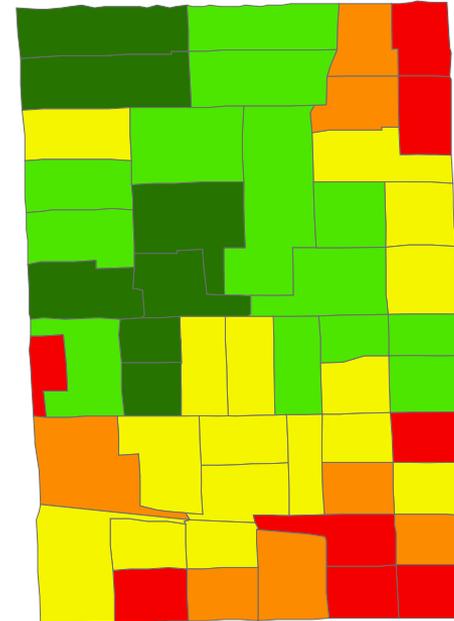
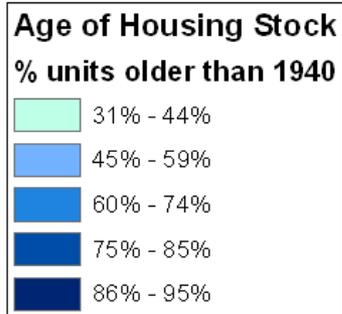
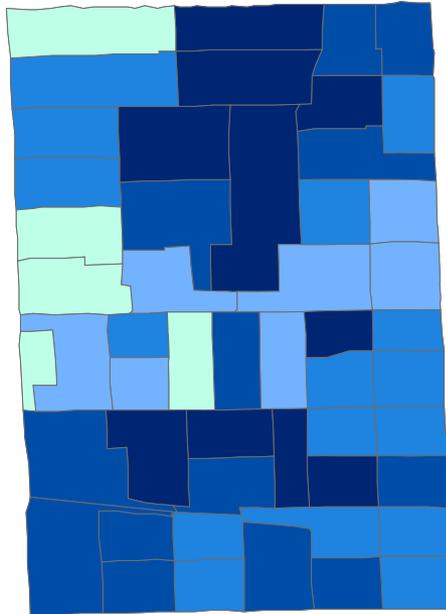
Efficiency in Multifamily Buildings



Data synthesis & analysis

- “Think and do” tank for urban sustainability
- Focus on transportation, land use, energy, green infrastructure, community development and climate change
- Strategies that benefit the environment **and** economy

Data synthesis and analysis

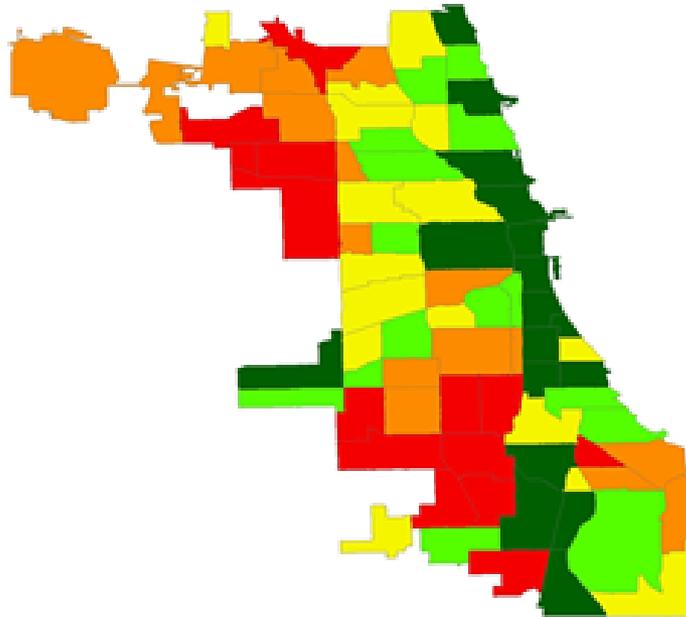


CNT Energy

Community focused innovation

- Smart grid and dynamic pricing
- Energy Planning
- Policy, research and analysis

City of Chicago Energy Usage Intensity



Programs & projects

- Commercial and municipal buildings
 - Regional Green Building Case Study Project
- Residential
 - MyHomeEQ for single family homeowners
 - Green MLS listings
 - Small 2-4 unit buildings
 - Multifamily

Green and Healthy Buildings



Green & Healthy Homes Initiative

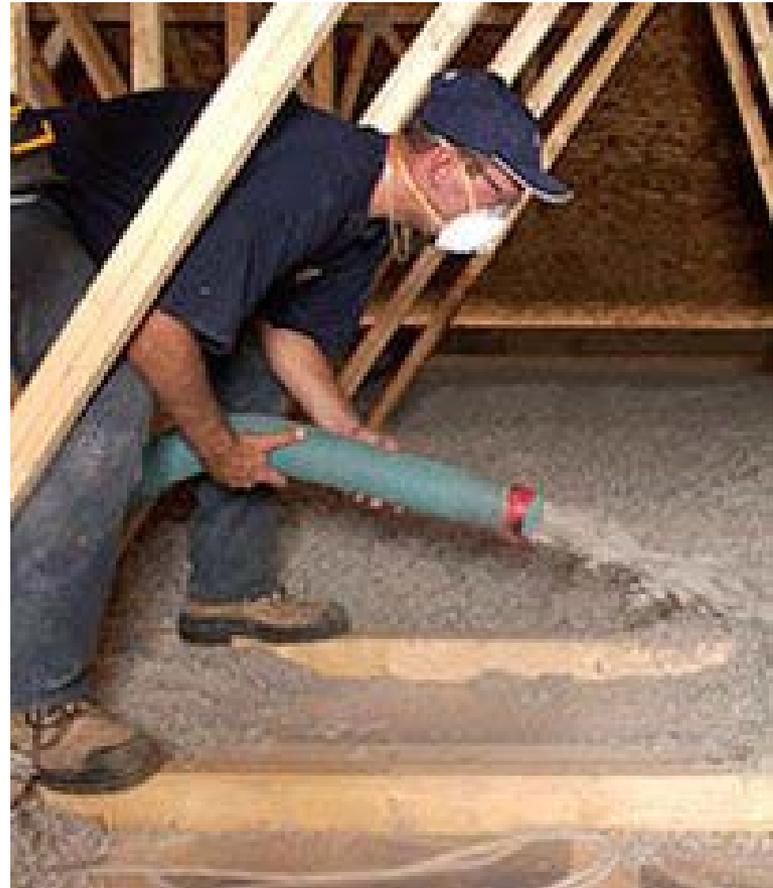
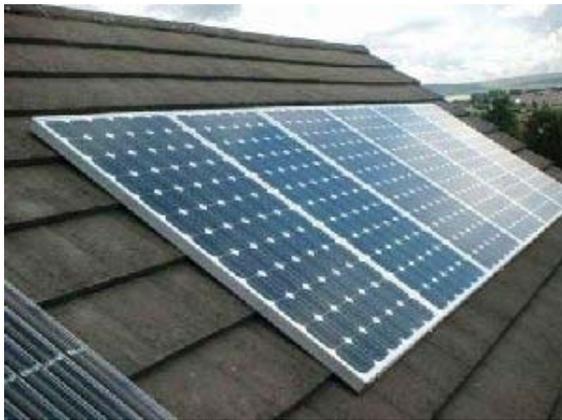
Collaborating on HUD research studies

MIGHHTY

WATTS to Well-Being

CLEAR
WIN

ECMs: exciting vs reliable



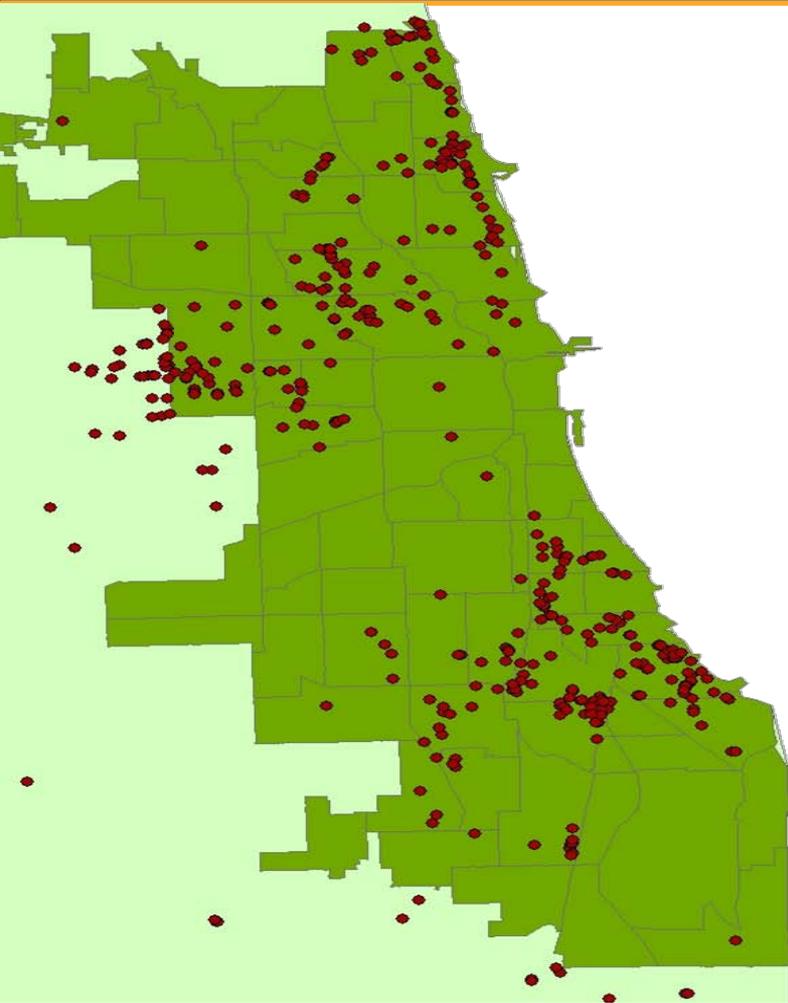
energy savers

**A one-stop energy efficiency shop
for multifamily building owners**



- Both the private and subsidized markets
- Combines technical services energy audits, construction management and financing low-interest revolving loan fund
- Post retrofit performance monitoring

Energy Savers-Results

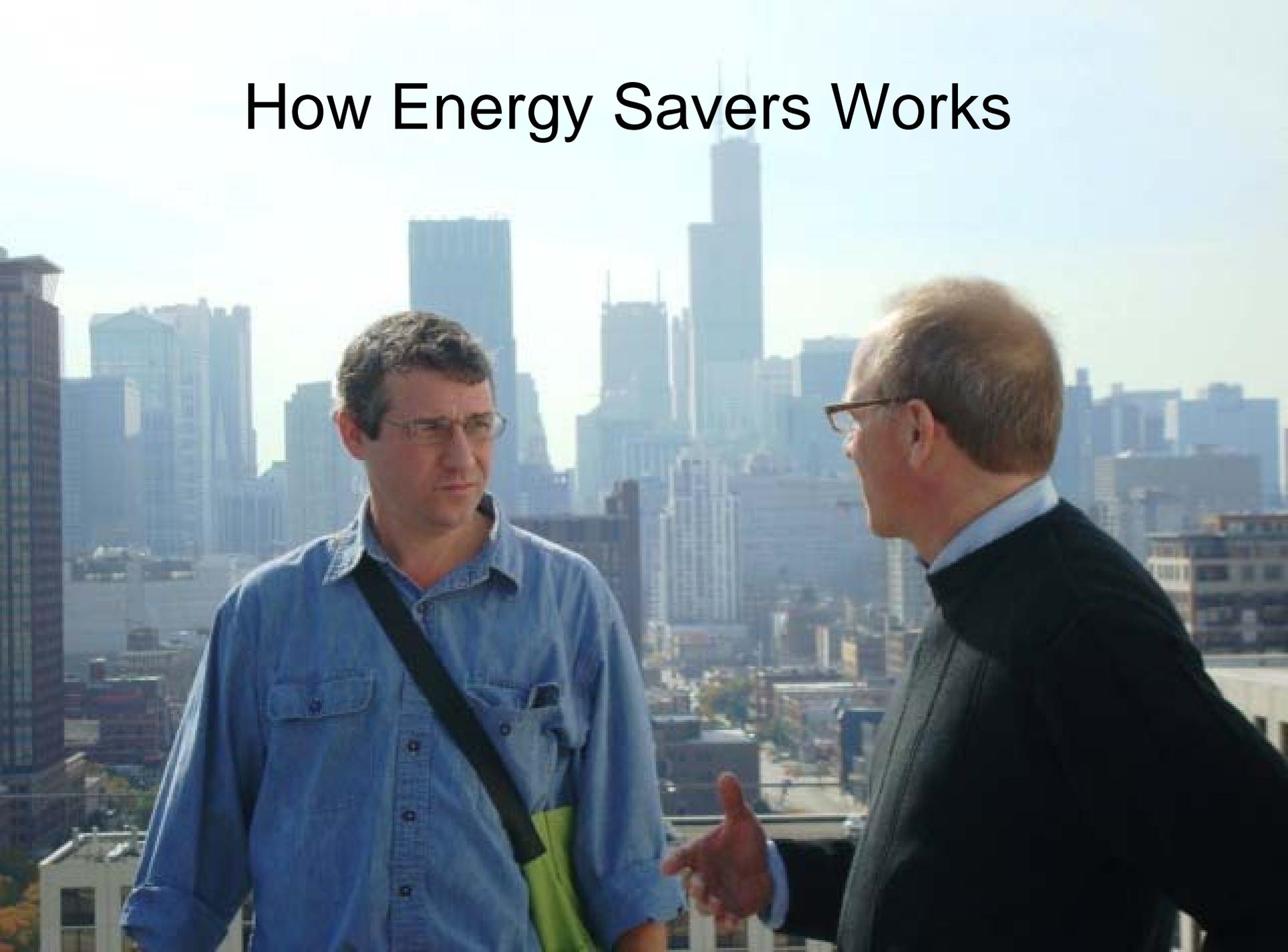


- 6,000 apartments updated for efficiency
- 30% average annual energy savings
- \$10,000 in annual utility bill savings for the typical 24-unit building
- Aggregate energy savings of \$3M and growing
- \$2.7M loan portfolio

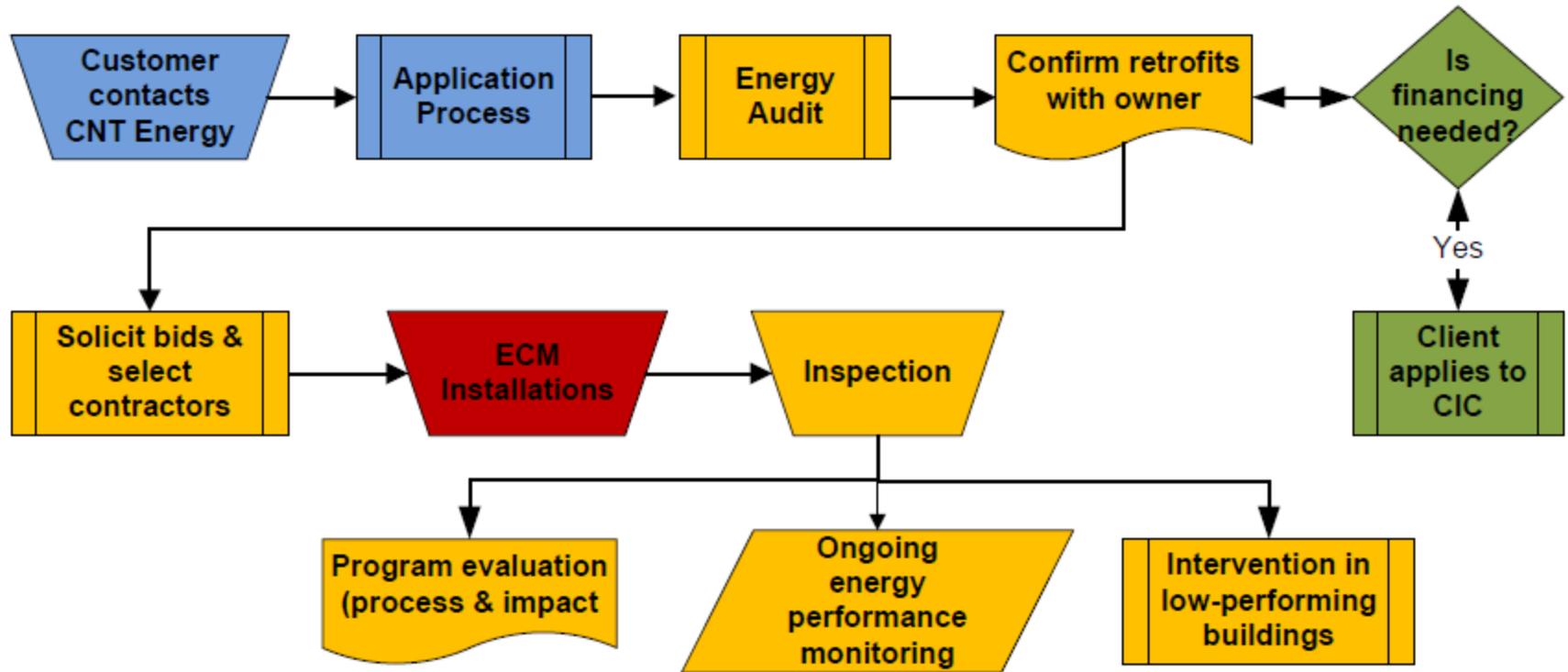
The Owner's Point of View



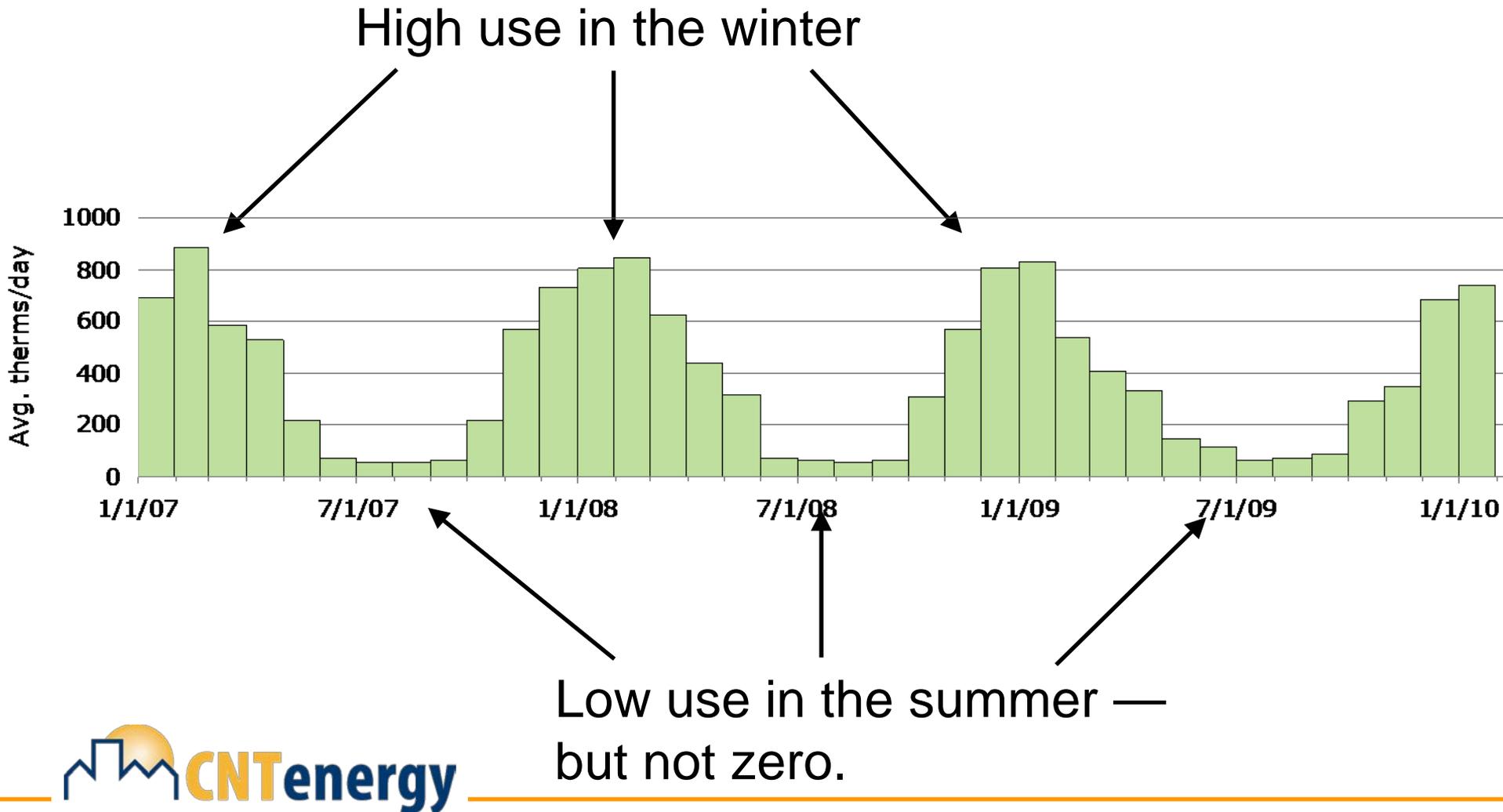
How Energy Savers Works



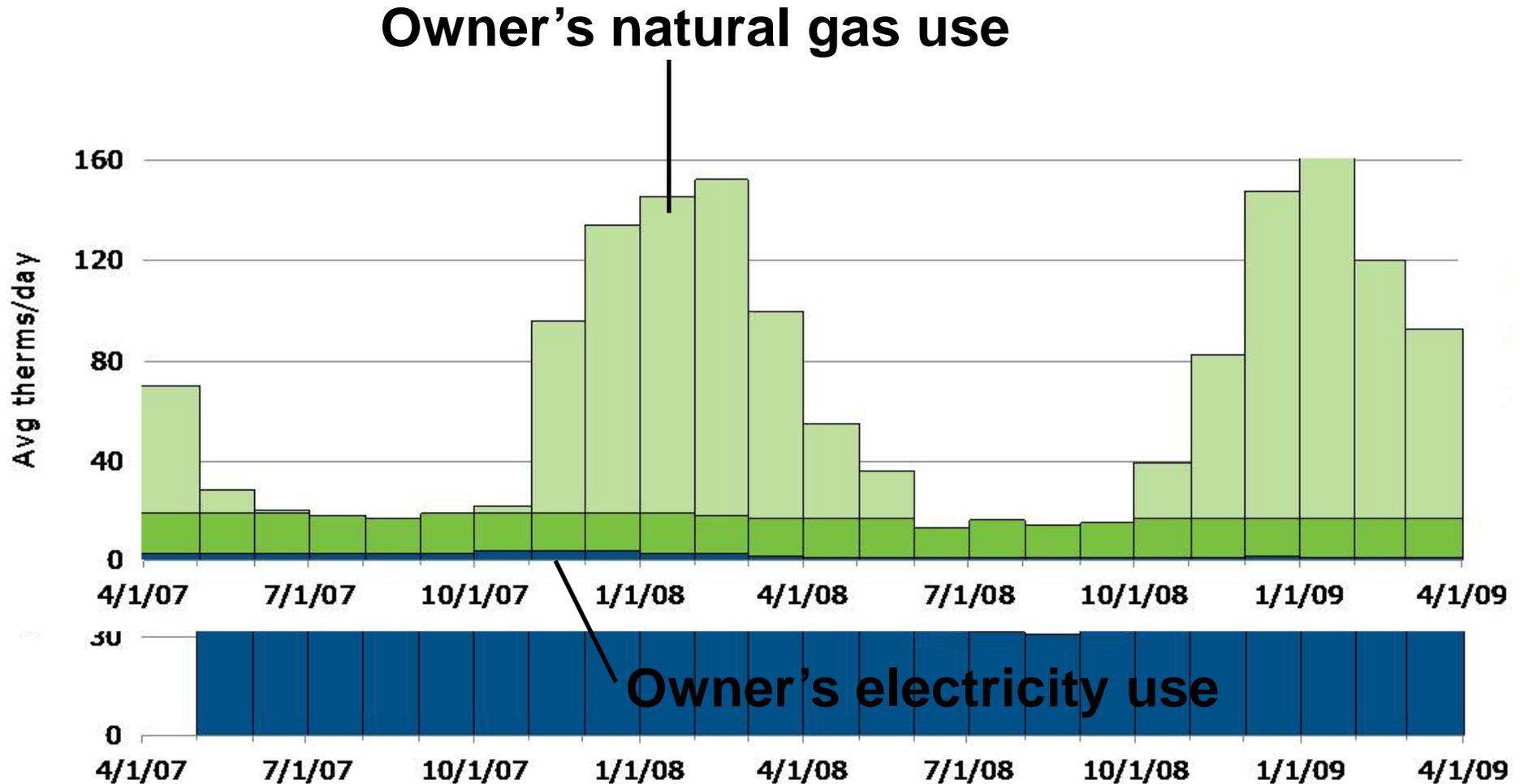
Energy Savers Process



Natural gas use



What about electricity?

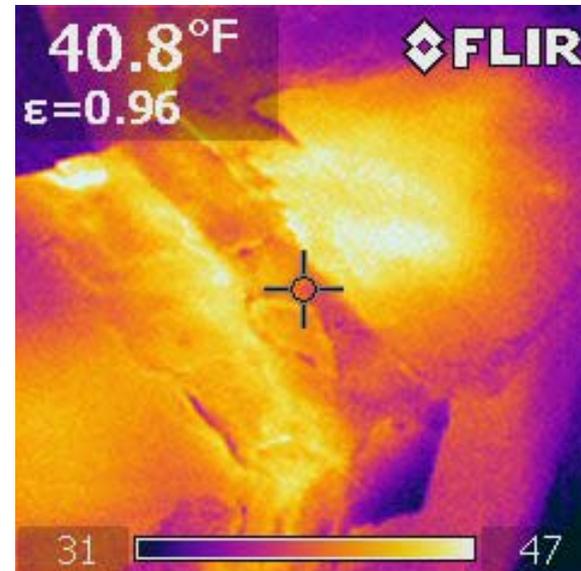


Energy Audit

- Analyze fuel bills-patterns and Energy Use Intensity (EUI, energy usage/square footage)
- Interview occupants/operators
- Visual inspection
- Instrumented Analysis: infrared thermography, thermometer, blower door
- Modeling/common sense

Infrared Thermography

Identifies surface temperature: applicable to assess existing insulation, pipes in chases, air leakage in tandem with blower door test, etc. Quantitative value limited for Multi-family buildings



Timing mainline steam vents

Boiler turns on

8 minutes later

30 minutes later





Auditor: Do you know how to operate this? Super: Nope.

Final report with recommendations

Energy Audit 5158 S. King Boulevard, Chicago, IL



Prepared for: Chicago Metropolitan Housing Development Corporation

Performed by: CNT Energy, a division of the Center for Neighborhood Technology

Sample Measure Package

	Cost	Annual savings	Simple payback
Building envelope			
Ceiling cavity insulation	\$7,049	\$1,531	4.6 years
Seal air leaks	\$400	\$70	5.7 years
Mechanical systems			
Replacement high-efficiency boiler	\$24,000	\$4,542	5.3 years
Boiler controls	\$4,500	\$901	5.0 years
Outdoor reset control	\$2,000	\$1,770	1.1 years
Repair condensate return lines	\$2,000	\$460	4.3 years
Replace radiator and line vents	\$1,270	\$755	1.7 years
Electrical/lighting			
Compact fluorescent lamps	\$152	\$55	2.8 years
Total for all measures	\$41,371	\$10,084	4.1 years

Financial support



- Established a revolving loan fund
- Can combine with grant sources
- Can combine with rehab
- Can combine with acquisition
- Creates a more flexible program

Construction Management

High quality
installation
makes a
difference.



Owners like and trust the program

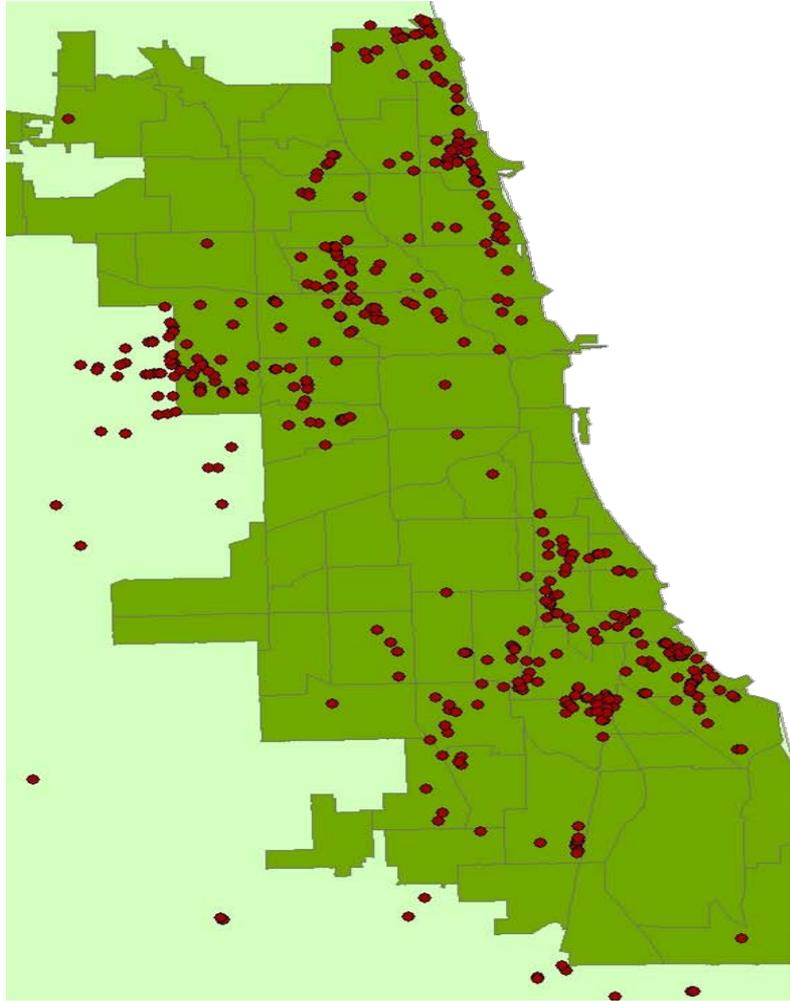
“I saved over \$30,000 on my operating costs with the Energy Savers Program. This is the best investment I’ve made in my buildings in 10 years”
Don Wenzel, building owner.



Energy Efficiency pays back

- Portfolio of 5 buildings, 93 units
- Total loan Amount: \$117,000
- Scope of work includes: insulation, air sealing, balancing heating systems
- Monthly Loan Payment - \$1,519.73
- Monthly Savings due to ECM - \$2,129.5

Questions



Peter Ludwig
Energy Efficiency
Programs

Manager

CNT Energy

peter@cntenergy.org

(773) 269-4048

Thank you for attending the Webinar

If you have any comments or ideas for future Webinars, please email
webmasterbtp@nrel.gov

Visit www.buildings.energy.gov/webinars.html to download
today's presentation and to register for announcements of upcoming
Webinars.

