

Efficiency Financing Works

Energy Efficiency Financing Seminar

Anchorage, AK

January 14, 2016

Andy Padian, President, PadianNYC Consulting

F.L.AndrewPadian@gmail.com

Who is this guy?

- ▶ I'm an energy and buildings geek
- ▶ I've spent the last 35+ years learning about why buildings go bad
- ▶ Started in policy, then energy, H+S, durability, sustainability, resilience, banking
- ▶ When I am at a building, I spend about the same amount of time with people as systems
- ▶ Owner+super+manager+occupants $\div 4 =$ near truth
- ▶ Today I want to talk about some things that I've learned

Agenda for Today

- Different types of financing
- Resource efficiency in buildings is not about sexy technology.
- Simple calculations of energy and resource efficiency.
- What that means directly in building cash flow and refinancing.
- Stop treating sustainability like a special case.
- Increasing energy efficiency of buildings, increases both the value of our buildings and the money in our pockets.

SURVEY!

- ▶ Owners of apartment buildings?
- ▶ Owners of commercial buildings?
- ▶ Utility employees?
- ▶ Engineers/Architects/Building Geeks?
- ▶ Policy/Government?
- ▶ Energy Auditors/Raters?
- ▶ Contractors?
- ▶ ESCO's?
- ▶ Other?





Technical Inefficiency

- 1. Tighten the buildings. Increase airsealing & firestopping in all apartment and common areas**
- 2. Good Systems. More efficient and properly sized heating, air conditioning, and hot water makers.**
- 3. Upgrade building controls. More efficient heating, cooling, and hot water controls**
- 4. Save Water. Better toilets, showerheads, aerators for water and hot water savings.**
- 5. Better Air. Upgrading of ventilation systems where present**
- 6. Brighter spaces. Complete apartment, common area, and exterior lighting retrofit**
- 7. Better Building Enclosure. Better specifications for windows and insulation**
- 8. Energy Star Appliances, Motors, elevators, lights, etc.**

Owner to Completed Project Psychology

- 9. Get Help from Building Professionals. You Don't Know Everything. Ask For Help. And Get Everyone Together in the same room to talk.**
- 10. Talk to your peers that can help. Better coordination with existing programs: State, Federal, Utilities**

Key Findings:

I. All Buildings

Figure 1: Overall Findings for 744 buildings (Audited and Benchmarked)

Total Square Footage	26,034,649 square feet
Annual Energy Consumption	3.26 trillion BTUs* of energy
Annual EUI Range	33,102 BTU/SF* – 1,973,345 BTU/SF*
Annual EUI Median	113,142 BTUs/SF*
Annual ECI Range**	\$0.68/SF – \$32.96/SF
Annual ECI Median**	\$4.31/SF
Square Footage Range	1,200 SF – 361,698 SF
Square Footage Median	19,332 SF
Building Age Median (All)	30 years
Building Age Median (Schools)	32 years

*British Thermal Unit

**Benchmark data not used in cost numbers

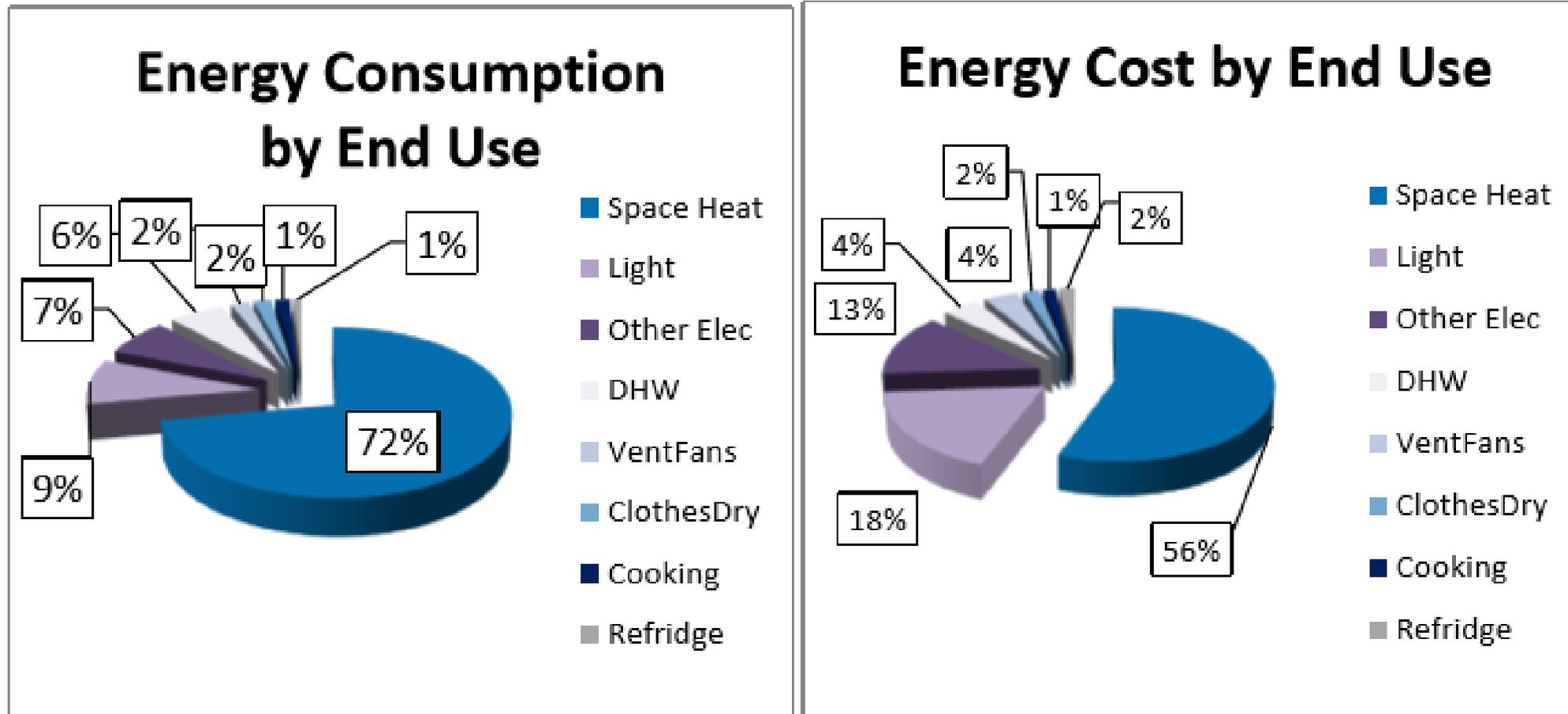
Source:
Energy
Efficiency
of Public
Buildings
in Alaska:
Metrics
and Analysis
11/21/14

Figure 7: ECI by Usage Type^A

USAGE TYPE	ECI ^A			
	AVG	MED	MAX	MIN
Athletics Facility	\$3.22	\$3.14	\$5.31	\$1.49
Education - K - 12	\$4.29	\$3.19	\$12.46	\$1.60
Health Care - Hospitals	\$5.37	\$4.13	\$8.76	\$3.22
Health Care - Nursing/Residential Care	\$1.36	\$1.36	\$1.64	\$1.07
Health Clinic	\$6.49	\$5.64	\$12.14	\$3.39
Maintenance/Shop	\$5.19	\$3.97	\$19.53	\$0.68
Office	\$5.09	\$4.71	\$10.39	\$1.25
Other	\$2.96	\$2.96	\$3.51	\$2.40
Pool	\$7.77	\$6.48	\$15.71	\$4.35
Public Assembly	\$3.99	\$2.69	\$9.69	\$1.79
Public Order and Safety	\$4.52	\$3.94	\$9.72	\$1.48
Terminals (Airport, Bus, Harbor, Train)	\$4.85	\$4.85	\$4.85	\$4.85
Warehousing and Wholesale	\$3.33	\$3.27	\$5.68	\$1.15
Washeteria / Water Plant	\$25.18	\$18.60	\$108.27	\$7.05

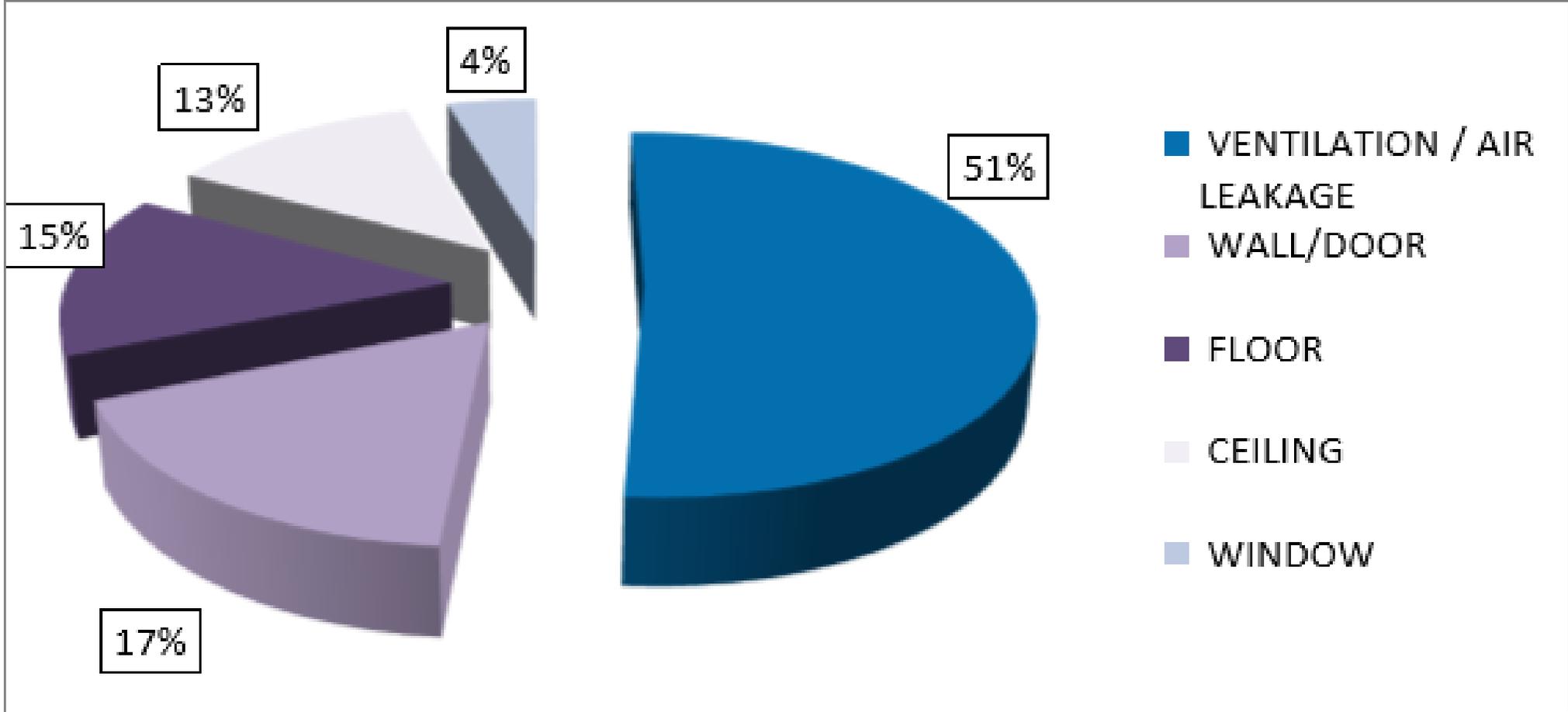
Source:
Energy
Efficiency
of Public
Buildings
in Alaska:
Metrics
and Analysis
11/21/14

Figure 9: Energy Consumption and Cost by End Use^A



Source:
Energy
Efficiency
of Public
Buildings
in Alaska:
Metrics
and Analysis
11/21/14

Figure 10: Space heat loss by component for all audited buildings^A



Source:
Energy Efficiency
of Public
Buildings
in Alaska:
Metrics
and Analysis
11/21/14

Some ideas when talking to *building owners/decision makers*

- ▶ Take them outside of their building
- ▶ Ask them to pretend they don't own/manage it
- ▶ Look around and point out stuff to them
- ▶ Think outside the box

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The central area is white, providing a clean space for the text.

Example of outside the
box just yesterday

Hybrid Vigor

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a dynamic, layered effect. The text 'Hybrid Vigor' is centered in a clean, sans-serif font, with the color matching the lighter green tones of the background.

Types of financing for buildings

- ▶ Government stipend/set aside (grant, not financing)
- ▶ Financing with government or utility rebate program (grant)
- ▶ Financing with a bank for people that own buildings
- ▶ Financing with an ESCO (public buildings)
- ▶ Cash from your pocket
- ▶ Other alternatives?

Buildings that are retrofitted
for energy efficiency
as part of refinancing
can save energy
if we target excessive usage
and retrofit accordingly.

“Why would a bank be interested in a building they’re loaning money to saving energy?”

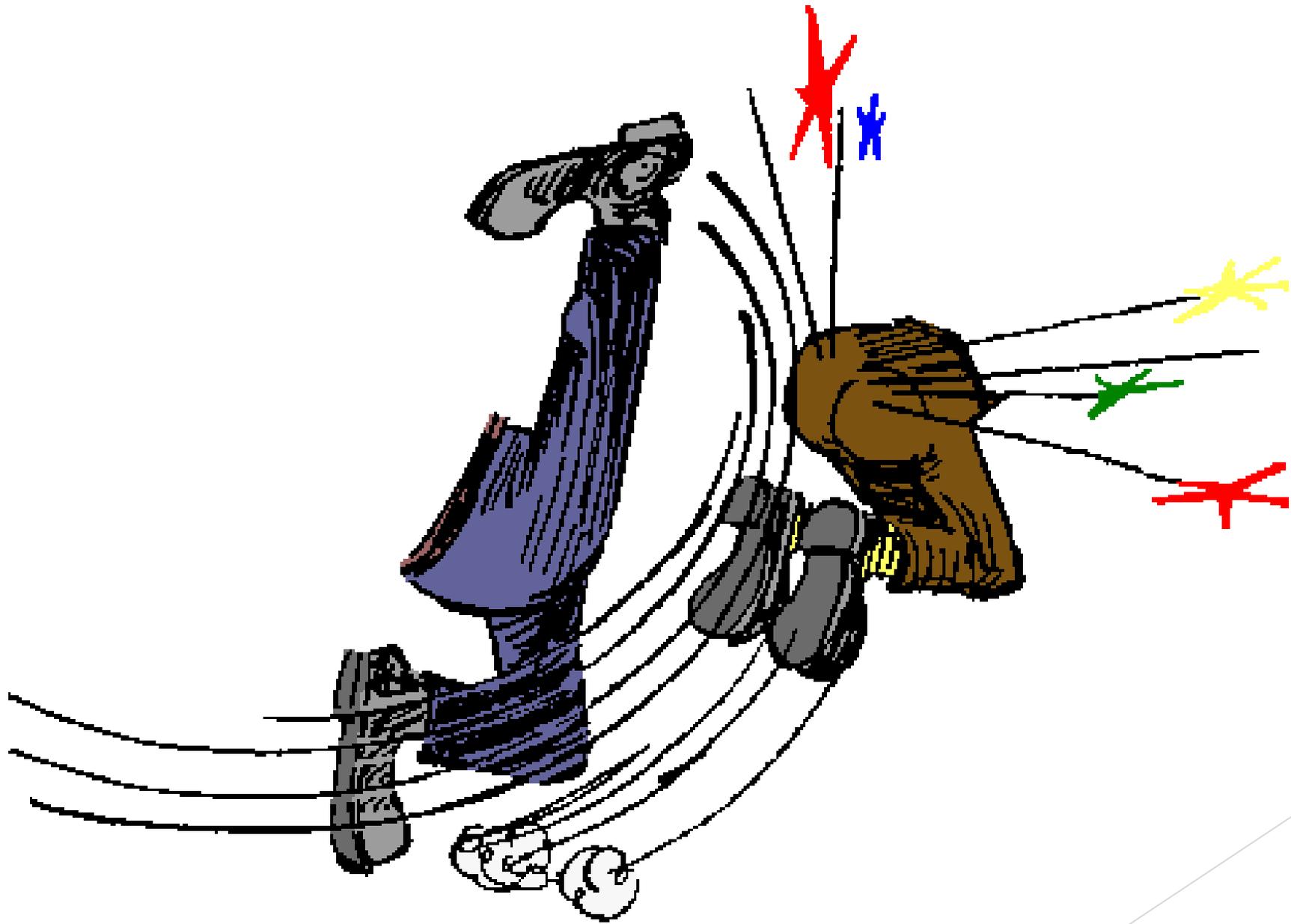
The answer came from Charles Ottoman (5th grade), who answered: “because they’ll save money in their building and be able to pay your loan back faster.”

How to get kicked out of a banker's office:

- ▶ “You just don’t understand this”
- ▶ “Deep energy retrofit”
- ▶ LEED, Energy Star™, PassivHaus, Green, etc.
- ▶ “I’m an expert!”
- ▶ Blower door analysis in CFM 50
- ▶ “We’re dense packing the walls”
- ▶ “Airsealing the building and the attic”

How to get kicked out of a banker's office: (part 2)

“We are doing a deep energy retrofit of this building, adding 4” of exterior insulation (or dense blowing the walls), moving a much smaller boiler to the roof and making it a condensing boiler, airsealing the apartments and the roof cavity, and reducing the water flow in the toilets, showers, and sinks.”



Let's Break This Down.....

- ▶ You're refinancing the debt on the building
- ▶ You're upgrading the firestopping throughout the building
- ▶ You're replacing the wall and roof insulation that has surpassed its useful life
- ▶ You're putting in a new boiler that will heat the building faster
- ▶ Installing high efficiency toilets and showerheads
- ▶ We have plans, specs, architect, engineer, Project Manager, and three bids

Economics of a 20 Unit Affordable Rental Building

- ▶ Income:
 - ▶ 20 units x \$1,000 = \$240,000 per year
- ▶ Expenses:
 - ▶ 20 x 4,500 per unit = \$90,000
 - ▶ 20 X 2,500 per unit taxes = \$50,000
 - ▶ Total Expenses = \$140,000
- ▶ Net Operating Income (NOI): \$100,000
 - ▶ \$240,000- \$140,000 = \$100,000

Affordable Rental Housing

- ▶ Net Operating Income - \$100,000
- ▶ Current property mortgage is \$1,200,000
- ▶ Apply the Debt Coverage Ratio (DCR)
 - ▶ Divide $\$100,000/1.25$
 - ▶ Available for Debt = \$80,000 a year
 - ▶ $\$80,000/12 =$ appx. \$6,500 monthly payment
 - ▶ 30 year loan at 5%
 - ▶ Annual Cash Flow: \$20,000 per year

Options for Financing Retrofit

- Cost of retrofit: $20 \times \$5,000 = \$100,000$
- Cash Flow = \$20,000 per year - only half for added debt service \$10,000
- Second mortgage options:
 - 5 years at 6% = \$43,000
 - 10 years at 8% = \$68,000
 - Need approval from first mortgage (not likely)
 - Adds a step and makes the process difficult

What is a Better Solution?

- ▶ Underwrite the savings into the first mortgage
- ▶ Expenses:
 - ▶ $20 \times 4,500$ per unit = \$90,000
 - ▶ Say 35% are for utilities: \$31,500
 - ▶ Projected savings of 20%: \$6,300
 - ▶ Additional monthly payment of \$525
 - ▶ Added to the 30 year first mortgage at 5% = \$98,000
- ▶ How to get lenders to adopt this simple approach?
 - ▶ Empirically prove that it is prudent to underwrite the savings

Recognizing the Benefits of Energy Efficiency in Multifamily Underwriting

January 2012



In conjunction with:



Prepared by:

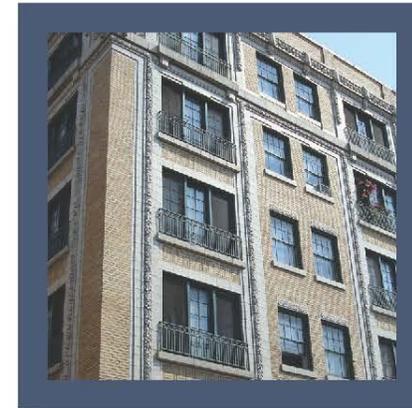
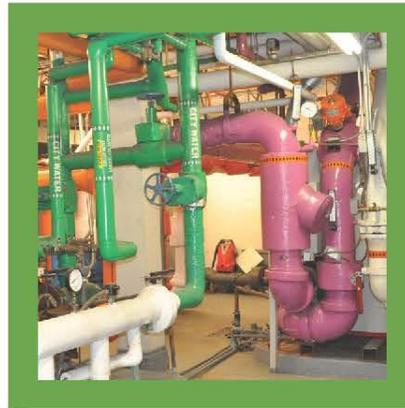
Steven Winter Associates
HR&A Advisors





Energy and Water Savings in Multifamily Retrofits

Results from the U.S. Department of Housing and Urban Development's
Green Retrofit Program and the Energy Savers Program in Illinois



Conclusion #1

1. Retrofits produced significant energy and water savings.

Conclusion #2

**2. Less efficient
properties achieved
higher
post-retrofit savings.**

Conclusion #3

3. Both energy and water retrofits were cost-effective (water was more cost effective and more predictable, fuel second, electricity third) and both energy and water savings vary widely at the individual property level.

Why Not Change the Mortgage System

- ▶ The majority of buildings have a mortgage
- ▶ Make standard long term financing the glue that brings it all together
 - ▶ If the financing requires it – it has to get done
 - ▶ Appraisal, environmental report, engineering report and an audit
- ▶ Create a new mortgage delivery system
 - ▶ Engage capitalism

Banking Transactions are about Risk

- ▶ Do you make enough money?
- ▶ Will the building have income?
- ▶ Expenses vs. income (we'll come back to this)
- ▶ How will income increase in the building?
- ▶ What are comparable buildings/rents?
- ▶ Who owns the title?
- ▶ Will the building last the length of the loan?
- ▶ Is there an environmental problem?

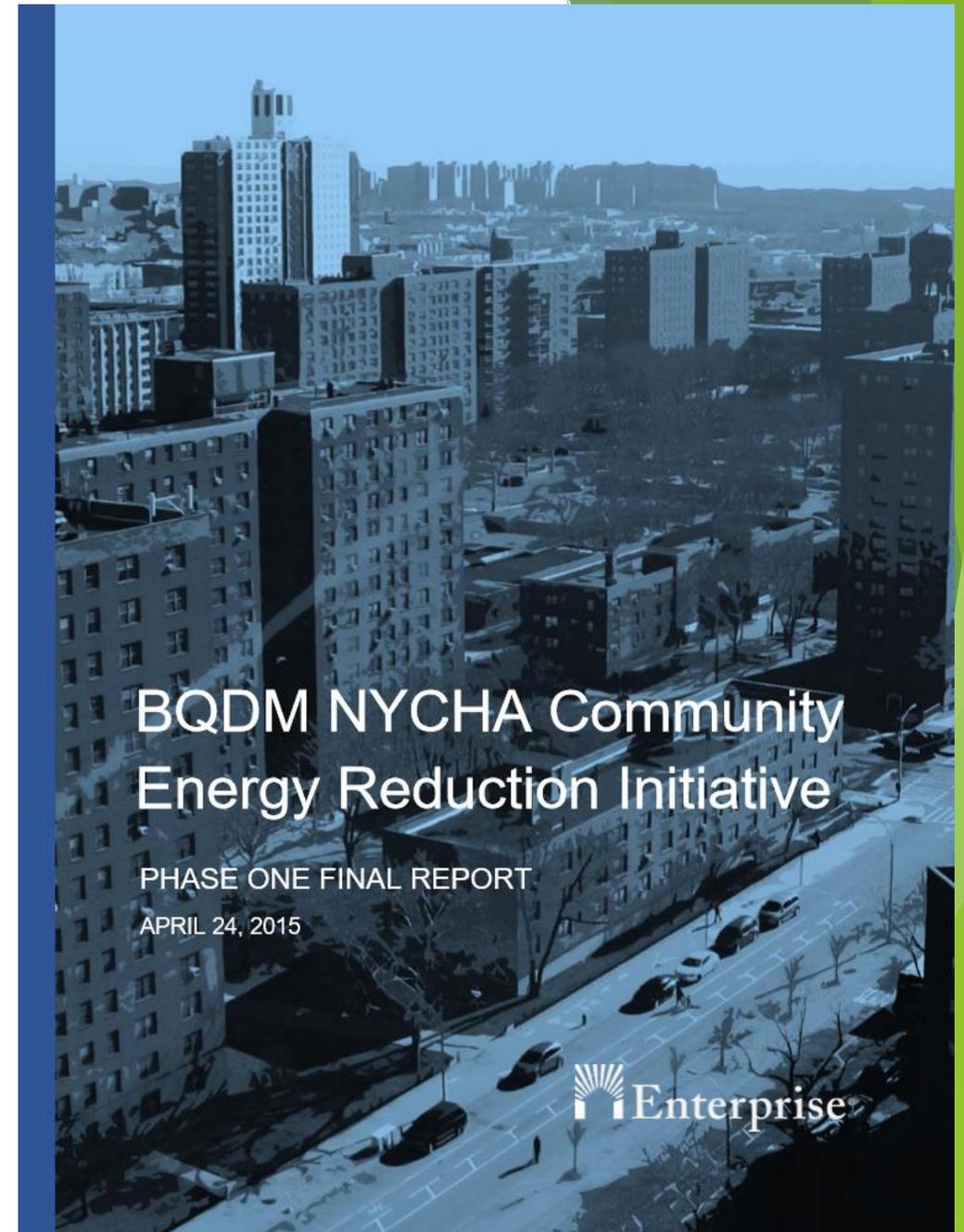
Energy Audits are about Improvement

- ▶ How much Energy/H²O does the Building Use?
- ▶ How can we reduce usage/increase cash flow?
- ▶ How will results be attained/exceeded?
- ▶ What are comparable usage in buildings?
- ▶ Who owns the building/who makes decisions?
- ▶ Will the building last/can we increase its life?
- ▶ Is there an environmental problem?

Bad Words in Energy Efficiency Finance

- ▶ Payback
- ▶ Free Energy Audit
- ▶ Green
- ▶ Carbon

Negawatts vs. Megawatts



BQDM NYCHA Community Energy Reduction Initiative

PHASE ONE FINAL REPORT

APRIL 24, 2015



Table 1: Highest-impact Peak Demand Reducing Measures, Ordered by Magnitude of Reduction

PDRM Description	PDR (kW)	As % of total
4-C. Apartment AC replacement/demand response	4473	42.9%
2-B. Apartment lighting upgrade	1905	18.3%
1-A. LED Hallways/Stairwells	846	8.1%
3-A. AC upgrade, Community Centers	670	6.4%
2-C. Install new electric box (breakers), install power measuring device	659	6.3%
4-B. Apartment cable box replacement	310	3.0%
4-D. Resident energy conservation education	279	2.7%
5-A. Staff energy conservation education	263	2.5%
8-A. Roof insulation, resurface, reflective coating	210	2.0%
8-C. Exterior Walls	194	1.9%
1-D. LED upgrade, Community Centers	158	1.5%
Total	9966	95.6%

One Really Crazy Idea:

Become an ESCO

Another Really Crazy Idea:

Talk to a banker

Some Crazy Ideas:

- ▶ RCA Institutional barriers to Generation (PV, CHP, Cogen)
- ▶ Regulatory Commission of Alaska (listed by Google as a library)
- ▶ You are their constituents
- ▶ Encourage utilities to invest in energy efficiency
- ▶ Upgrade the grid and prepare to pay for it
- ▶ Encourage microgrids

Thank you for
your time!