



BENCHMARKING SMALL COMMERCIAL BUILDINGS

RACHEL L. SERASPE, P.E.
WILLDAN ENERGY SOLUTIONS

BUILDING ENERGY NYC –
NORTHEAST SUSTAINABLE ENERGY ASSOCIATION
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AGENDA

- Overview of Energy Tracking & Benchmarking
- How to Conduct a Simple Benchmarking Study
- Examples of Benchmarking Results for Commercial Buildings & Energy End Uses
 - Offices
 - Retail
 - Restaurants
 - Grocery Stores
- Summary & Take Away Points
 - Small Business Direct Install Program
 - Case Study



ENERGY TRACKING & BENCHMARKING

Why is energy tracking important?

- “You can’t manage what you don’t measure”
- Gives building managers/owners data to make informed decisions

What is benchmarking?

- Comparing a building’s energy related consumption and expenditures to those with similar use

Why is benchmarking small buildings difficult?

- Not required
- Perceived cost
- Uncertainty about incentives



HOW TO CONDUCT A BENCHMARKING STUDY

Data Gathering

- Information from utility bills – one year of electric & gas consumption and cost
- Ensure all accounts in the building are available
- Square footage

Energy Use Index (EUI)

- The sum of all energy uses on-site divided by square footage
- Expressed in kBtu per square foot per year
- The most common means of comparing building energy consumption
- High EUI indicates potential for energy savings



HOW TO CONDUCT A BENCHMARKING STUDY

Conversions

- Electric – 3.412 kBtu per kWh
- Natural Gas – 100 kBtu per therm

Next Steps

- Once in common units, take the sum and divide by square footage
- Do the same for cost

Name: RACHEL SERASPE Account number: 42-1209-0897-0007-2 Billing period ending: Sep 12, 2012 Page 2 of 2

Your electricity charges

These charges are for the electricity you used (supply) and getting that electricity to you (delivery). Rates are based on a 30 day period. When your billing period is more or less than 30 days, we prorate your bill accordingly.

Electricity you used during this 30 day billing period from Aug 13, 2012 to Sep 12, 2012	
Rate: EL1 Residential or Religious	Meter# 6333855
We measure your electricity by how many kilowatt hours (kWh) you use. One kWh will light a 100 watt bulb for 10 hours.	
Sep 12, 12 actual reading	39133
Aug 13, 12 actual reading	-38858
Your electricity use	275 kWh

▶ **Your supply charges**

Supply 275 kWh @11.0182¢/kWh	\$30.30
Change for the electricity supplied to you by Con Edison.	
Merchant function charge	\$1.72
Change associated with procuring electricity, credit and collection related activities and uncollectible accounts.	
GRT & other tax surcharges	\$0.77
Taxes on Con Edison gross receipts from sales of utility services and other tax surcharges.	
Total supply charges	\$32.79

Your total electricity supply cost for this bill is 17.9¢ per kWh. You can compare this price with those offered by energy services companies (ESCOs). For a list of ESCOs, visit www.PowerYourWay.com or call 1-800-760-2884.

▶ **Your delivery charges**

Basic service charge	\$16.80
Change for basic system infrastructure and customer-related services, including customer accounting, meter reading and meter maintenance. A billing and payment processing charge of \$1.04, which may be avoided by enrolling in an energy service company (ESCO), is also included.	
Delivery 275 kWh @10.8618¢/kWh	\$29.87
Change for maintaining the system through which Con Edison delivers electricity to you.	

SBC/RPS charges @0.4809¢/kWh	\$1.35
The System Benefits Charge (Renewable Portfolio Standard) changes fund New York State renewable energy, environmental and other related public policy programs.	
Temporary NY State Surcharge @0.4691¢/kWh	\$1.29
Covers new fees imposed by the state.	
GRT & other tax surcharges	\$2.44
See earlier definition.	
Total delivery charges	\$51.75

▶ **Your sales tax**

Sales tax @4.5000%	\$3.80
Tax collected on behalf of New York State and/or your locality.	
Total sales tax	\$3.80

▶▶ **Total electricity charges** **\$88.34**

Your average daily electricity use

WILLDAN Energy Solutions

HOW TO CONDUCT A BENCHMARKING STUDY

Benchmarks

- Commercial Buildings Energy Consumption Survey (CBECS)
 - Published by the Energy Information Administration (EIA)
 - A national sample survey that tracks US buildings' energy consumption and expenditures
 - Other buildings included
- Portfolio Manager
 - An interactive energy tracking tool by the Environmental Protection Agency (EPA)
 - Consumption & cost entered into the tool to benchmark performance
 - Energy Star recognition
- Other
 - Private Sources



HOW TO CONDUCT A BENCHMARKING STUDY

Degree Days

- A way to normalize energy consumption by factoring out the effects of weather
- Heating Degree Day (HDD) – a measure of how much the average outside air temperature is lower than a baseline of 65 deg. F
- Useful for comparing a building's performance over time, to see the effect of implementing energy efficiency measures

Year	Annual Consumption (therms)	HDD	Therms per HDD
2011	100,000	4,525	22.1
2012	92,000	4,172	22.1

- The higher the number of heating degree days, the colder the outside temperature, the more energy required to heat building



BENCHMARKING EXAMPLES – ABOUT THE DATA

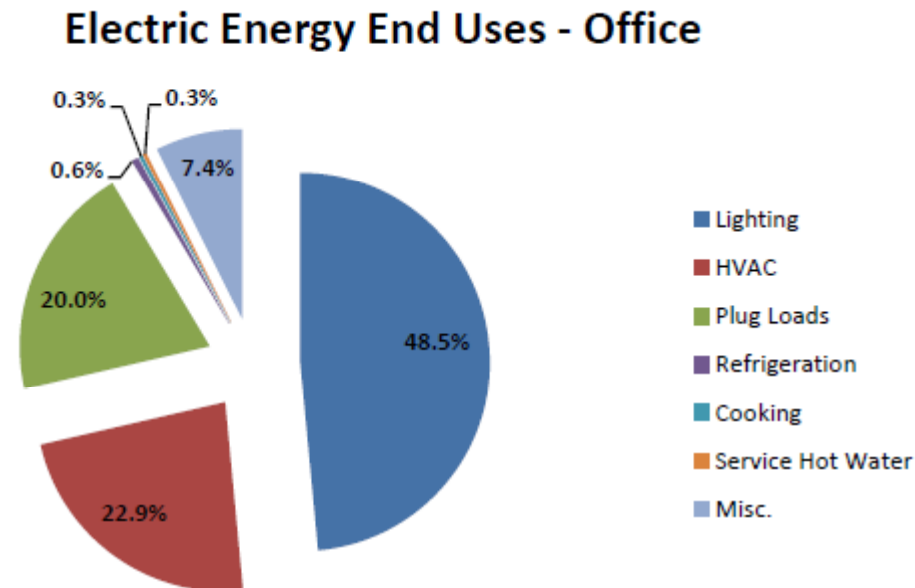
- Buildings are located in New York City
- All are less than 50,000 sq. ft.; majority are less than 25,000 sq. ft.
- At least five buildings in each category
- Consumption is actual data; costs are estimates based on service classification
- For each building category, the average EUI and average cost were compared to CBECS data



RESULTS – OFFICES

- Average EUI – 72 kBtu/sq.ft./yr.
- Average Cost – \$2.06/sq.ft.
- CBECS Median Cost - \$2.01/sq.ft.

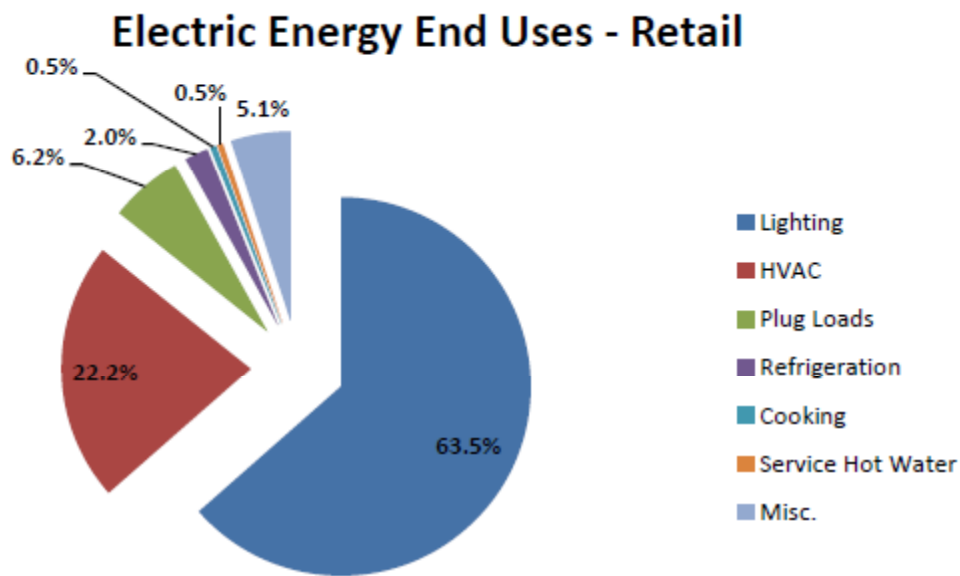
CBECS Peer Benchmarking Percentiles, Office (kBtu/sq.ft./yr.)		
25th	50th	75th
41	62	93



RESULTS – RETAIL

- Average EUI – 92 kBtu/sq.ft./yr.
- Average Cost - \$2.54/sq.ft.
- CBECS Median Cost - \$2.23/sq.ft.

CBECS Peer Benchmarking Percentiles, Retail (kBtu/sq.ft./yr.)		
25th	50th	75th
25	45	93

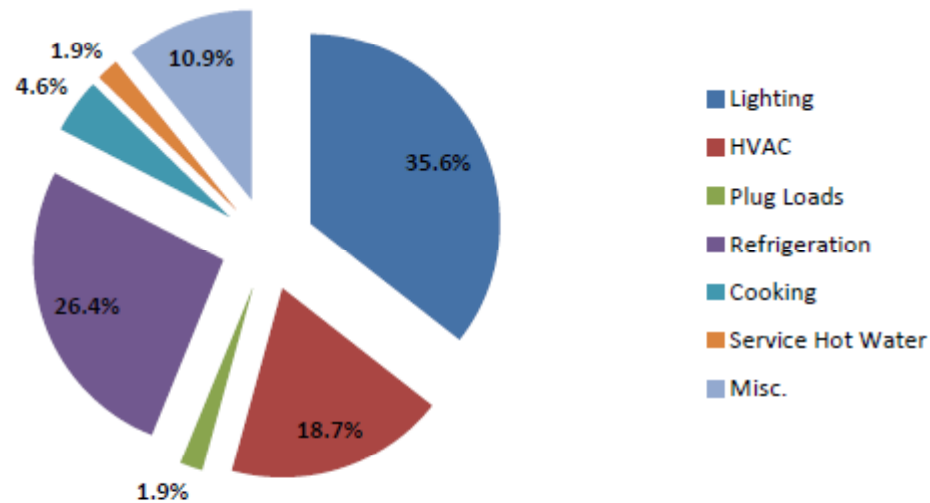


RESULTS – RESTAURANTS

- Average EUI – 270 kBtu/sq.ft./yr.
- Average Cost – \$3.54/sq.ft.
- CBECS Median Cost – \$4.88/sq.ft.

CBECS Peer Benchmarking Percentiles, Restaurants (kBtu/sq.ft./yr.)		
25th	50th	75th
117	207	462

Electric Energy End Uses - Restaurant

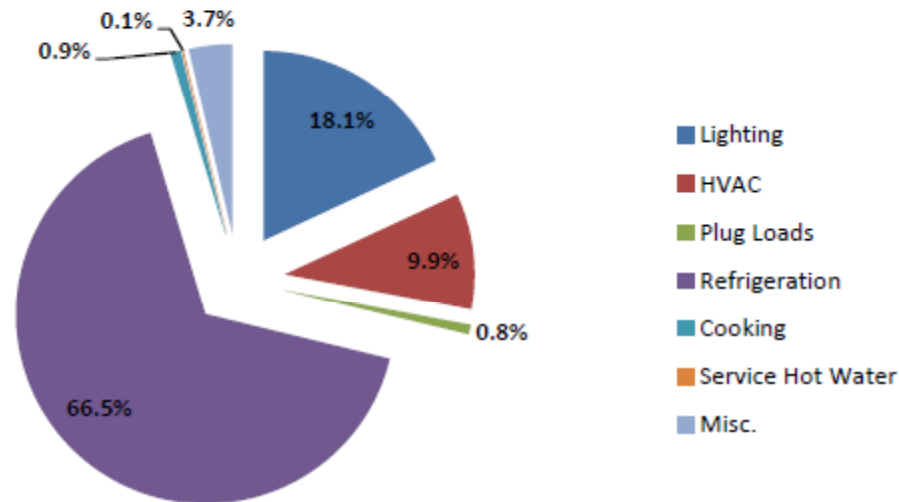


RESULTS – GROCERY STORES

- Average EUI – 193 kBtu/sq.ft./yr.
- Average Cost - \$6.03/sq.ft.
- CBECS Median Cost - \$4.68/sq.ft.

CBECS Peer Benchmarking Percentiles, Grocery Stores (kBtu/sq.ft./yr.)		
25th	50th	75th
138	185	239

Electric Energy End Uses - Grocery Store



SUMMARY & TAKE AWAY POINTS

Summary

Building Type	NYC Sample Average EUI (kBtu/sq.ft./yr.)	NYC Sample Average Cost (\$/sq.ft.)	CBECS Median EUI (kBtu/sq.ft./yr.)	CBECS Median Cost (\$/sq.ft.)
Office	72	\$2.06	62	\$2.01
Retail	92	\$2.54	45	\$2.23
Restaurant	270	\$3.54	207	\$4.88
Grocery Stores	193	\$6.03	185	\$4.68

Take Away Points

- A high EUI indicates potential for energy savings
- Lighting is one of the largest electric energy users for all space types sampled
- When it comes to restaurants and grocery stores, refrigeration is significant



CON EDISON SMALL BUSINESS DIRECT INSTALL PROGRAM

Benefits

- Free energy efficiency survey of the site
- Customized recommendations
- Available for customers in New York City & Westchester County

Incentives

- For certain upgrades, customer pays only 30% of cost
- Con Ed pays contractor directly up to 70% of remaining cost
- No waiting on rebates



CASE STUDY – BAKERY

What Was Implemented

- Replace incandescent bulbs with compact fluorescents (CFLs)
- Relamp & reballast fluorescent fixtures
- LED exit signs
- Replace evaporator fan controls on refrigeration units

Results

- 18% annual energy savings
- \$7,075 annual cost savings
- Five month payback



Questions?

