CNT Energy's Energy Savers Program

The Streamlined Approach to Retrofitting Multifamily Buildings in Chicago

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Energy Analyst
CNT Energy

CNT Energy

- A nonprofit organization dedicated to helping communities and consumers save energy and money
- An affiliate of the Center for Neighborhood Technology
- Other CNT affiliate includes IGO CarSharing

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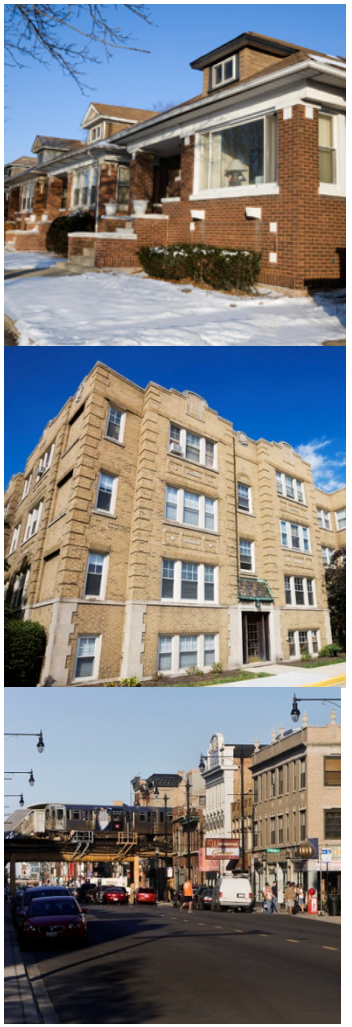
- We help reduce energy usage and costs in **households**, **buildings**, and **communities**.
- Areas of expertise include:
  - Dynamic pricing and smart grid
  - Regional energy planning
  - Energy-efficient, green, and healthy buildings
- We manage programs in Illinois and consult nationally and internationally



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Our Program

energy savers

a one-stop energy efficiency shop for building owners

- Small Multifamily
- Nonprofits and Houses of Worship
- Large Multifamily (5+ units)

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Streamlined Approach

- Target Chicago's older MF housing stock
- Why?
  - Preserve affordable housing
  - Considerable savings potential
  - Provide a customized approach
    - Similar construction
    - Similar age
    - Similar measures

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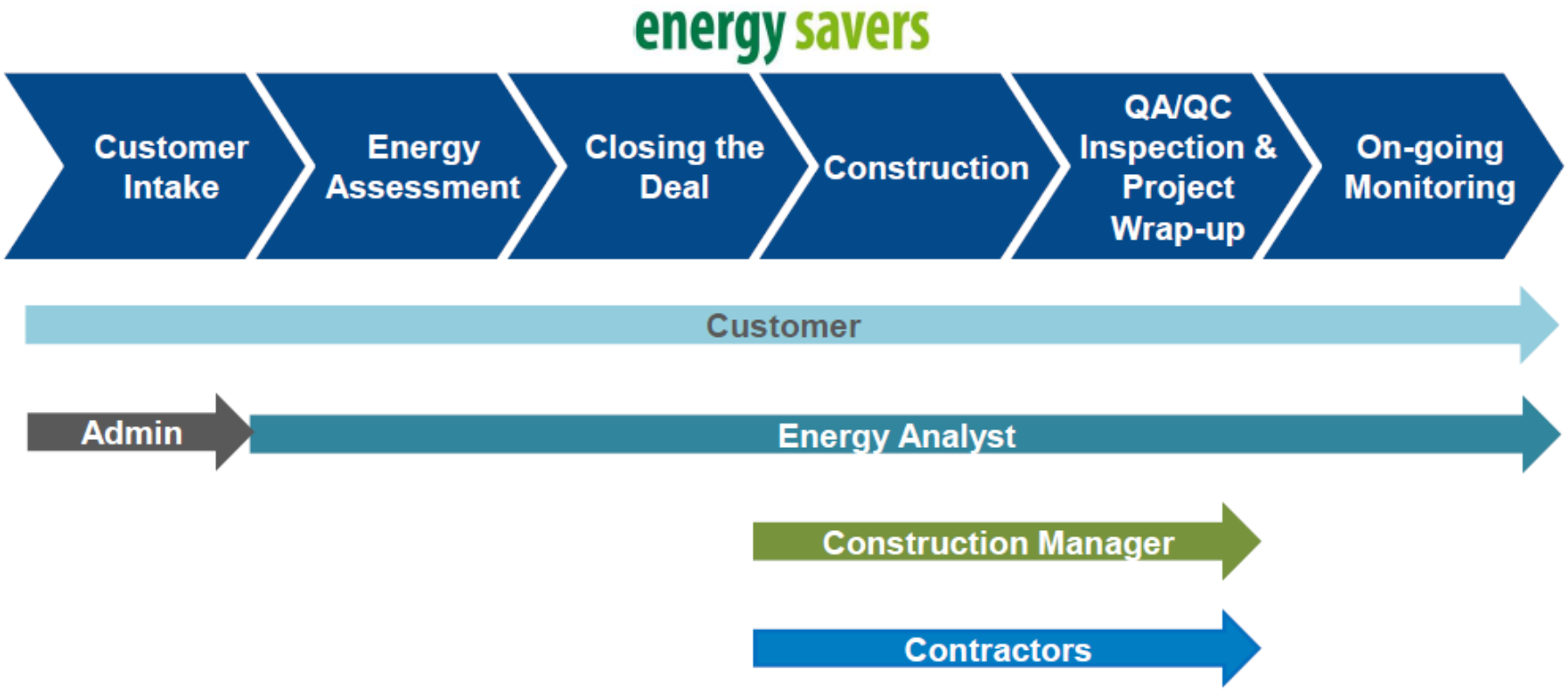
The Energy Savers Model



Energy Savers creates a streamlined process with one point of contact to help owners access all services – the Energy Analyst

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Energy Savers: Success

- Since 2008:
  - 11,000+ units
  - 2.7 million therms
  - 16,000 metric tons CO2e
  - 440 jobs
- 30% savings on average

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Energy Savers: Success

- Navigant Consulting study
  - Third-party assessment
  - March 2013
  - 21 retrofitted vs. similar non-retrofitted
  - 179,800 therms/year saved
  - Average 26.1% heating gas savings

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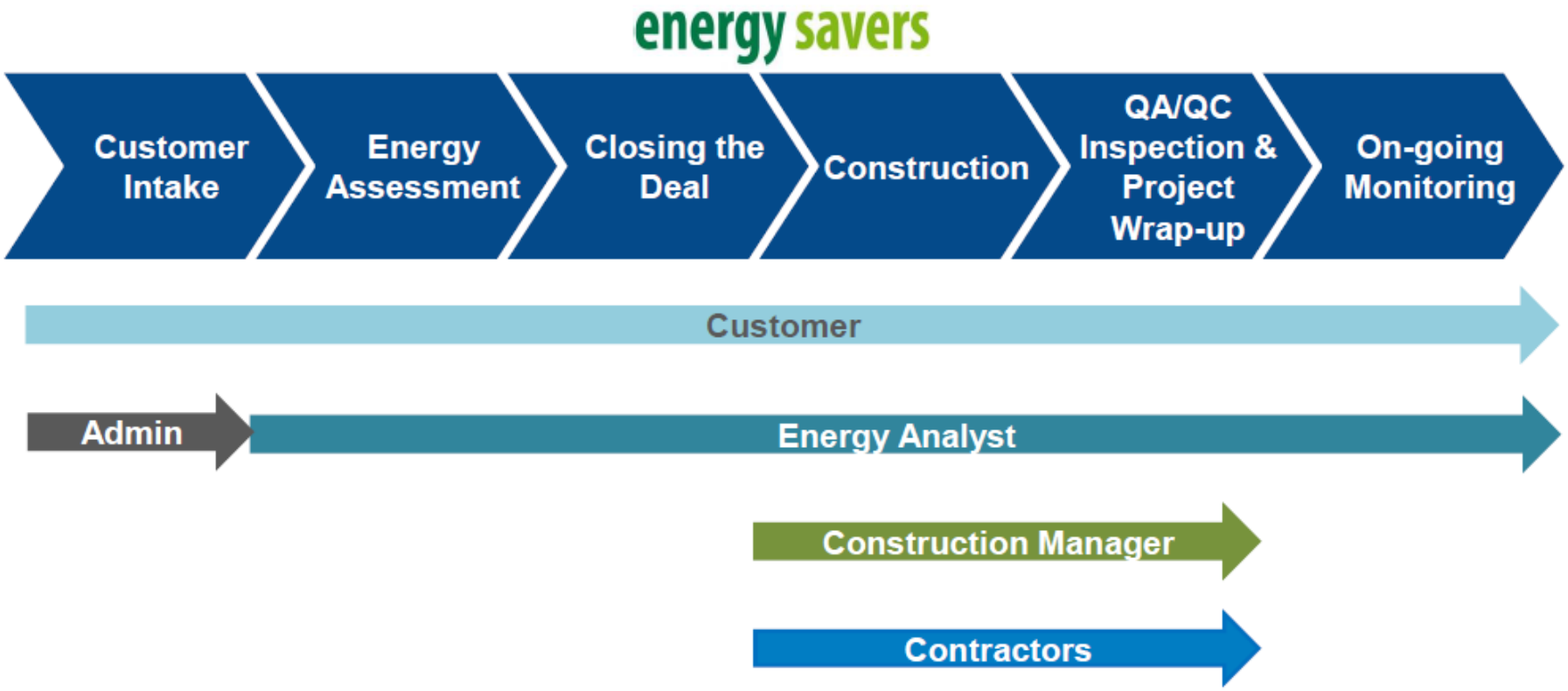
The Energy Savers Model



Energy Savers creates a streamlined process with one point of contact to help owners access all services – the Energy Analyst

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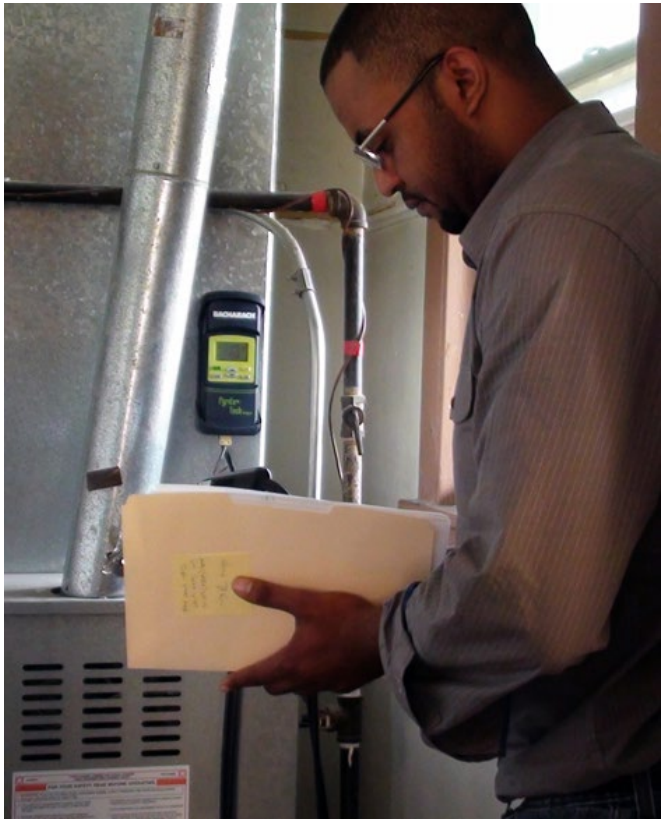
Energy Audit

- Building owner receives a FREE audit
  - Interview with owner and maintenance staff
  - Physical and visual analysis
  - Combustion tests
  - Walk-through of sample units
  - Assessment of roof and cavity
- Full report within 2 weeks



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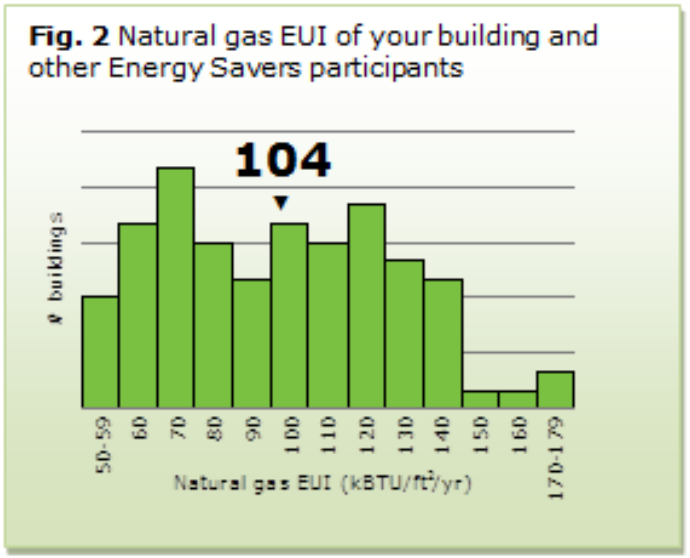
Utility Bill Analysis

- We request usage data from the utilities
- Calculate Energy Use Intensity (EUI)
  - A standardized measurement: kbtu/sf/year
  - Heating load (weather-normalized) vs. baseload



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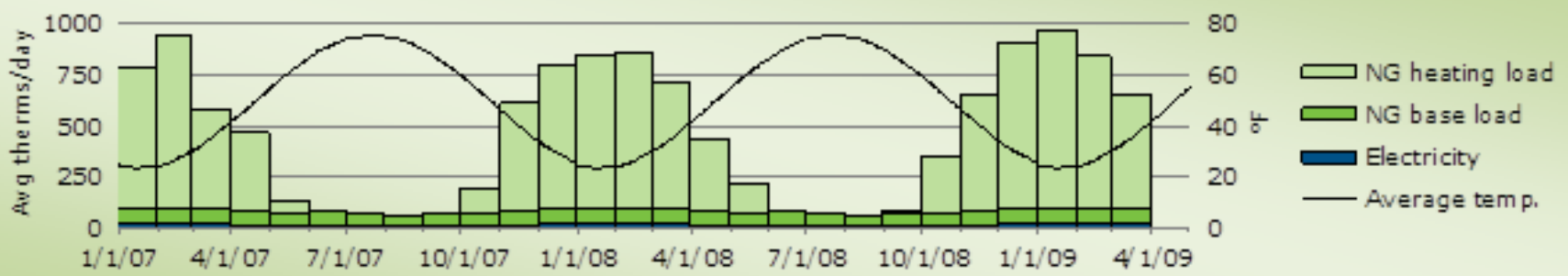
Utility Bill Analysis

Fig. 1 Billed energy use over the past two years, in average therms per day (1 therm = 29 kWh)



Source: Peoples Gas, ComEd

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Retrofit Calculator

- We use spreadsheet tools to choose the best retrofits for the building
- Cost-effective (SIR > 1) measures only
  - Thermal envelope
  - Heating system
  - Distribution and electrical equipment

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Retrofit Calculator

- An informed but “prescriptive” approach
  - Tailored for the building, but not modeling
  - Relying on program experience, homogeneity of the building stock
  - Using modeling software and post-retrofit analysis regularly to check assumptions
- Reduce time and cost to ramp up retrofits

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Roof Cavity: Air Seal & Insulate

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Roof Cavity: Air Seal & Insulate

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Mainline Steam Air Vents

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Furnace Replacement

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Furnace Replacement

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HHW Pipe Insulation

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HHW Pipe Insulation

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Steam & DHW Pipe Insulation

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Energy Assessment Report

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

Energy Assessment and Savings Opportunities

7301 S Rupert Ave
Chicago, IL 60696

Total projected energy cost savings: 46%

Estimated current yearly natural gas usage	**$18,871**
Estimated post-retrofit yearly natural gas usage	$10,246
Total yearly natural gas cost savings:	**$8,625**

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Energy Assessment Report

Table 1 Recommended retrofits

Recommendation	Cost ($)	Savings (therms/year)	Savings* ($/year)	Simple payback (years)	Retrofit lifetime (year)	SIR
1. **Roof Cavity**: Air-seal with foam & insulate to R-49 with blown-in cellulose	15,500	2,400	2,400	6.5	25	3.9
2. **Steam Piping**: Insulate header piping and all accessible uninsulated mainline supply steam piping	1,000	150	150	6.7	25	3.8
3. **Low-Flows and Aerators**: Install low-flow shower heads (1.5 GPM) and faucet aerators (1.5 GPM kitchen, 1.0 GPM bathroom)	1,600	590	590	2.7	10	3.7
4. **Air Venting**: Increase mainline air venting and replace any missing radiator air vents	2,000	500	500	4.0	10	2.5
5. **Boiler Replacement**: Replace steam boiler with a higher efficiency (83% AFUE) steam boiler, with header piping installed according to manufacturer specifications	30,000	2,800	2,800	10.7	15	1.4
6. **TRVs**:Install thermostatic valves wired to programmable thermostats in each unit	3,000	250	250	12.0	15	1.3
7. **Boiler Controls**: Install boiler controls with four indoor wireless sensors and an outdoor reset	4,000	360	360	11.1	12	1.1
TOTAL	**57,100**	**7,050**	**7,050**	**8.1**	-	-

* Assumes $1.00 per therm of natural gas.

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Energy Assessment Report

Table 2 Rebates for select measures †

Rebate	Estimated rebate ($)	Cost after rebate ($)	Cost reduction (%)	Simple payback after rebate (years)	SIR after rebate (years)
Roof cavity insulation Peoples Gas Prescriptive Rebates Program* Any existing insulation must be R-19 or less	1,800	13,700	12%	5.7	4.4
Steam pipe insulation Peoples Gas Prescriptive Rebates Program* Rebate is for $8 per linear foot	1,000	0	100%	-	-
Showerheads and aerators ComEd Small Business Energy Savings Program Fixtures are direct installed at no cost to owner**	Direct Install	0	100%	-	-
Mainline steam vents Peoples Gas Single Pipe Steam Rebate Program*** Rebate is for $50/unit, up to 75% of project cost	800	1,200	40%	2.4	4.2

† Rebate amounts are estimated. Actual rebate amount may vary according to eligibility.
* http://www.peoplesgasdelivery.com/business/pdf/rebates_prescriptive.pdf
** http://www.peoplesgasdelivery.com/business/rebates_direct.aspx

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Closing the Deal

- Strategies for working with owners
  - Simplify and streamline the process
  - Speak to their level of EE knowledge
  - Listen and respond to their needs and intentions

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Closing the Deal

- Strategies for working with owners
  - Connect owners with low-interest energy loans from our partner
  - Leverage available grant funds
  - Walk the owner through a real-world example to provide validation from the experience of other owners

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Construction Oversight

- Solicit bids from expert contractors
- Apply for utility rebates
- Oversee and inspect work for QA/QC

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Post-Retrofit Analysis

- Gather utility bill data at 1 and 2 years post-retrofit
- Calculate savings and post-retrofit EUI
- Inform building owner of their savings
- Use the results as a program
  - Verify measure savings
  - Improve our recommendations

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Case Study

- Year of construction: 1928
- Heat system: Steam boiler
- Seven-story brick building with 55 units, mostly studios
- Energy Assessment performed by CNT Energy in September 2009

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Before

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Energy Saving Improvements

- New steam boiler
- New boiler controls with indoor temperature sensors

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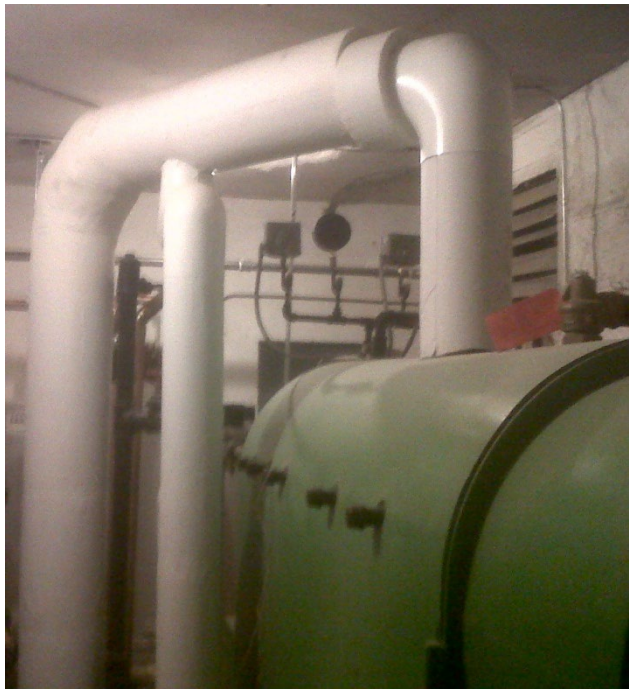
Energy Saving Improvements

- Replaced hot water heaters with high efficiency model
- Insulated heating pipes



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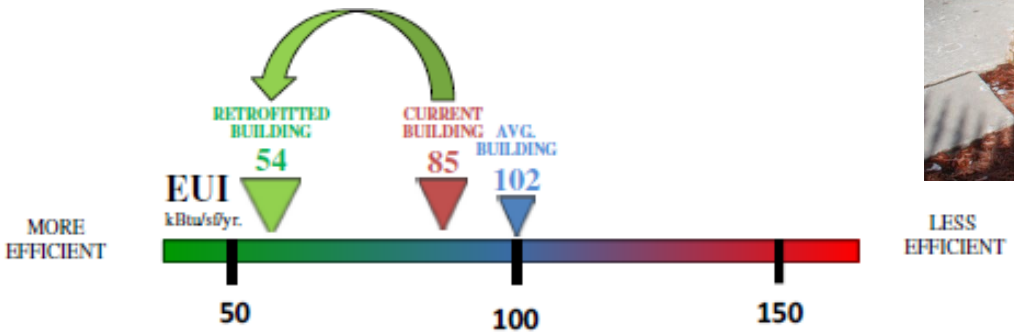
Savings

- 45% gas savings
- $21,600/year cost savings
- Simple payback based on actual savings to date: 4 years



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Questions?

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