

EFFICIENCY CITIES NETWORK

Aug 4, 2009

3pm EDT

Determining Metrics for Success

Moderators:

Joel Rogers, Director of Center on Wisconsin Strategy (COWS)

Satya Rhodes-Conway, Administrator of Efficiency Cities Network (ECN)

Agenda

- Welcome and intro (5 min)
- Presenters (30 min)
 - Anne Evens, Center for Neighborhood Technology
 - Jeff Perlman, Bright Power
 - John Picard, Zero Plus
 - Jim Meacham, CTG Energetics, Inc.
 - Ron Herbst, Deutsche Bank AG London
- Questions and discussion (50 min)
- Next call
 - Tuesday August 18, 3PM EDT, Certifying auditors and contractors - TENTATIVE



Energy Efficiency Metrics Multifamily Examples

Efficiency Cities Network

August 4, 2009

Jeff Perlman, CEM, LEED, BPI/MFBA

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Greening Existing Buildings

1. Benchmark

- Evaluate the building's current performance using historical utility bills

2. Audit

- Assess the building's systems for greening and efficiency opportunities – on site visit + audit report

3. Finance

- Figure out how to pay for energy and green retrofits

4. Retrofit

- Make improvements to the building

5. Verify

- Monitor the building's post-retrofit performance to evaluate success



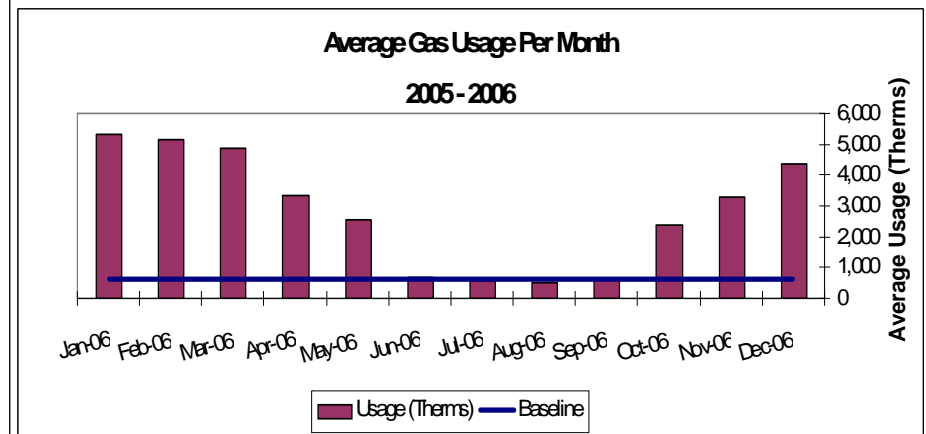
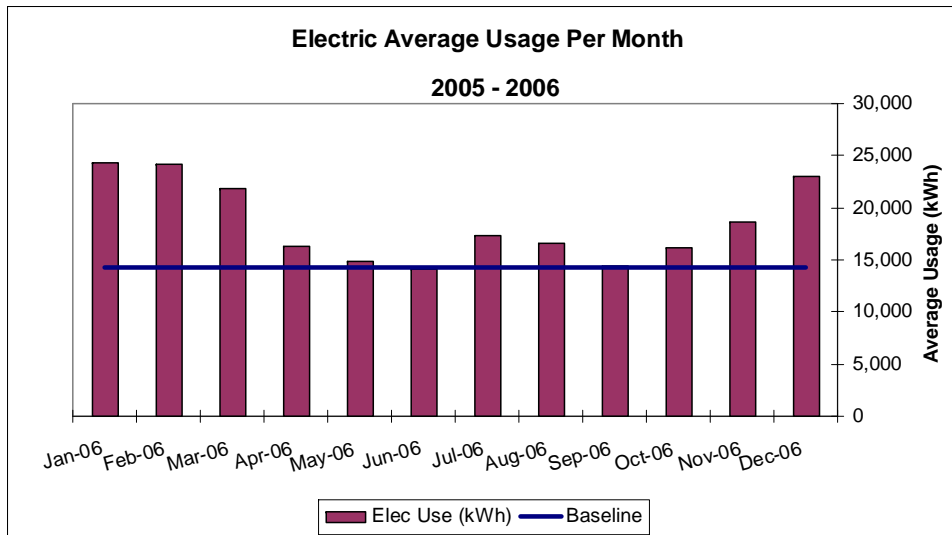
Data Needs and Wants

- Required
 - Utility Bills
 - And to which spaces they provide energy
 - Weather Data
 - Property Information
 - Size and occupancy
 - Production information (if manufacturing)
- Potentially Helpful
 - Energy Management System
 - Smart Meters

1. Benchmark From Utility Bills

Common Area Electric	Acct #: 407350610			
<i>Date</i>	<i># of Days</i>	<i>Usage (kWh)</i>	<i>Demand (kW)</i>	<i>Amount</i>
Jan-07	31	28697	65.2	\$5,056
Dec-06	31	22858	64.6	\$3,897
Nov-06	30	18533	56.5	\$3,248
Oct-06	31	16042	40.0	\$2,796
Sep-06	30	14436	36.3	\$2,538
Aug-06	31	16661	41.8	\$2,887
Jul-06	31	17205	43.5	\$2,928
Jun-06	30	14087	38.8	\$2,399
May-06	31	14855	37.6	\$2,476
Apr-06	30	16444	41.5	\$2,789
Mar-06	31	22088	53.5	\$3,713
Feb-06	28	24024	62.9	\$3,853
1 Year Total	365	225930	48.5	\$38,581

Gas	Acct #: 407010004		
<i>End Date</i>	<i># of Days</i>	<i>CCF</i>	<i>Amount*</i>
Jan-07	31	5092	\$5,633*
Dec-06	31	4326	\$4,785*
Nov-06	30	3270	\$3,617*
Oct-06	31	2335	\$2,583*
Sep-06	30	572	\$633*
Aug-06	31	522	\$577*
Jul-06	31	586	\$648*
Jun-06	30	655	\$725*
May-06	31	2586	\$2,861*
Apr-06	30	3393	\$3,753*
Mar-06	31	4939	\$5,464*
Feb-06	28	5195	\$5,747*
1 Year Total	365	33471	\$37,025*





Building Benchmarks

- **Total Energy Usage Index (kBTU/sf/yr)**
- **Heating Index (BTU/sf/HDD)**
 - Weather-normalized
- **Cooling Index (BTU/sf/CDD)**
 - Weather-normalized
- **Hot Water Index (mmBTU/bedroom/yr)**
- **Electricity Index (kWh/unit/yr)**
 - Baseload usage only

“Baseload” = non-seasonal consumption

YEAR BUILT	2004	CITY	Albuque
MOST RECENT RENO/REHAB	n/a	STATE	NM
TOTAL CONDITIONED SQFT	17,300	CLIMATE ZONE	3
COMMON AREA SQFT	2600 (estimated)*	OCCUPANCY TYPE	Elderly
UNITS	60		
BEDROOMS	61		
PAYMENT TYPE	000	Owner pays cooling, heating and hot water	
FUEL TYPE	EEG	Electricity used for cooling and heating, gas used for hot water	

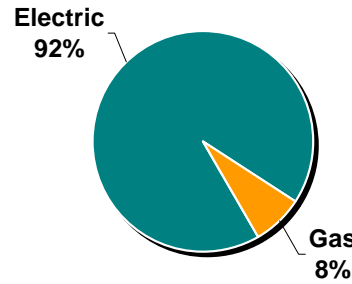
Energy Score Card:

Metric name	Units	Notes	Percent
Owner Energy Spend / sqft	\$2.35 \$/sqft/yr	Calculated for total sqft	
Owner Energy Spend / unit	\$677 \$/unit/yr		
Owner Energy Index	96 kBTU/sf/yr	Only includes bills paid by owner	
Baseload Electric Index	4576 kWh/unit/yr		
Cooling Index	4.2 BTU/sf/CDD		
Heating Index	4.7 BTU/sf/HDD		
Domestic hot water	4.3 mmBTU/bedroom/yr		

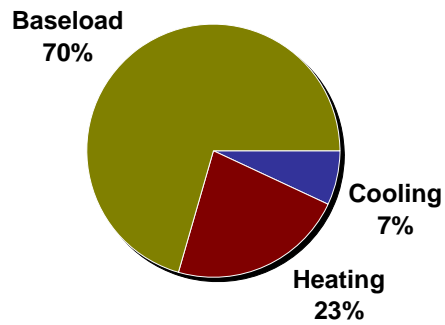
Energy Use and Cost: Most Recent 12 months * Projected Annual Consumption **

Date Range	06/01/2008 - 05/31/2009	n/a
Electricity Usage	378,452 kWh	388,459 kWh
Electricity Cost	\$37,300	\$37,555
Natural Gas Usage	3,140 therms	3,269 therms
Natural Gas Cost	\$2,593	\$3,051
Total Cost	\$39,893	\$40,606
Carbon Footprint	540,829 lbs of CO2	555,684 lbs of CO2

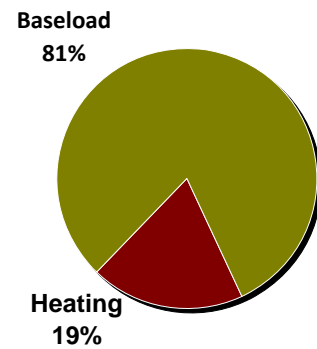
Fuel Usage by Cost



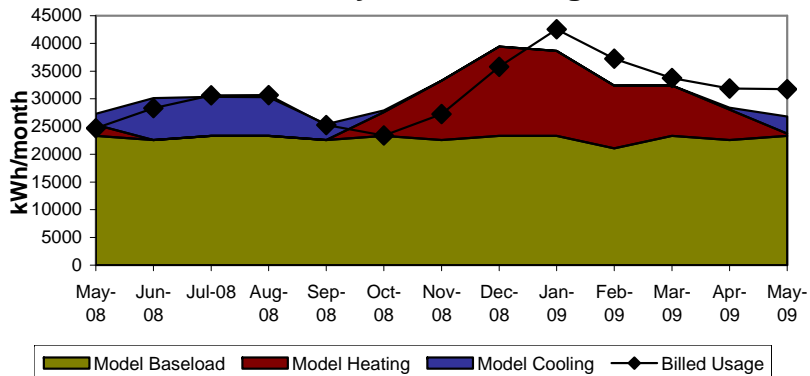
Electric Usage by End Use



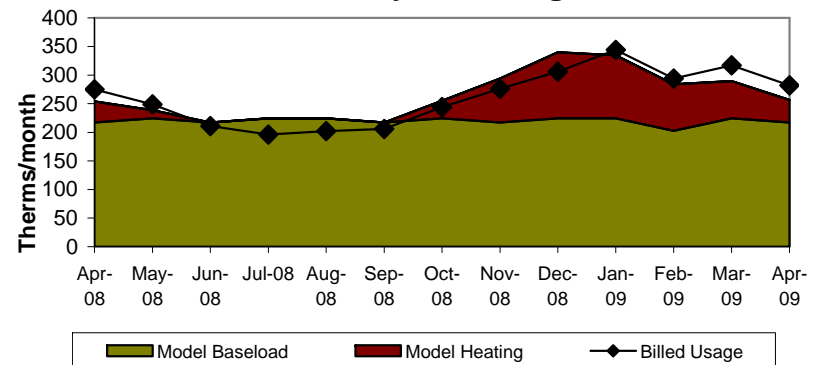
Gas Usage by End Use



Monthly Electric Usage

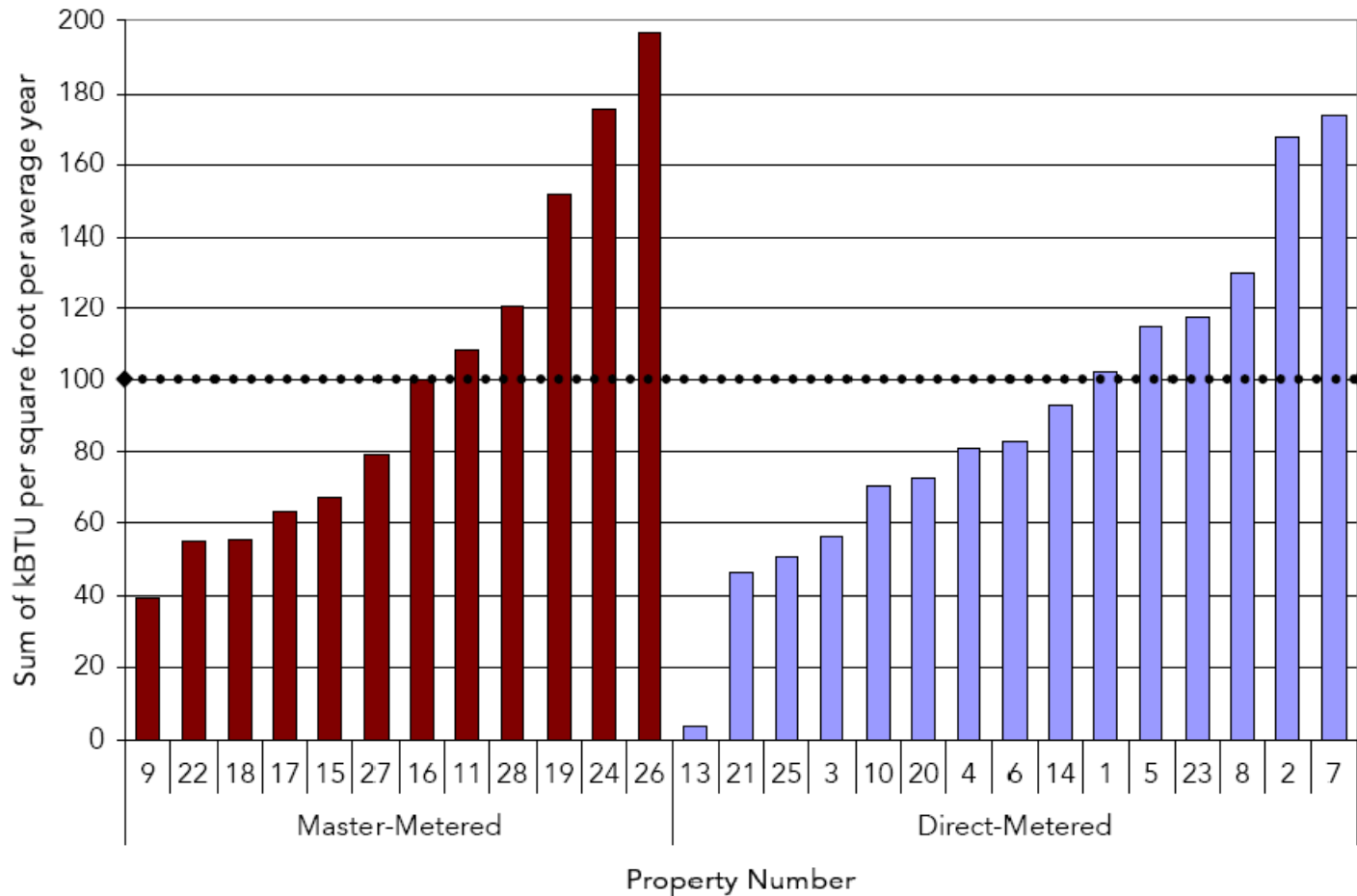


Monthly Gas Usage

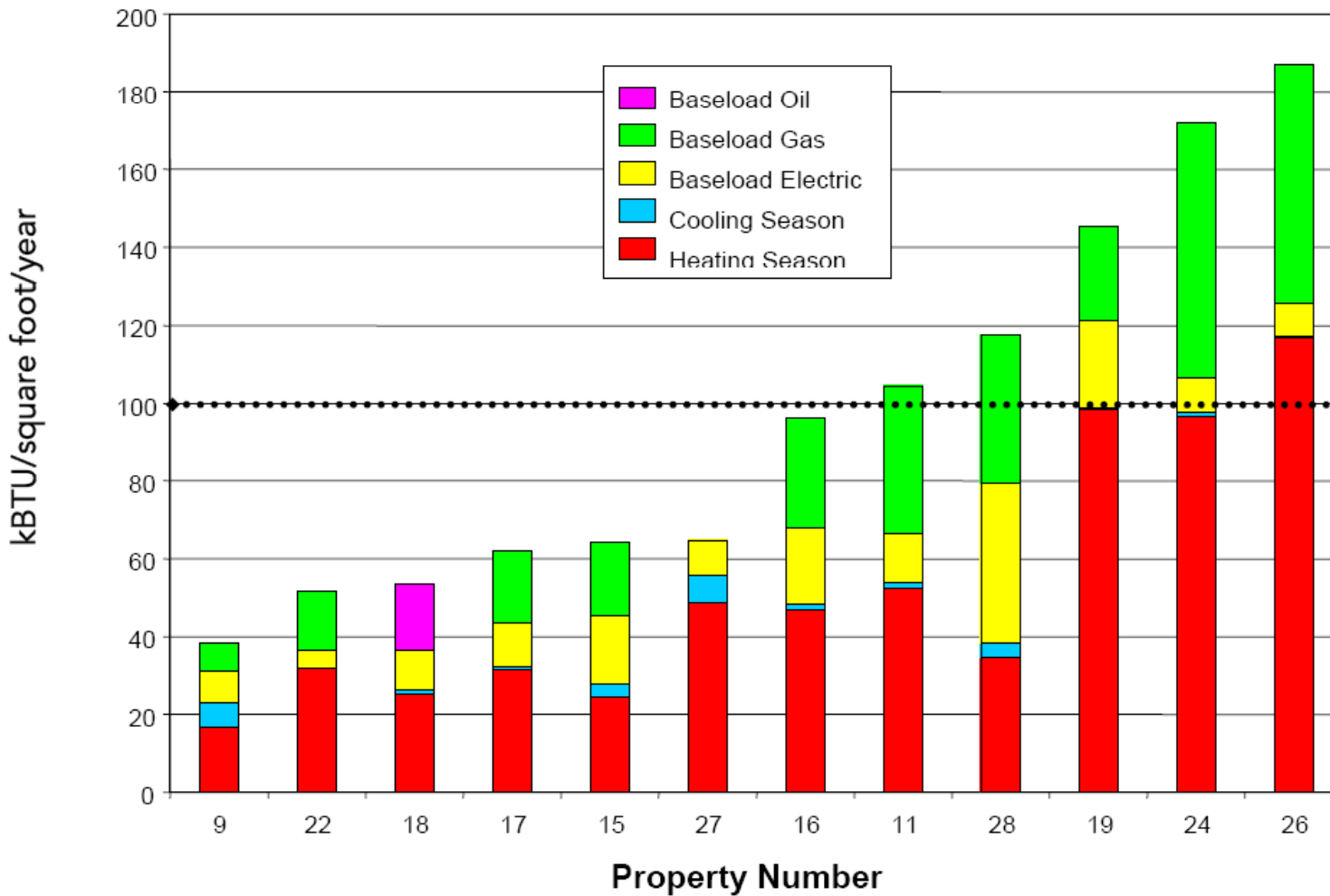


Comparing Across a Portfolio

Total Energy Usage (kBTU/sq ft/year)

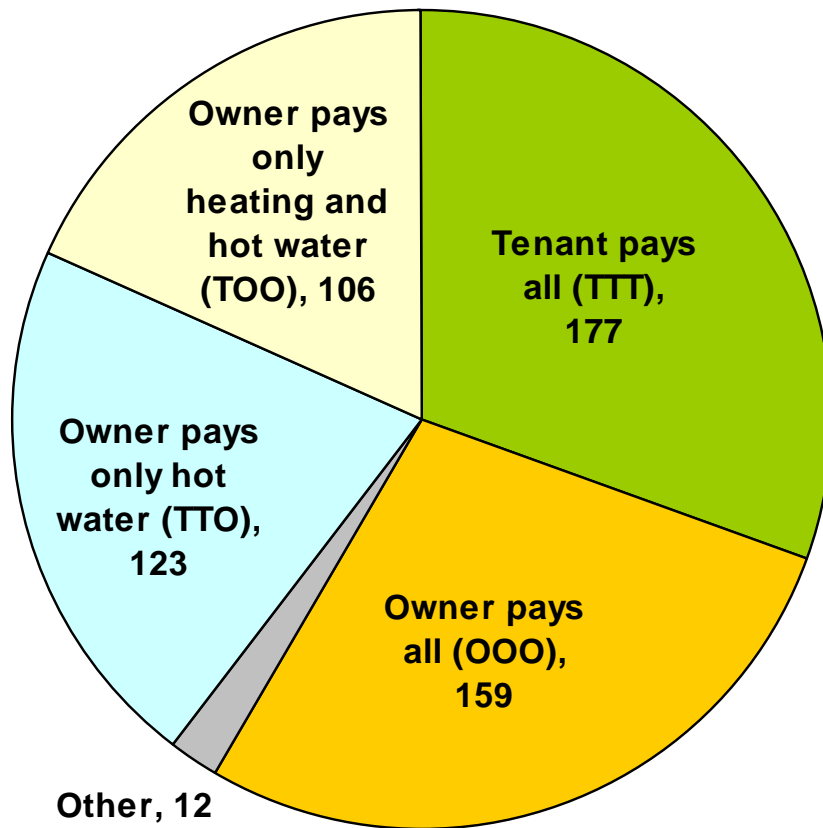


Compare by Energy End Use



Energy Payment Profiles (sample)

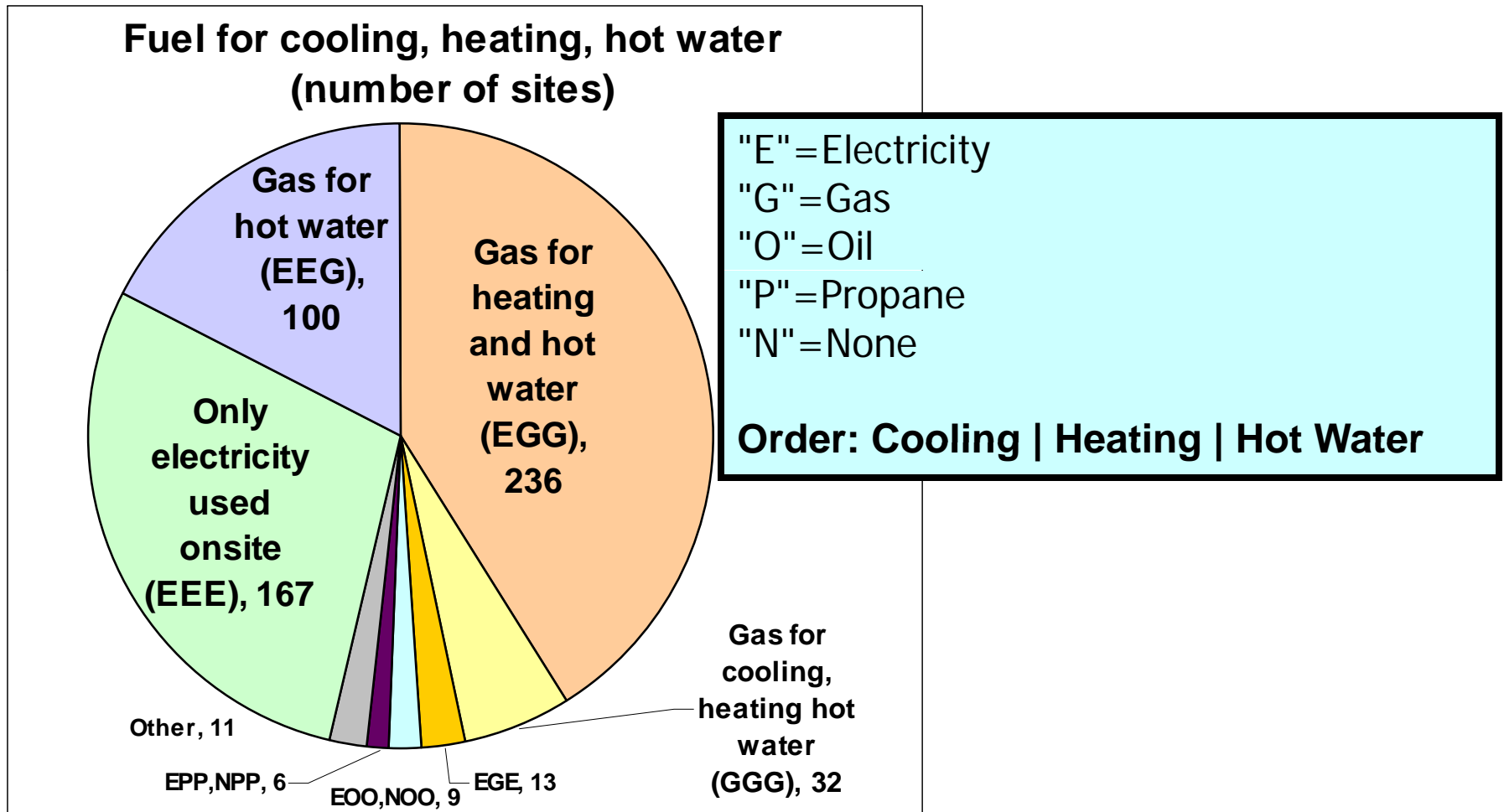
Who Pays for Cooling, Heating and Hot Water (number of sites)



"O" = Owner pays
"T" = Tenant pays
"N" = None

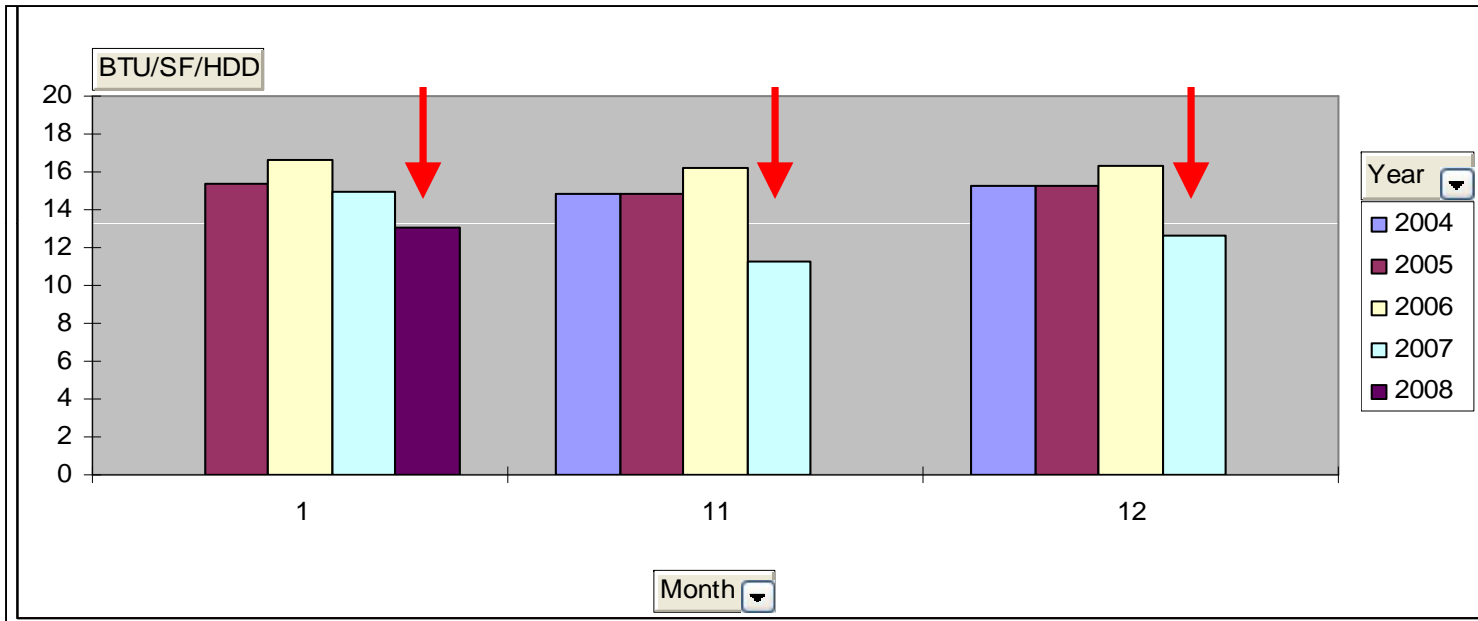
Order: Cooling | Heating | Hot Water

Fuel Use Profiles (sample)



5. Verify

- Weather-normalized comparison (new boiler)



	Average Monthly Heating Index (BTU/ft ² /HDD)	Average Annual HDD	Building SF	Total Heating Therms
Before Upgrades	15.59	4,880	18,877	14,366
After Upgrades	12.32	4,880	18,877	11,345
	21%	Annual Savings		3,021



Thank you!

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Potential ECN topics:

- Certifying auditors and contractors
- Overcoming the split incentive and reaching renters
- Working with utilities
- Efficiency Labeling - disclosing energy costs at sale or lease
- Opportunities in nonresidential properties
- Contracts
- Determining measures and payback times
- Structure of municipal bonds
- Point of Sale ordinances
- Aggregating properties to achieve scale
- Model training programs and curriculum
- Coordinating purchasing, and applying technology

Contact Information

ECN:

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WEBSITE: www.efficiencycities.us

Presenters:

- Anne Evens, Center for Neighborhood Technology – www.cnt.org
- John Picard, Zero Plus
- Jeff Perlman, Bright Power - www.brightpower.biz
- Jim Meacham, CTG Energetics, Inc. – www.ctgenergetics.com
- Ron Herbst, Deutsche Bank AG London - www.banking-on-green.com