

Donuts To Dollars

Energy Consumption Data Analysis in a Food Service Setting

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Discussion Overview

01 Building automation systems (BAS)

02 What does this have to do with Massachusetts evaluation?

03 Was energy consumption data analysis feasible for BAS?

04 Pain points

05 What's happening now



Building Automation Systems (BAS)

The Measure That's Hard to measure

- Controls HVAC, refrigeration lighting, process, temperature data
 - Process – resistance electric toasters, deck ovens, coffee machines, and microwaves
- Collects one minute interval data at every channel
- Override by staff possible
- No available baseline data as currently implemented



Why is it time to make the Donuts?



- Franchisor negotiated a bulk price
- Aggressively promoted by the vendor
- Incented in the "custom" and "small business" programs
- High savings claims
- Little evaluation history

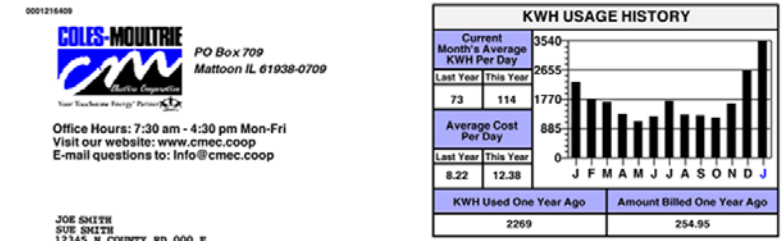
Why did the PA's consider Energy Consumption Data Analysis?

- Anticipated emphasis on controls
- Anticipated changes in evaluation frameworks
- Potential for faster results
- The ability to evaluate persistence (the hand)
- Sites could be pulled from larger evaluations to evaluate a census



Energy Consumption Data Analysis (ECDA)

- This ECDA used monthly billing records only
 - billing analysis, PRISM
- It conforms to IPMVP Option C for interventions that impact multiple systems
- ECDA fits a premise-specific degree-day regression model
- Accounts for physical interactive effects, take-back or rebound effects
- Participant same-year spillover effects



Billing Period Dates	Account #	Service Address	Bill Type		
01/01/18 - 02/01/18	0000000	12345 N COUNTY RD 000E	REGULAR BILL		
Meter #	Map Location	Rate	Present Reading	Previous Reading	KWH Used
1ND056554091 3PD056456603	XYZ-20.24	1 24	86412 1286	82872 1192	1660 1880
Activity Since Last Bill	\$ Amount	Current Bill Information	\$ Amount		
Previous Balance	331.96	BALANCE PRIOR TO THIS BILLING ON 02/13/18	0.00		
Payment	-331.96	SERVICE AVAILABILITY CHARGE	50.00		
Other Adjustments	0.00	ENR CHARGES	172.64		
Balance Prior to this Billing	0.00	FORMULA RATE PLAN ADDER (FRP)	5.89		
		WHOLESALE POWER ADJ 1660 @ .0035500	4.00		
		SERVICE AVAILABILITY CHARGE	131.60		
		ENR CHARGES	7.05		
		FORMULA RATE PLAN ADDER (FRP)	6.67		
		WHOLESALE POWER ADJ 1880 @ .0035500	11.33		
		TILL PUB UTIL REV TAX			
		TOTAL CURRENT CHARGES	395.41		
Net bills are due by the 6th of next month. Unpaid bills become subject to disconnection after 4:30pm on the 22nd.		Due Date	03/06/18	Amount Due	395.41
Bills may be paid in person at 104 Dewitt Avenue East, Mattoon, IL. Night and weekend depositories on site. Bills may also be paid at many First Mid-Illinois Bank & Trust locations.		Past Due After	03/06/18	Past Due Amt	432.56
If your service is interrupted, check your fuses or circuit breakers. Check to see if your neighbor has power. Report outages by calling 235-0341 or toll free at 888-661-2632.		Weather is the #1 cause for higher electric bills. The outside temperature directly effects how long your HVAC runs increasing costs.			

Please detach and return this portion with your payment.

Coles-Moultrie Electric Cooperative
PO Box 709
Mattoon IL 61938-0709
A Teachstone Energy Partner

JOE SMITH
SUE SMITH
12345 N COUNTY RD 000 E
MATTOON IL 61938-0000

Phone # 217-000-0000
Corrected Phone #

Account Number	0000000	Due 03/06/18	After 03/06/18
		395.41	432.56

Your payment and any returned checks may be processed electronically.

COLES-MOULTRIE ELECTRIC COOPERATIVE
PO BOX 709
MATTOON IL 61938-0709

Is ECDA Feasible for Quick Serve Restaurants?

Could we find enough stores?

- Using the Massachusetts C&I evaluation database we identified 578/1300 stores with billing and tracking data from 2013-2018

Could savings be modeled?

- Consumption was stable and similar across sites and years
- Savings can be modeled at the facility level using monthly data
- Higher interval data is needed to break out measure level savings



Pain points

Pain Points of Study

- Tracking data revealed BAS projects included multiple measures. Only 18/183 sites installed BAS only.
 - We could not isolate savings attributed to BAS only
- No measure-level baseline data
 - Could request implementer to collect 3 months of pre-controlled data?

Pain Points of BAS

- Pesky humans



What's happening now?

- Emphasis continues to be placed on controls measures
- Massachusetts is currently evaluating its “Custom” and “Retrofit” Programs and several donut stores were drawn in the random sample
 - Provides a chance to compare BAS generated data with metered data to determine it’s usefulness for determining measure level savings
 - ECDA and engineering analysis results can be reviewed side-by-side to identify ways the methods can compliment each other



Thank You

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