



CADMUS

Energy Savings from Business Energy Feedback

Behavior, Energy, and Climate
Change Conference 2015

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INTRODUCTION

Study Background

- Xcel Energy runs the Business Energy Feedback pilot in CO and MN
- Targets small and medium businesses (SMBs)
 - SMBs account for about 45% of U.S. commercial electricity consumption
- Pilot theory
 - Many business managers and employees aren't attentive to energy use or aware of savings opportunities

Research Questions

- What are the energy savings from business energy feedback?
- Do savings vary across months of the year?
- Do high usage customers save more energy than low usage customers?
- Do some business segments save more energy than others?

XCEL ENERGY COLORADO BUSINESS ENERGY FEEDBACK PROGRAM

Xcel Energy Colorado BEF Pilot

- Pilot implemented by Opower
- Beginning in summer 2014, Xcel Energy sent business energy reports to about 10,000 SMB customers
- Eligibility requirements
 - Receive electric or electric and gas service
 - Average daily energy use greater than 1 kWh and less than 1,000 kWh
 - Agriculture, mining, equipment, wholesale segments excluded
- Pilot implemented as randomized control trial
 - Expected to yield unbiased and robust estimates of pilot treatment effects

Xcel Energy Colorado BEF Pilot (cont.)

- First report sent on June 24, 2014
- Seven reports sent during 1st program year

Business Energy Report Mailings												
Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
●	●		●		●		●		●			●

- Reports contained normative comparisons, energy use analysis, and savings tips

Example Business Energy Report

UtilityCo

1515 N. Courthouse Road, Floor 8
Arlington, VA 22201-2909

Attn: Candice Burns
Golden Duck
4123 13th Street
Richmond, VA 23226

Business Energy Report

This is not a bill



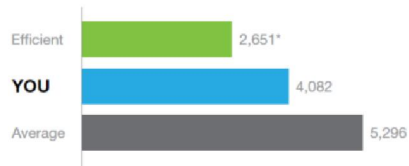
Golden Duck
Restaurant type: Chinese restaurant
Location: 1642 Waverley St.
Size: 3870 sq ft
Acct # 123 456789-0

Not correct?
See back to update online.

Not responsible for energy decisions? Pass this along to the person who is.

Your use compared to competitor restaurants

01/04/13-01/03/14



* How is this calculated? Your use is compared to approx. 50 similar-sized Asian restaurants within 20 miles. The energy unit is a combination of electricity (kWh) and natural gas (therms).

How you're doing

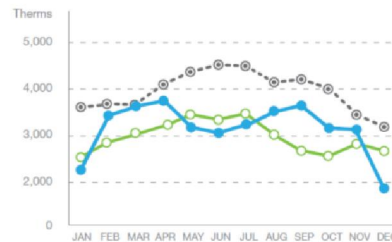
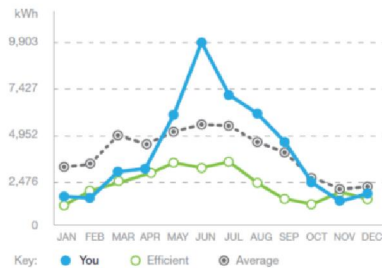


Last 12 months: You used less than average, but **54% MORE** than efficient restaurants.

Electricity and natural gas breakdown

32% MORE electricity than average restaurants.

18% LESS natural gas than efficient restaurants.



Flip over for best practices →

What you can do in less than 10 minutes

Checklist: Best practices to start reducing your energy spending

- Prepare for the next report**
You'll receive reports like this one periodically, and the more you know about your restaurant's energy use, the more useful they'll be. Start by learning more about the equipment you use to heat and cool your restaurant.
- Make a copy of this report for your management staff**
Do you have a management staff that should also be seeing this report? It's important to make everyone aware of how energy efficiency can help strengthen your business.
- Set thermostat to the appropriate temperature**
To save on energy costs while keeping your restaurant comfortable, set your thermostat to 68°F in the winter and 76°F in the summer. For every degree you adjust your thermostat, you'll see sustained energy savings that will help your bottom line.
[Save up to \\$225/year](#)
- Talk to your staff about turning cooking equipment off**
The typical restaurant in our area uses about one-third of its energy on cooking. The actions of your staff can be a big part of this. Remind your staff that small actions, like turning off equipment that won't be used for a meal, can still have a positive impact on the business.
[Save up to \\$180/year](#)
- Complete your business profile online**
The more we know about your business, the more useful the tips we provide can be. We'll be able to send you more relevant information in future reports. Fill in your business profile and explore more tips at: UtilityCo.com/smbEnergyReports



Our website gives you the power to save

Dive deeper into your energy graphs and trends and find ways to make smart energy choices. Go to: UtilityCo.com/smbEnergyReports

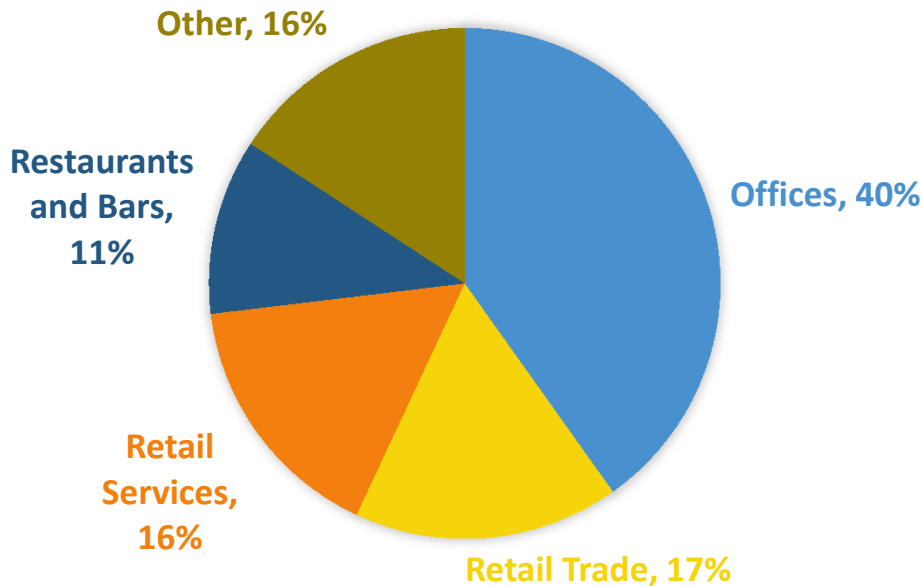


Next report:
Learn how to reduce cooking costs.

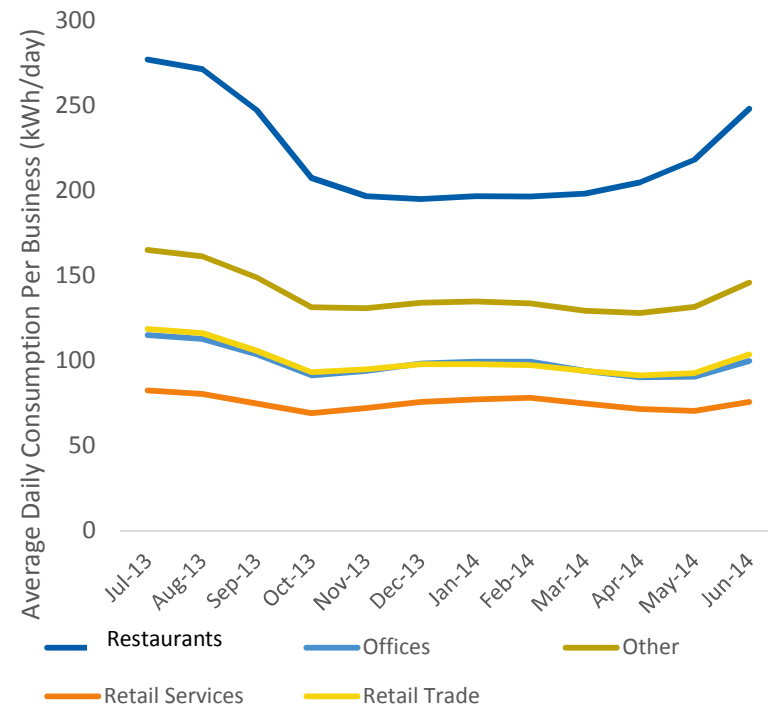
Update your profile at UtilityCo.com/smbEnergyReports
(555) 555-5555 | smbenergyreports@example.com
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Participant Business Characteristics

PILOT BUSINESS SEGMENTS
(% OF PARTICIPANTS)



AVERAGE ENERGY CONSUMPTION
PER BUSINESS BY SEGMENT (KWH)



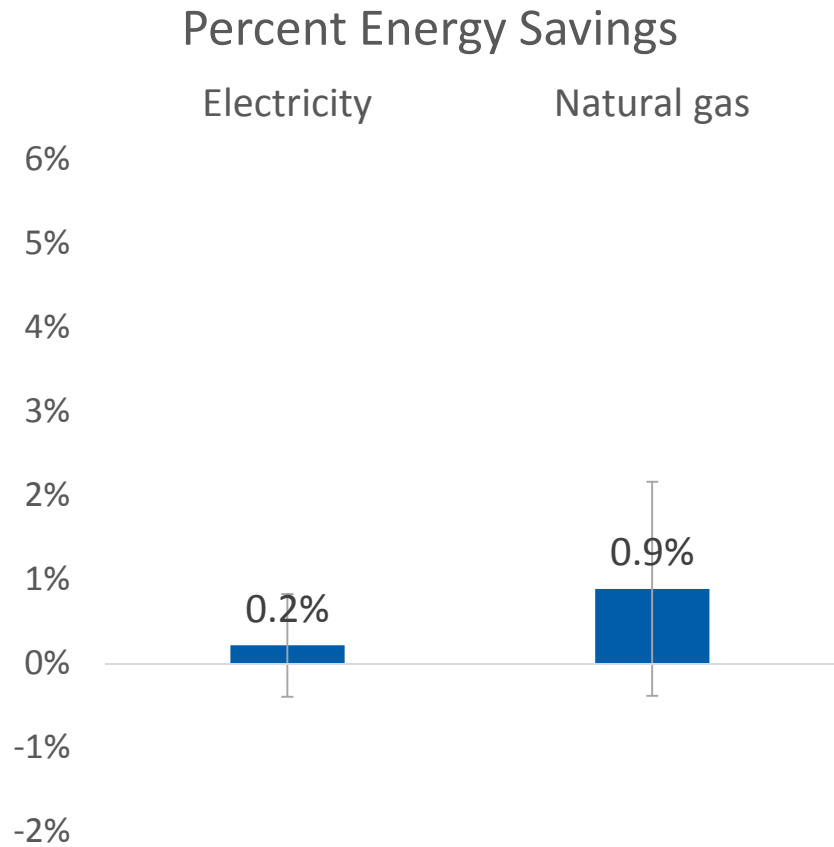
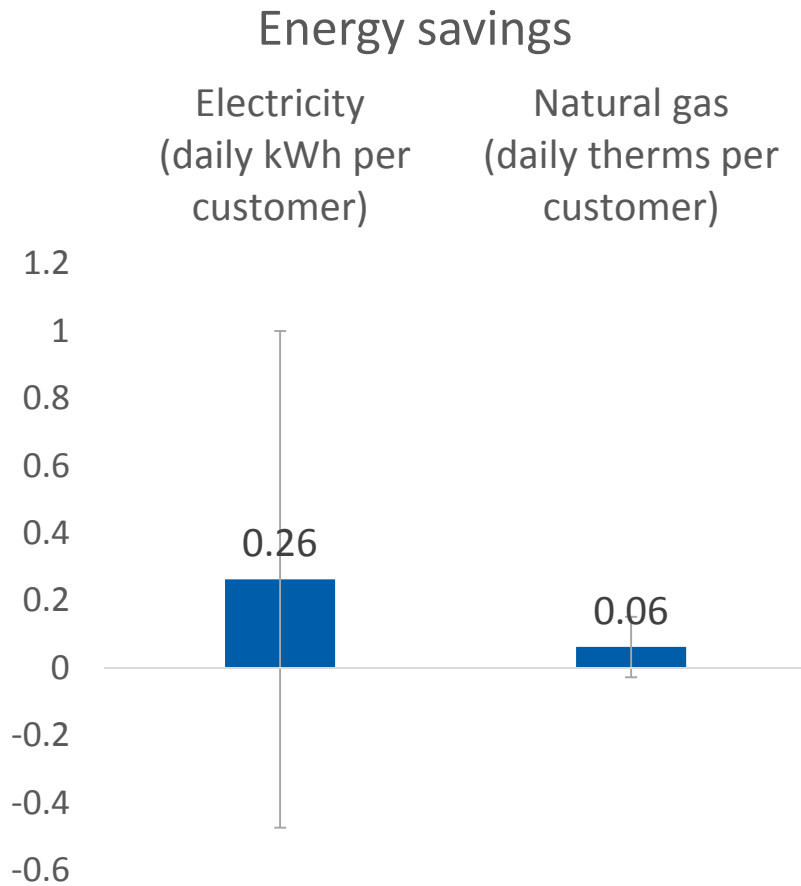
Notes: businesses assigned to segments based on NAICS codes.

ENERGY SAVINGS ANALYSIS

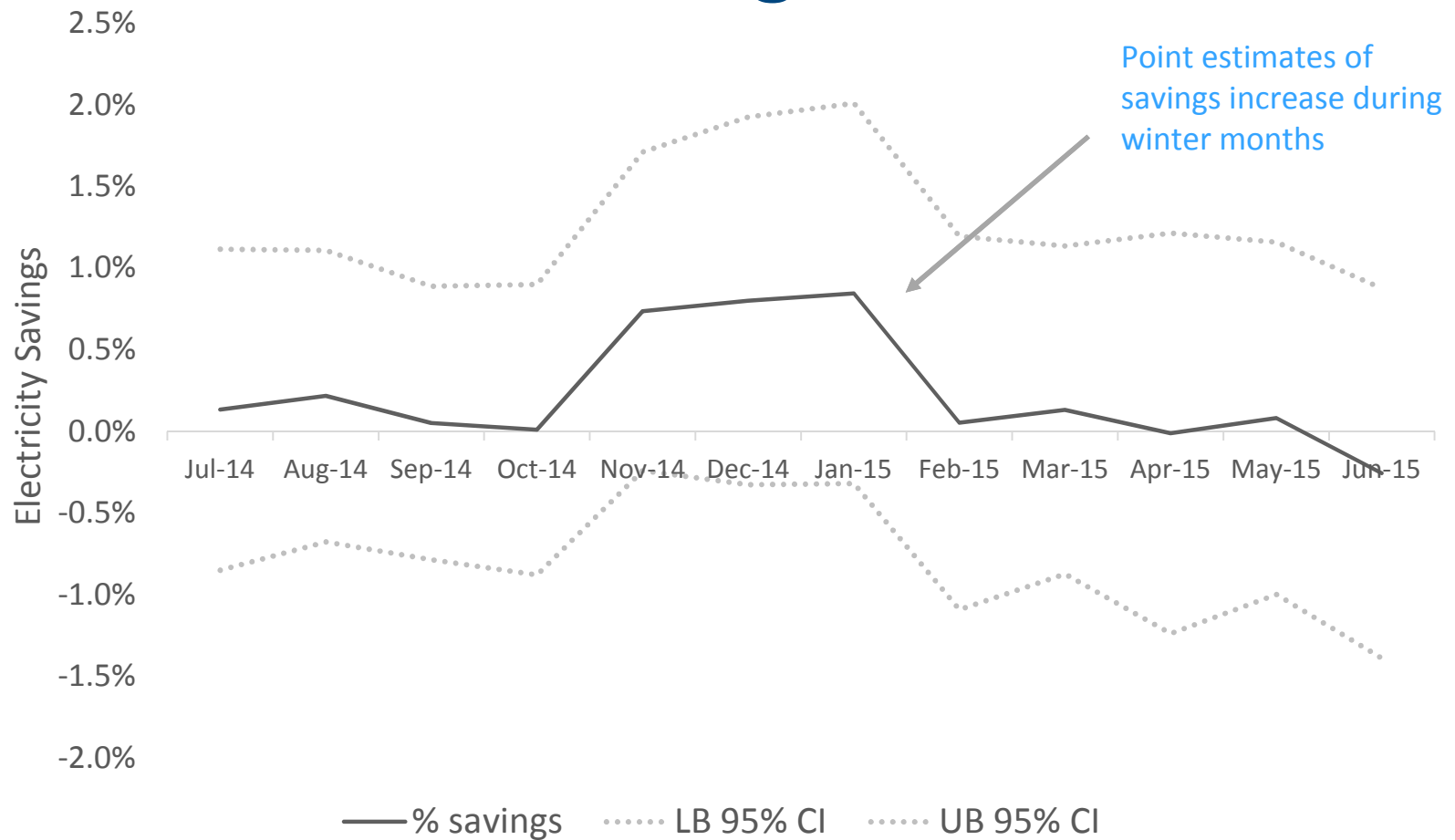
Savings Estimation

- Collected pre- and post-treatment monthly electricity and gas bills for pilot SMBs
- Verified random assignment resulted in balanced treatment and control groups
- Panel regression analysis
- OLS estimation with standard errors clustered on businesses
- Several model specifications to test robustness of savings estimates

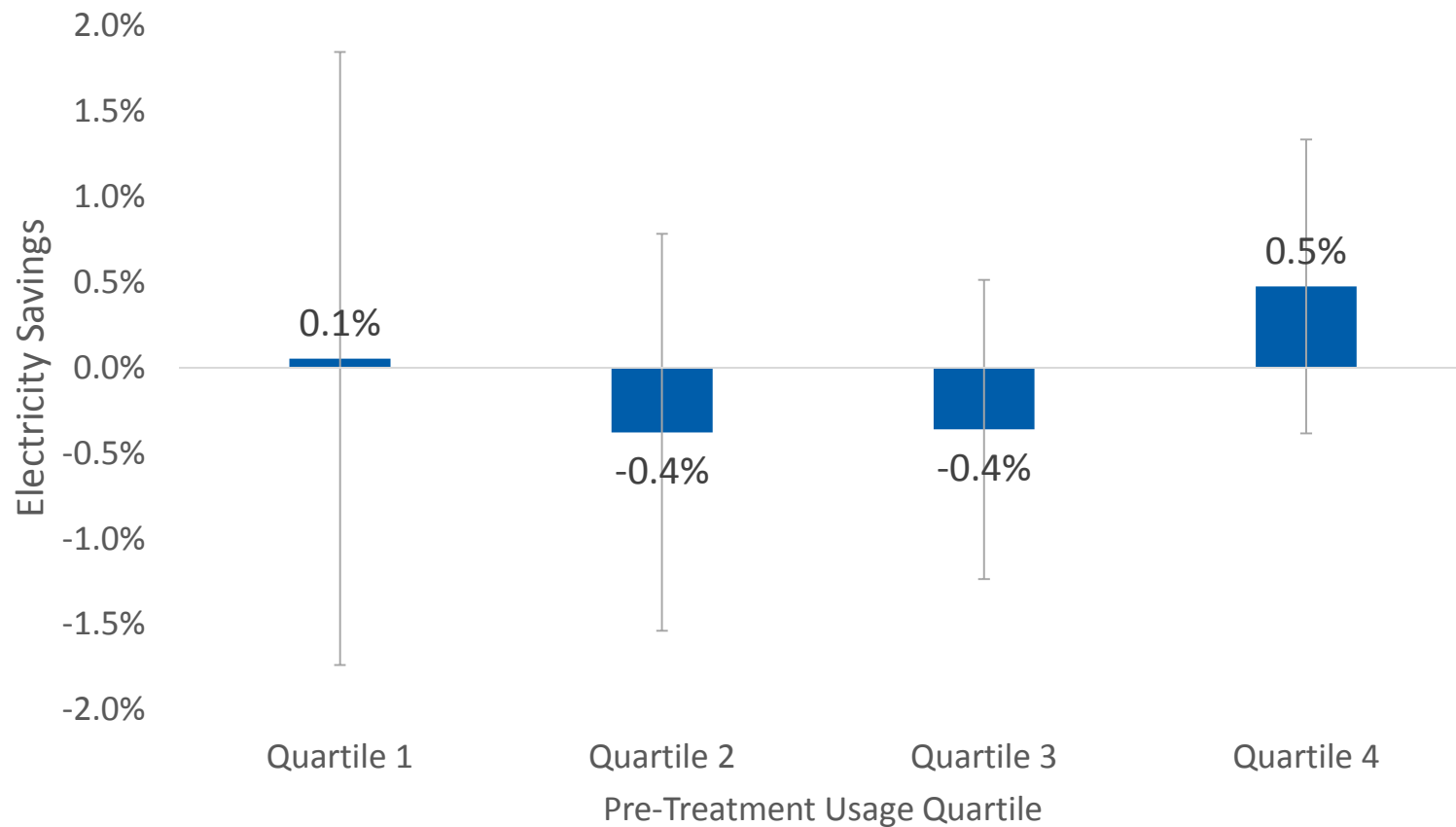
First Year BEF Pilot Savings



Estimates of Monthly BER Electricity Savings



BEF Electricity Savings by Usage Quartile

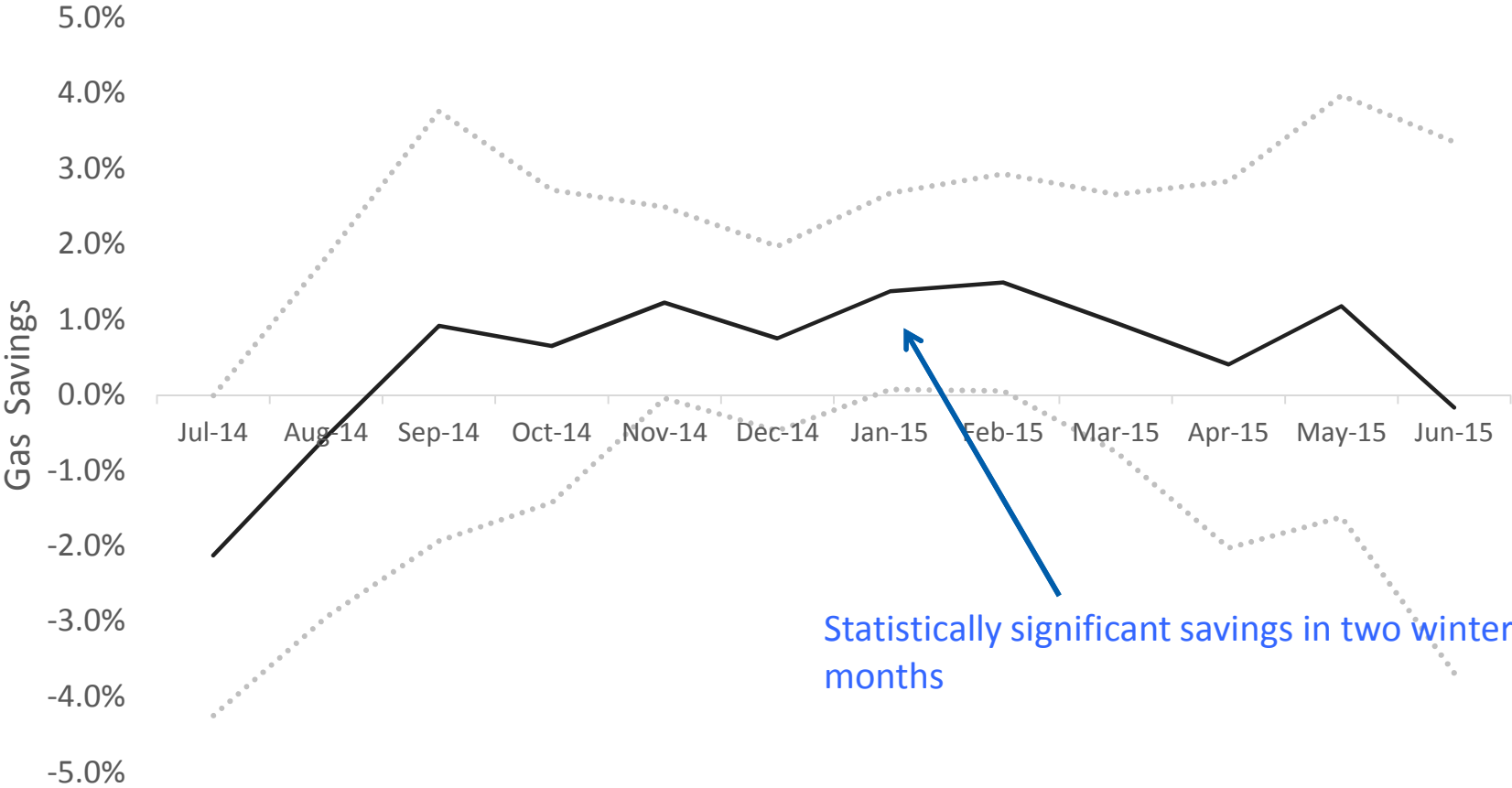


Note: 95% confidence intervals estimated using robust standard errors clustered on businesses.

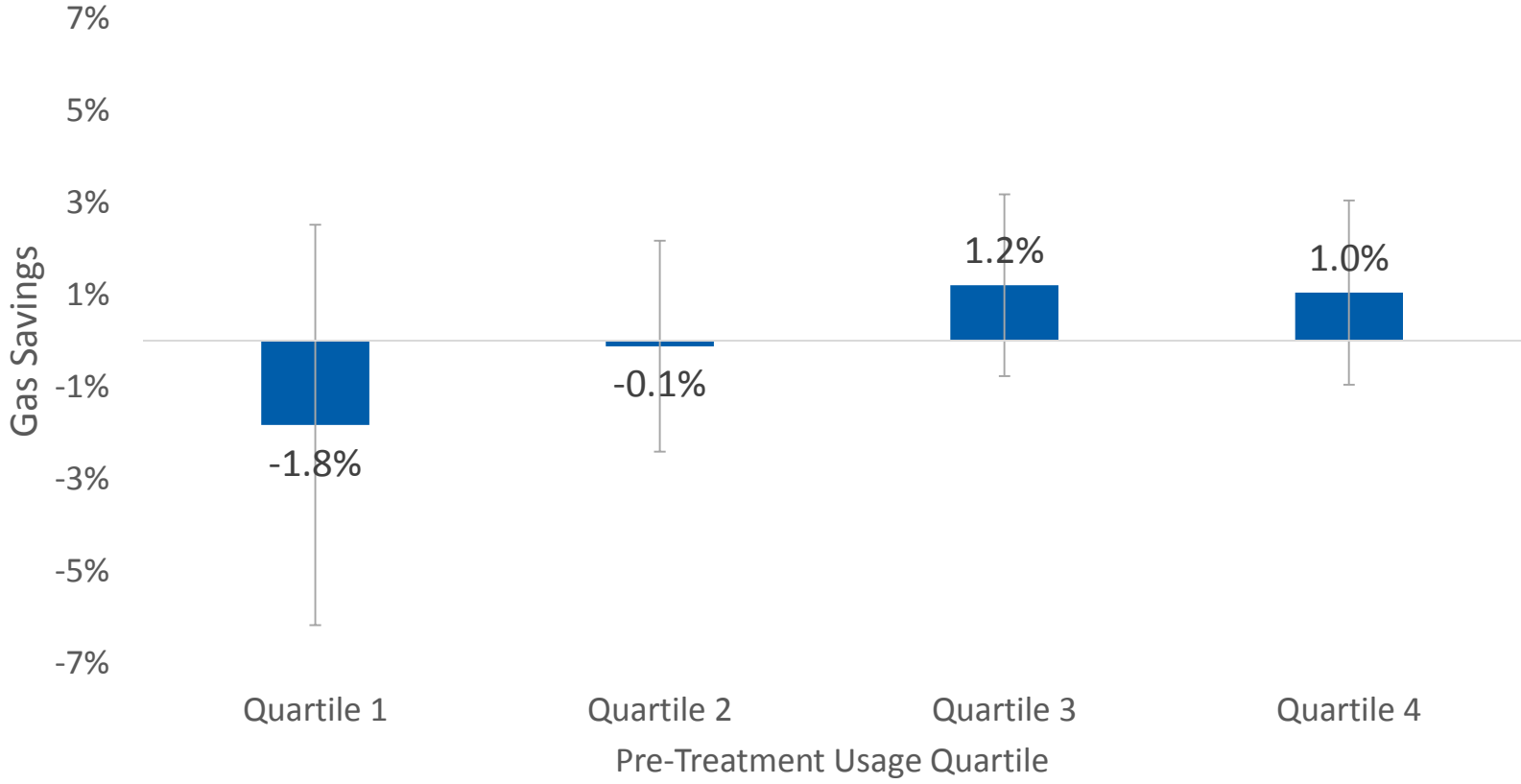
BEF Electricity Savings by Business Segment



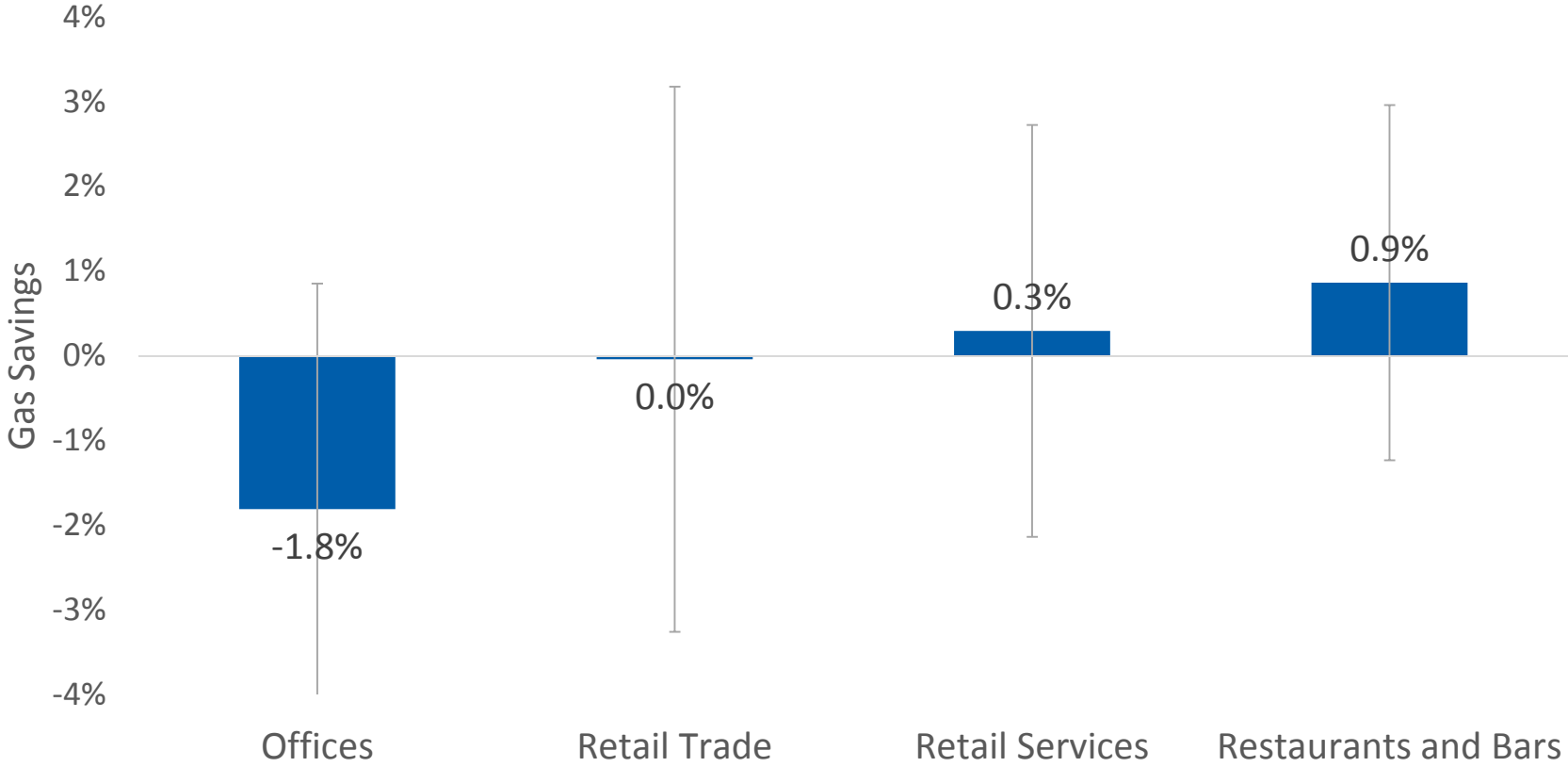
Estimates of Monthly BEF Gas Savings



BEF Gas Savings by Usage Quartile



BEF Gas Savings by Business Segment



Note: 95% confidence intervals estimated using robust standard errors clustered on businesses.

CONCLUSION

Summary of Key Findings

- BEF pilot did not yield expected savings
 - Estimates were positive but not statistically significant
 - Savings estimates were imprecise
 - Sample sizes relatively small
- Some evidence of savings when savings estimated by month, business segment, and usage quartile
 - Point estimates of electricity and gas savings higher during winter months
 - Retail trade customers had statistically significant electricity savings
 - Point estimates of savings greatest for biggest users

Future Research

- Evaluate program again during second year
- Specifically investigate
 - Savings persistence of retail trade customers
 - Sources of any gas and electric savings during summer and winter months
 - Pilot impacts on efficiency program participation and customer engagement
- Conduct surveys/focus groups to understand interest in efficiency, satisfaction with reports, and barriers to saving energy

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