

# DAN LECKIE FORUM 2007

## Energy Efficiency Retrofits In Residential High Rise Buildings

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Finn Projects  
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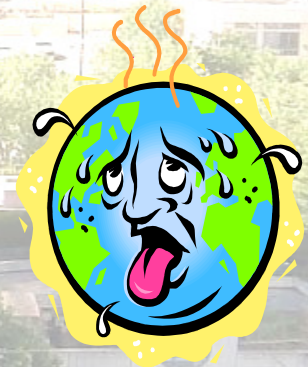
DAN LECKIE FORUM 2007

# FINN PROJECTS

- Established 1990
- Energy Auditing
- Engineering Design, Drawings, Specifications for Energy Efficiency Retrofits
- Project Management of Energy Efficiency Retrofits
- Training & Awareness Programs
- Monitoring & Verification of Energy Savings

# WHY EMBARK ON ENERGY EFFICIENCY?

- Reduce Annual Operating Costs
- Generate Building Renewal
  - *with a Return on Investment*
- Lower Maintenance Costs
- Improve Indoor Environment
- Reduce GHG
- Conserve Our Resources



# START THE PROCESS – ENERGY AUDIT

Select an  
Energy  
Auditor



Conduct  
Energy Audit



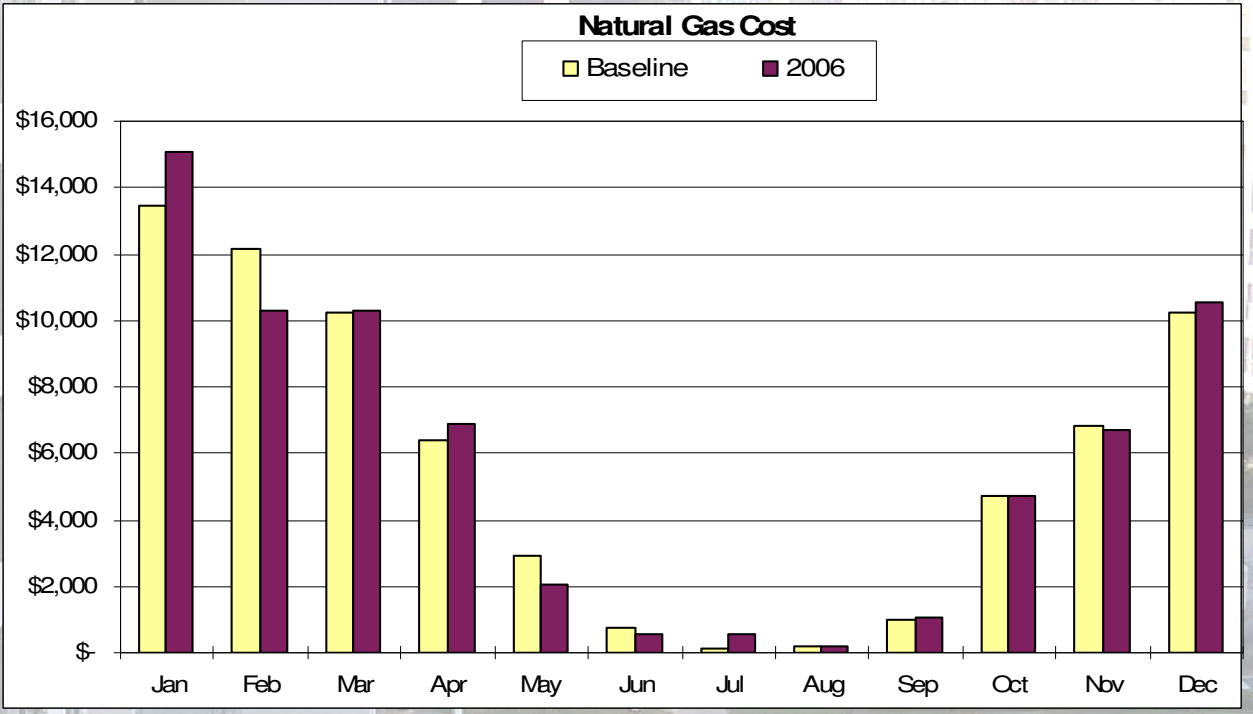
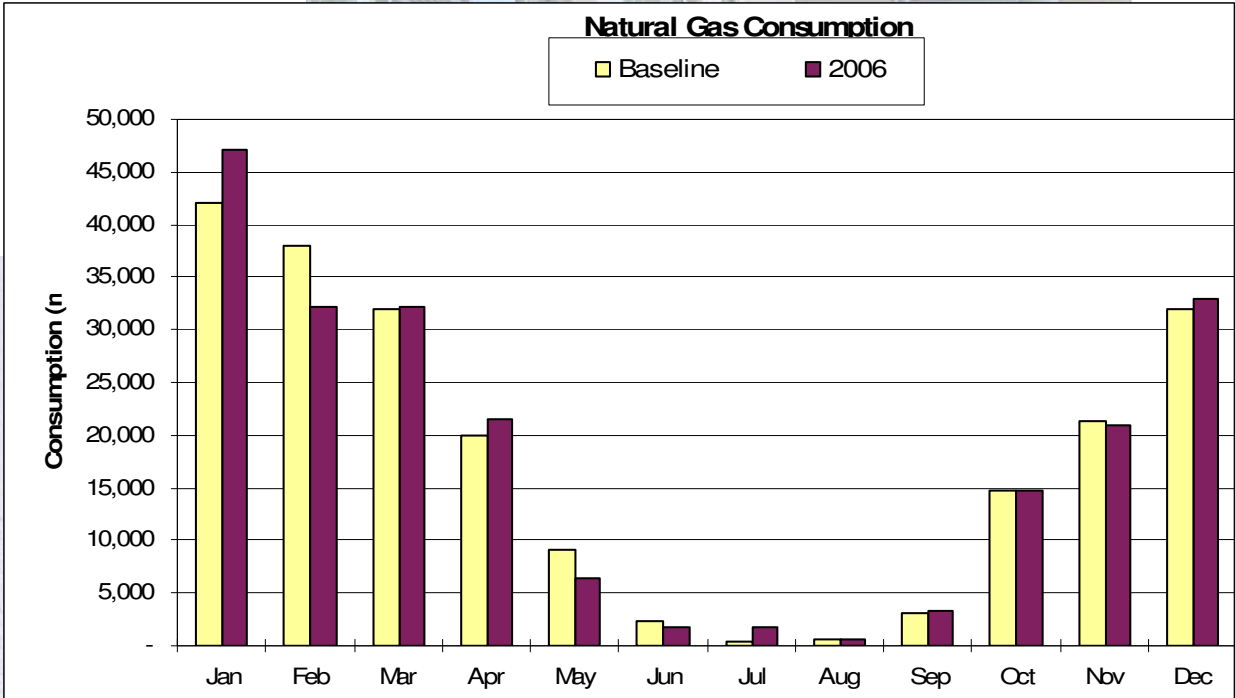
Establish  
Energy  
Baselines

Considerations for Selection:

- Experience
- Ability to provide Engineering Design & Specifications for the Measures
- Ability to provide Project Management for Implementation

# Establish Weather-Corrected Energy Baselines

If you don't know where you've been, how do you know where you're going?

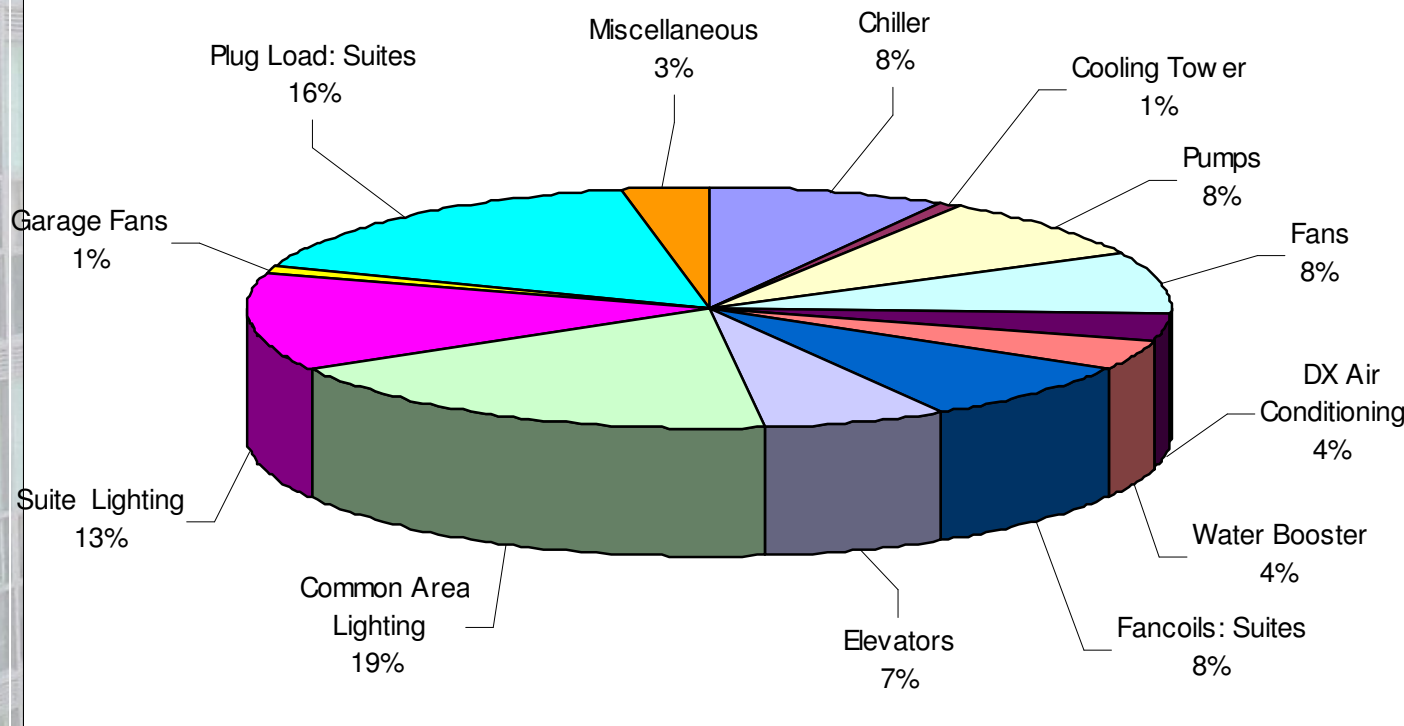


# SITE ENERGY & WATER AUDIT

- Mechanical Systems
- Lighting Systems
- Building Envelope
- Water Consuming Equipment & Systems
- Controls
- Hours of Operation
- Operating Parameters
- Interview Operating & Maintenance Staff

# ENERGY END USE INVENTORY

**Hydro Usage Breakdown**



# THE ENERGY AUDIT REPORT

Energy Audit  
Report



Select  
EE  
Measures



Commitment  
to Proceed

Have a Comprehensive  
vision:

- Look at Overall Payback, not just each item
- Opportunity to make Capital Expenditures with a Payback!
- Owner Approval, Financing Solution

ENERGY CONSERVATION MEASURES	ANNUAL HYDRO SAVINGS (kWh)	ANNUAL GAS SAVINGS (m3)	ANNUAL COST SAVINGS (\$)	CAPITAL COST ESTIMATE (\$)	SIMPLE PAYBACK (years)	FINANCED PAYBACK PERIOD (years)
Conversion of Make-up Air Units to Glycol Heating & Cooling with VFDs	149,697	103,696	\$56,448	\$180,000	3.2	3.7
Install New High Efficiency Heating Boiler Acting as a Lead Boiler - Heating System		62,441	\$24,976	\$85,000	3.4	4.0
Install New High Efficiency Condensing Boiler Acting as a Lead Boiler - DHW System		29,023	\$11,609	\$61,000	5.3	6.8
Carbon Monoxide CO System to Control Exhaust Fans in the Parking Garage	69,842		\$6,984	\$27,000	3.9	4.6
Install VFD on Domestic Cold Water Booster Pumps	64,574		\$6,457	\$18,800	2.9	3.3
Install VFD on Cooling Tower Fan Motor	19,222		\$1,922	\$23,000	12.0	39.5
Install VFD on Existing Chiller Motor	76,000		\$7,600	\$80,000	10.5	23.1
Chilled Water Temperature Reset	10,000		\$1,000	\$5,000	5.0	6.4
Upgrade of existing Building Automation System	35,369	5,966	\$5,923	\$58,000	9.8	19.2
Whirlpool and Swimming Pool Covers		1,927	\$771	\$3,500	4.5	5.7
Lighting Retrofit	130,676		\$13,068	\$42,100	3.2	3.7
Low Flow Showerheads		14,174	\$8,762	\$2,400	0.3	0.3
Training and Education	35,369	5,966	\$6,614	\$5,000	0.8	0.8
Potential Rebate: Enbridge Gas \$ 0.10/ m <sup>3</sup>				-\$22,319		
<b>TOTAL</b>	<b>590,748</b>	<b>223,193</b>	<b>\$152,135</b>	<b>\$568,481</b>	<b>3.7</b>	<b>4.5</b>
<b>Energy Baseline</b>	<b>3,536,895</b>	<b>596,593</b>	<b>\$592,926</b>			
<b>Percent Reduction</b>	<b>17%</b>	<b>37%</b>	<b>26%</b>			

# DESIGN & CONSTRUCTION PHASE

Eng. Design,  
Drawings,  
Specifications



Tender,  
Receive Bids,  
Awards



Implementa-  
tion

Competent, Experienced  
Engineering Services:

- Functional Design
- Competitive Tenders
- CCDC-2 for lump sum
- Project Management
  - Scheduling
  - Contract Administration
  - Costs Control
  - Commissioning

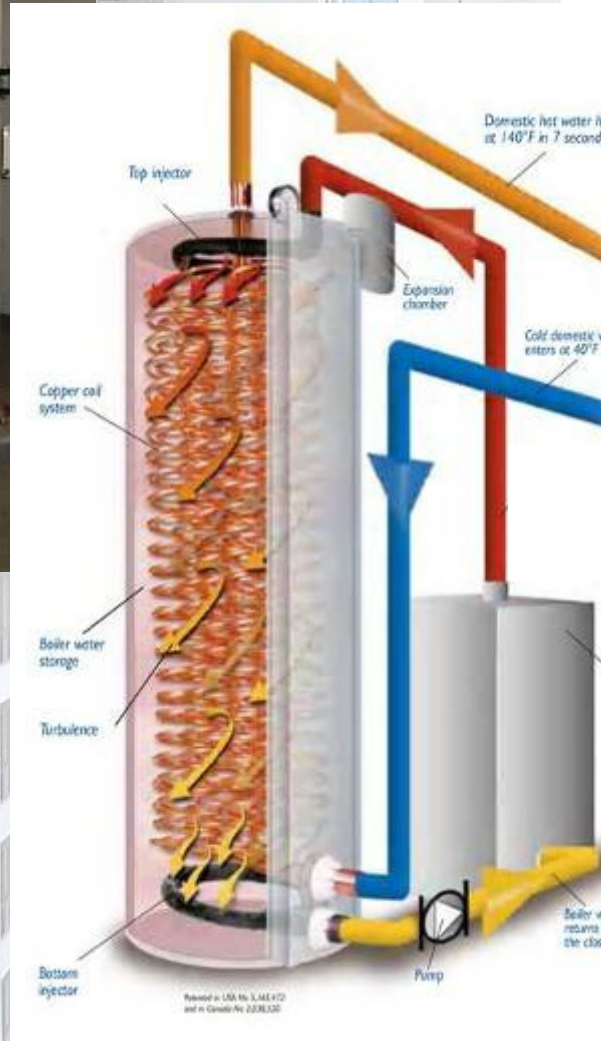
# Make-up Air Unit Retrofit



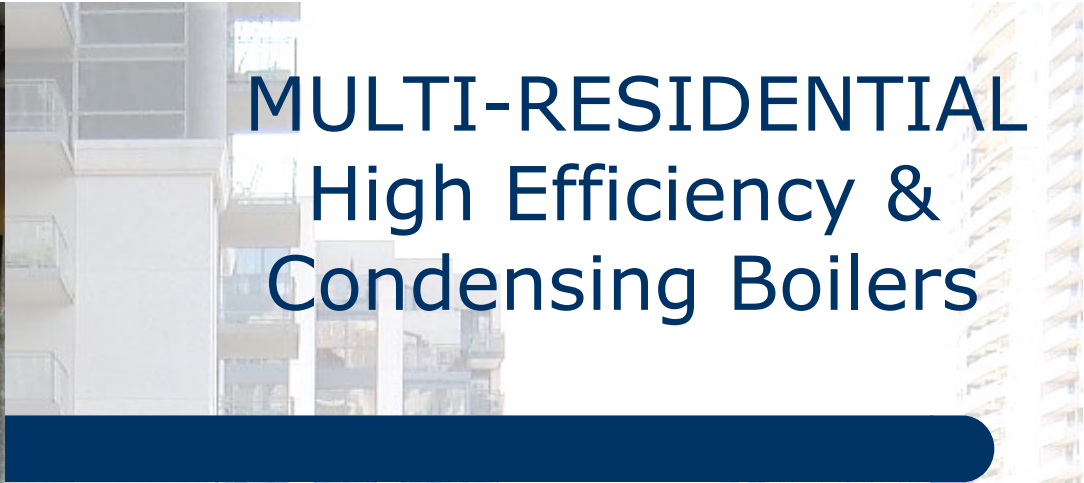
# Hotel Boiler Plant - BEFORE



# Hotel Boiler Plant - AFTER



# MULTI-RESIDENTIAL High Efficiency & Condensing Boilers



# Solar Wall & Make-up Air Ductwork



# Lighting

EXIT



# TURNOVER PHASE

Commissioning



Training  
&  
Awareness

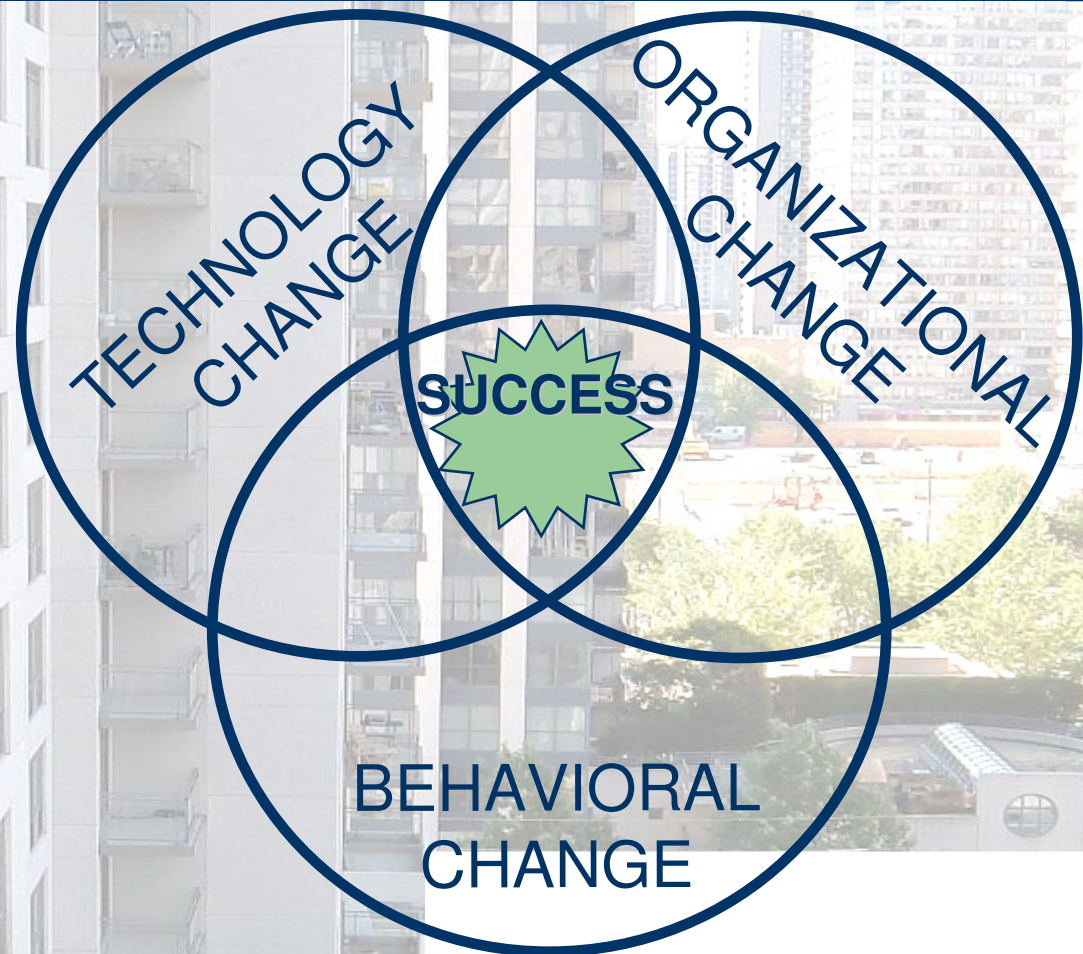


Monitor  
Monthly  
Savings

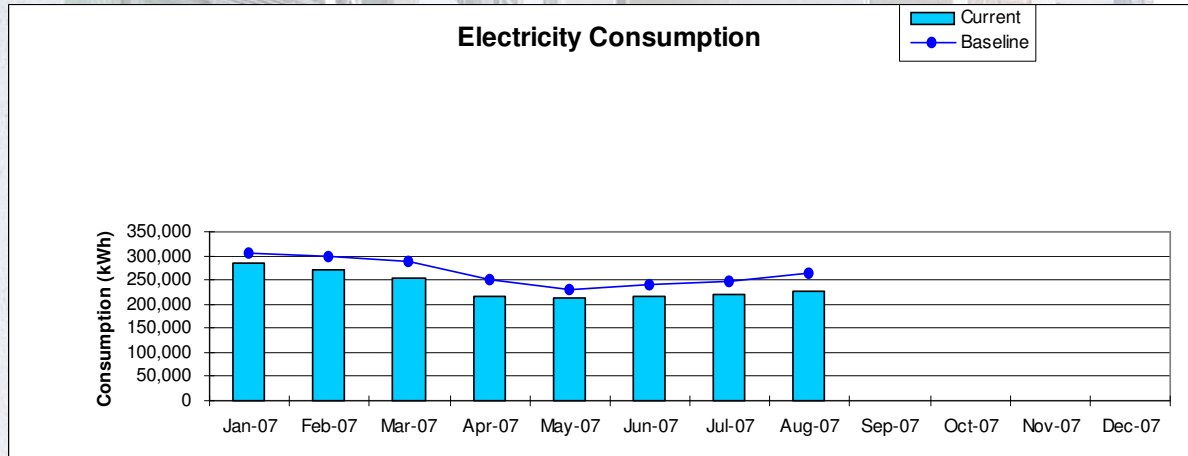
Critical, sometimes overlooked, items:

- Final commissioning to ensure the systems operate as designed
- Training for operators & energy awareness program
- Compare against the energy baseline established in the Energy Audit

# THE CHALLENGE

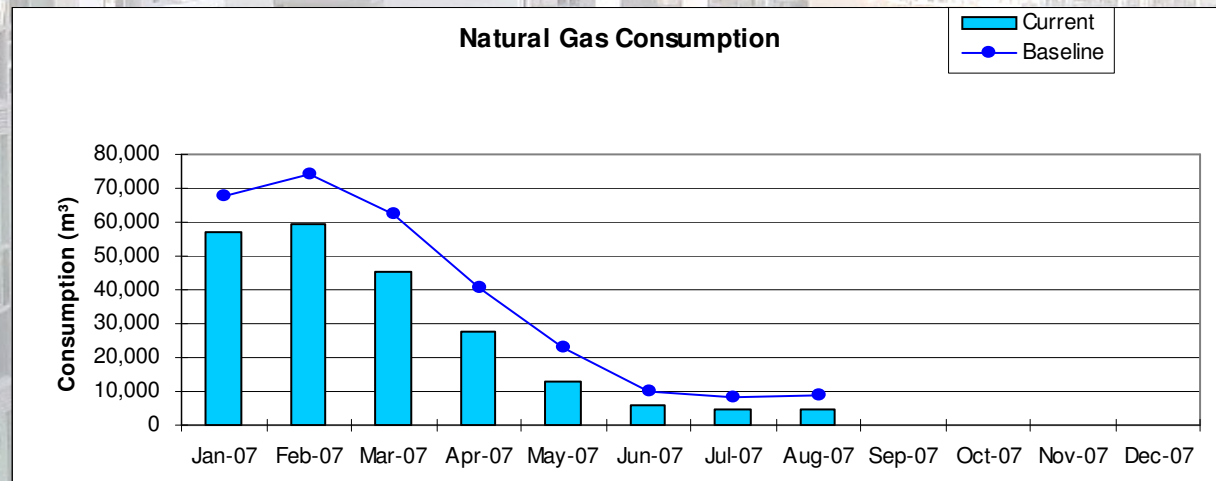


# MULTI-RESIDENTIAL Energy Retrofit I



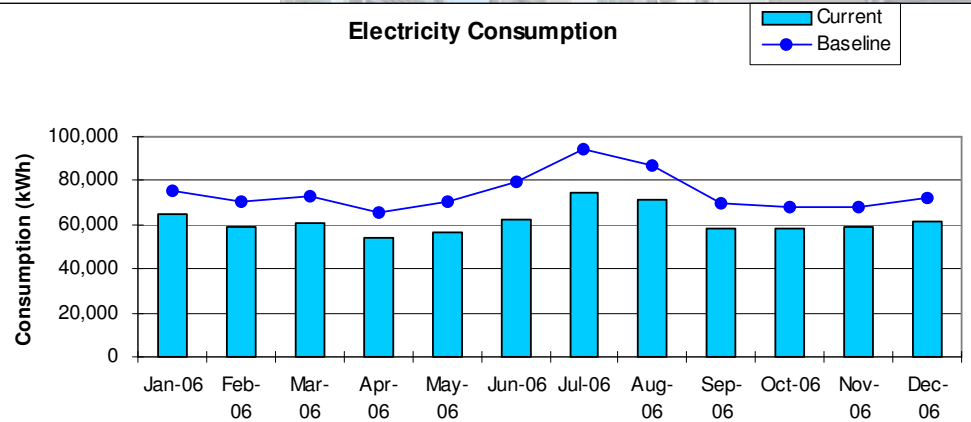
2007 Electricity Savings  
**11%**

2007 Gas Savings  
**27%**



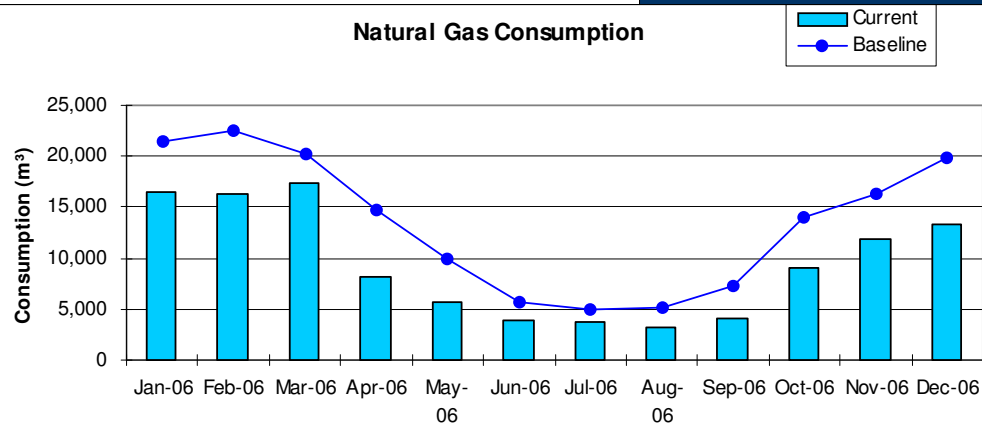
# MULTI-RESIDENTIAL Energy Retrofit II

**Electricity Consumption**



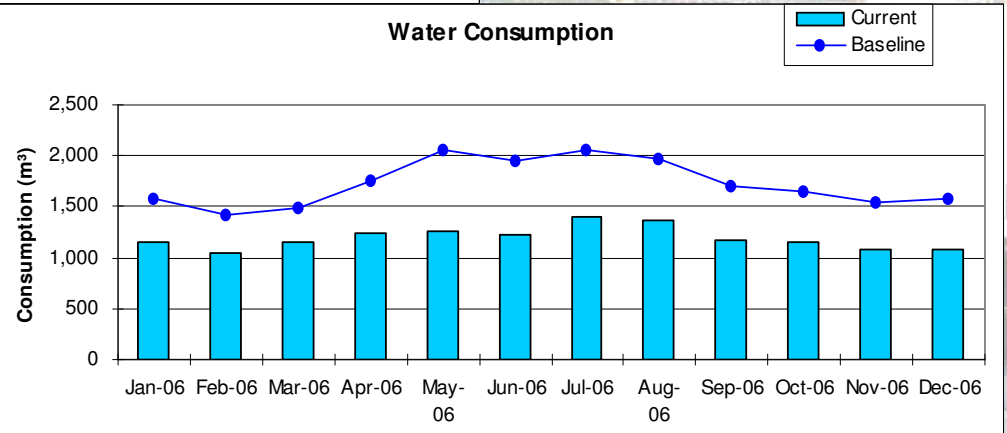
2006 Electricity Savings  
**17%**

**Natural Gas Consumption**



2006 Gas Savings  
**30%**

**Water Consumption**



2006 Water Savings  
**31%**

# Thank You

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