Behavioral Reminders Affect Customers' Energy Usage: Early Findings

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Background

- Time-of-Use (TOU) rates
- Feedback on bills / energy consumption can help customers lower their electricity consumption and lower their bills
- Evidence from CPP rates encouraging

Experimental Design

- Customers who opted in to be in TOU rate were offered text alerts.
  - Peak hours: 2pm-8pm.
  - Randomly assigned to either receive text at 2pm OR at 8 pm
- Rolling enrollment : April ‘16- Aug ‘17.
  - Alerts for 2 months
- N= ~ 3300 residential customers
- Testing: Reminders *before peak-hours* vs. reminders *after peak-hours*

2pm

Mon-Thurs

SCE TOU Update: Your On-peak time period has begun. Avoid using larger appliances until the off peak period begins at 8pm to take advantage of lower pricing.

8pm

Mon- Thurs

SCE TOU Update: It's now the off-peak time period. Take advantage of lower pricing and use larger appliances now until 2 pm tomorrow!

Methodology: Difference-in-Differences

$$DiD_{Estimate} = (T_{post} - T_{pre}) - (C_{post} - C_{pre})$$

$$Y_{it} = \alpha + \beta TS_i + \gamma TP_t + \boldsymbol{\delta}(TS_i * TP_t) + X_{it} + \epsilon_{it}$$

Y: Hourly electricity consumption, kWh.

TS: Treatment Status.

TP: Treatment Period.

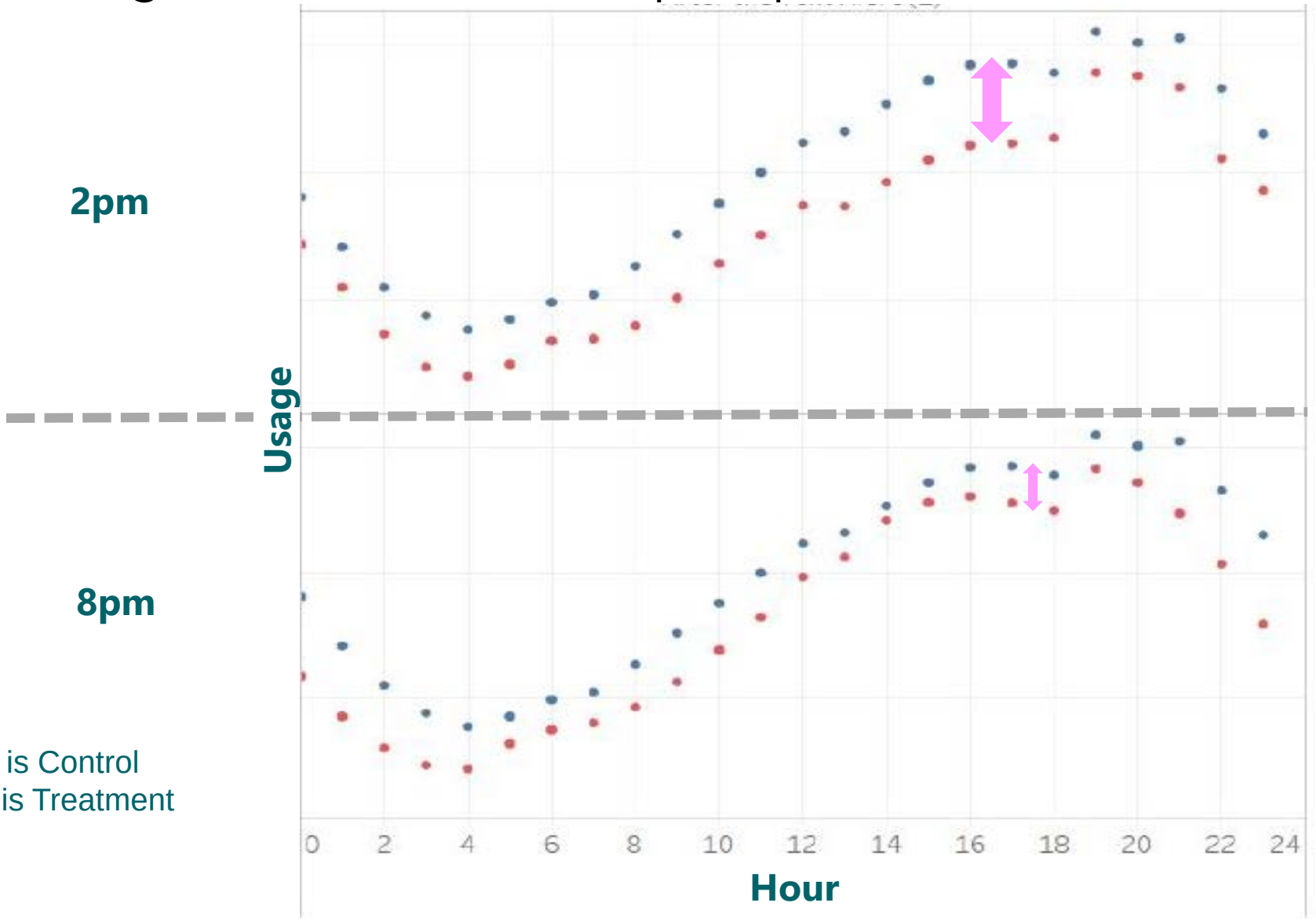
$\boldsymbol{\delta}$: coefficient for Diff-in-Diff.

- Our estimates rely on the Diff-in-Diff Fixed effect model

Treatment Group: Opted-in to receive the text messages.

Control Group: Did not opt in

Alerting customers before the peak period is more effective



Blue is Control
Red is Treatment

Results: 2 pm group: Savings were persistent for peak periods, and increased over time

VARIABLES	(1) Pooled DiD	(2) DiD FE	(3) FE: Peak-Long	(4) FE: Peak-Short
Dif-in-dif,δ	-0.121***	-0.0875***	-0.152***	-0.105***
	(0.00320)	(0.0221)	(0.0358)	(0.0288)
Constant	3.135***	2.727***	3.182***	3.066***
	(0.00564)	(0.0575)	(0.0802)	(0.0732)
Observations	37,729,668	37,729,668	11,010,774	9,439,904
R-squared	0.046	0.068	0.107	0.088
Number of SA		3,130	3,130	3,130

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Achieved overall peak shift by 5 - 7%

Results: 8 pm group: Savings were short-term only with no persistence for 6 months

VARIABLES	(1) Pooled DiD	(2) DiD FE	(3) FE: Peak-Long	(4) FE: Peak-Short
Dif-in-Dif, δ	-0.0767***	-0.0569**	-0.0468	-0.0542**
	(0.00281)	(0.0222)	(0.0357)	(0.0273)
Constant	3.108***	2.697***	3.156***	3.025***
	(0.00551)	(0.0558)	(0.0784)	(0.0706)
Observations	38,785,256	38,785,256	11,318,391	9,704,509
R-squared	0.047	0.070	0.108	0.088
Number of SA		3,216	3,216	3,216

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Achieved overall peak shift by ~3%

Limitations

- Frequency of texts
  - Different household routines
  - Did not optimize text timings to time of day and week.
- Did not examine if customers actually read their texts
  - We did not employ read-receipts
- In future, we could consider providing bill incentives to increase participation
  - ~20% opt-in rate. Could increase customer satisfaction .

Discussion & Implication

- Timing of text reminders are important both short and long-term
  - Reminders before peak vs. after peak
  - Before peak showed persistence and gradual increase in peak reduction over time

- Salient reminders could be more effective than generic reminders
  - Past research – personalized reminders, tangible follow-through actions

Questions ?

Summary of Results

	Treatment	
	2PM	8 PM
Average Peak Shift	~6%	3%
Short Term Peak Shift	5%	3%
Long Term Peak Shift	7%	–

More Effective