THE ILLINOIS EXPERIENCE WITH HOURLY PRICING

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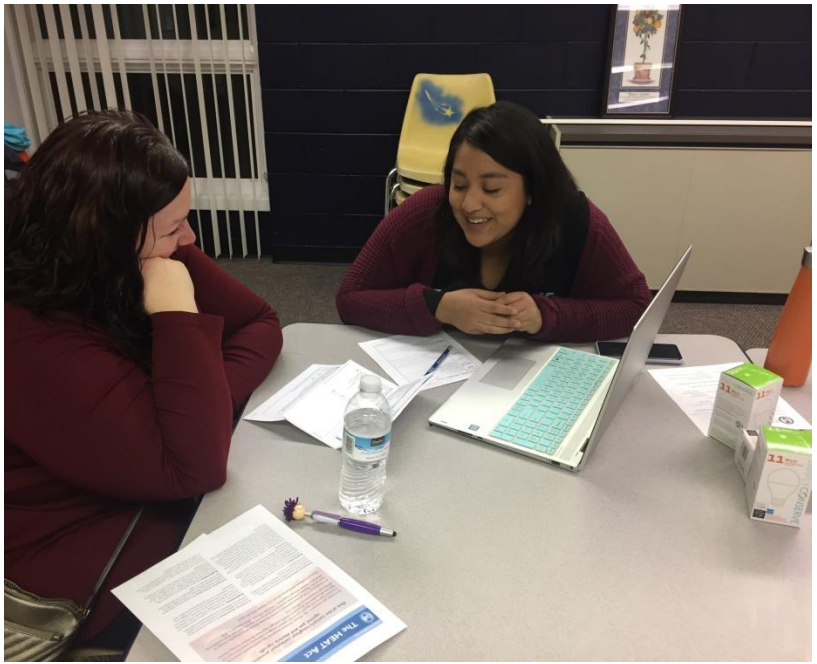
CPUC Workshop on Advanced DER and Demand Flexibility Management: MAY 25, 2021

CITIZENS UTILITY BOARD (CUB)

CitizensUtilityBoard.org

- Non-governmental Illinois utility consumer advocacy organization
- Represents the interests of
  - Residential utility customers
  - Small businesses
- Mission:
  - Direct consumer services
  - Policy advocacy
- RESEARCH



RESEARCH

https://www.citizensutilityboard.org/welcome-big-energy-data-center/

THE COSTS & BENEFITS OF REAL-TIME PRICING

AN EMPERICAL INVESTIGATION INTO CONSUMER BILLS USING HOURLY ENERGY DATA & PRICES

CHARGE FOR LESS

AN ANALYSIS OF ELECTRICITY PRICING FOR ELECTRIC VEHICLES IN AMEREN TERRITORY

SIX UNIQUE LOAD SHAPES

A SEGMENTATION ANALYSIS OF ILLINOIS RESIDENTIAL ELECTRICITY CONSUMERS

THE **COSTS & BENEFITS OF REAL-TIME PRICING**

AN EMPERICAL INVESTIGATION INTO CONSUMER BILLS USING HOURLY ENERGY DATA & PRICES

The Citizens Utility Board (CUB)
Environmental Defense Fund (EDF)

Lead authors:
Jeff Zethmayr, director of research, CUB
David Kolata, executive director, CUB

November 14, 2017

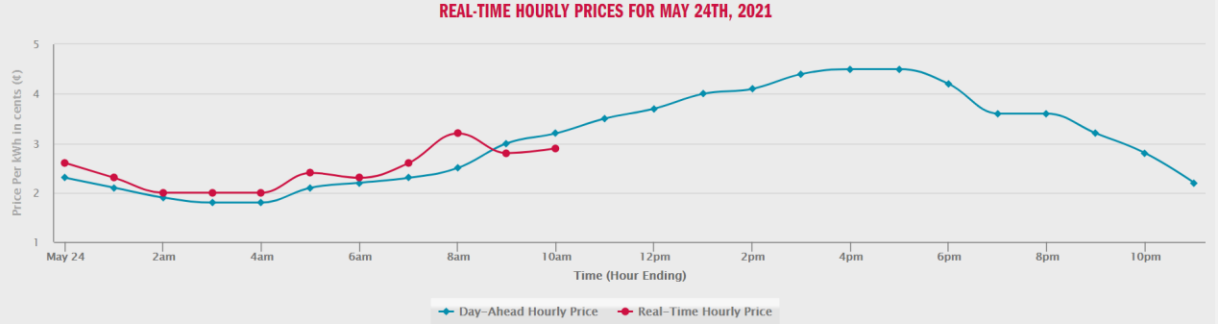
METHODOLOGY

COSTS AND BENEFITS OF RTP

Both rate designs include volumetric, $/kWh rates.

Hourly also includes $/kW and flat monthly rates

January 2016	Flat Rate	Hourly Pricing
Supply	$0. 0698 (per kWh)	market rate (per kWh)
Capacity	(bundled into $/kWh supply)	$3.122 per kW
Transmission	$0.0134 (per kWh)	$0.00845 (per kWh)
Misc.	--	$0.00191 (per kWh)
Monthly Flat	--	$0.39



FINDINGS

COSTS AND BENEFITS OF RTP

- 97% of study sample estimated to have saved in 2016 on RTP
- Savings distributed across study footprint and income groups
- Best annual results, by both $ and % of bill
  - Lower capacity obligation/PLC
  - Higher usage (due to consistent difference between PJM LMPs and flat ComEd supply rate)
  - Space - heaters

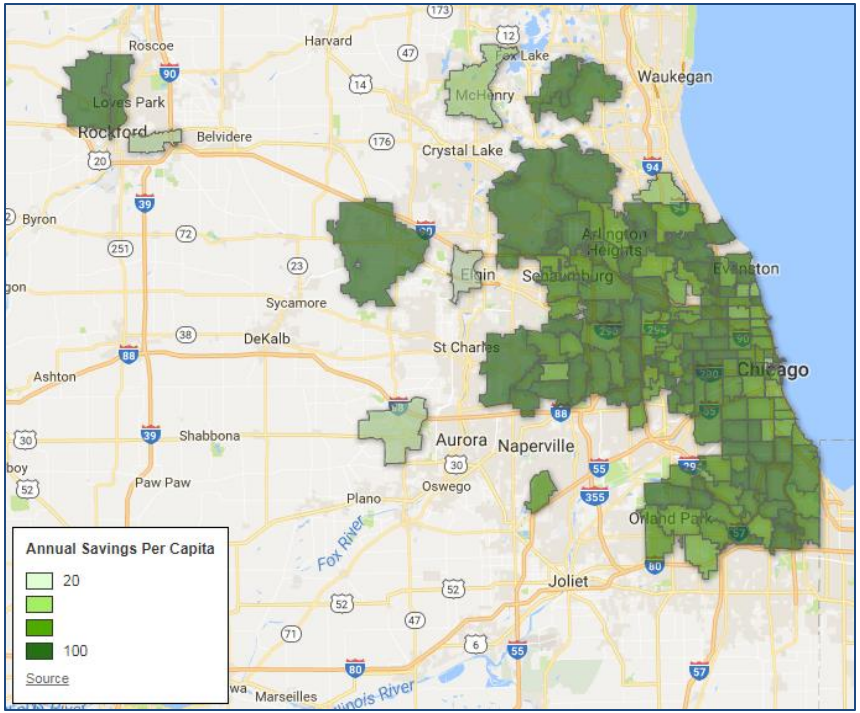
FINDINGS

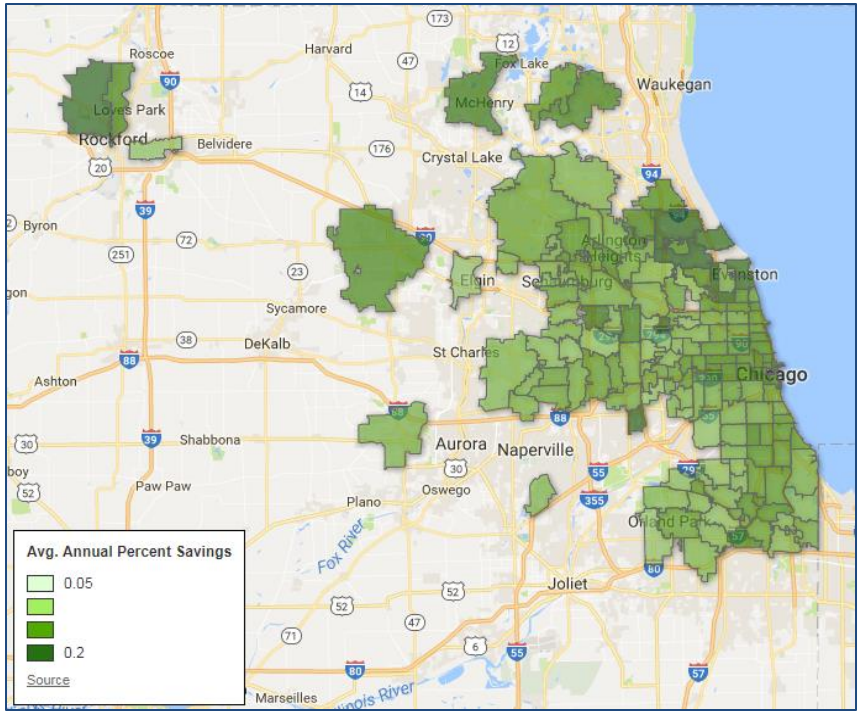
COSTS AND BENEFITS OF RTP

Summary Saving Statistics	All Customers	Top 5% of Savers	Bottom 5% of Savers	Non-Savers
Avg. Annual Savings	$86.63	$103.76	$0.62	-$10.99
Median Savings	$69.78	$68.42	$0.77	-$6.23
Avg. % Savings	13.2%	31%	0%	2.4%
Median % Savings	12.6%	28.8%	0.3%	1.6%
Total Annual Savings	$29.8 mm	$3.95 mm	$10,121	-$63,159
# of Customers	344,717	19,538	16,282	5,748

WHO WINS, AND WHERE?

COSTS AND BENEFITS OF RTP



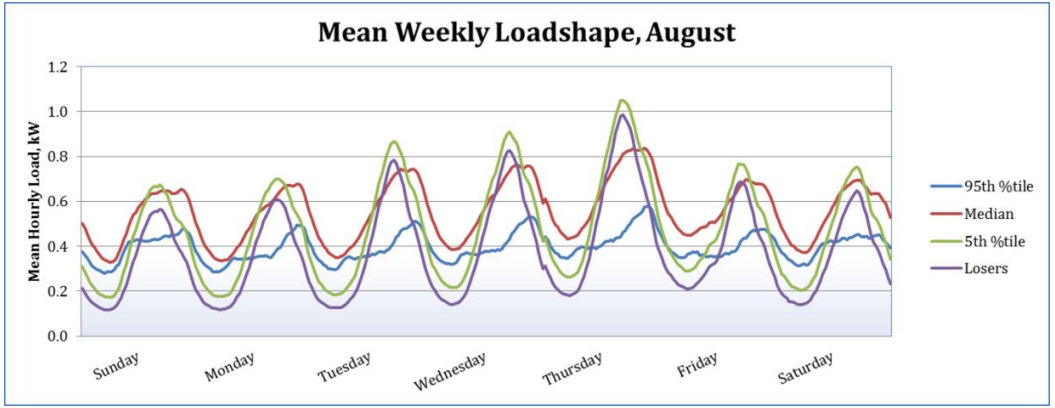


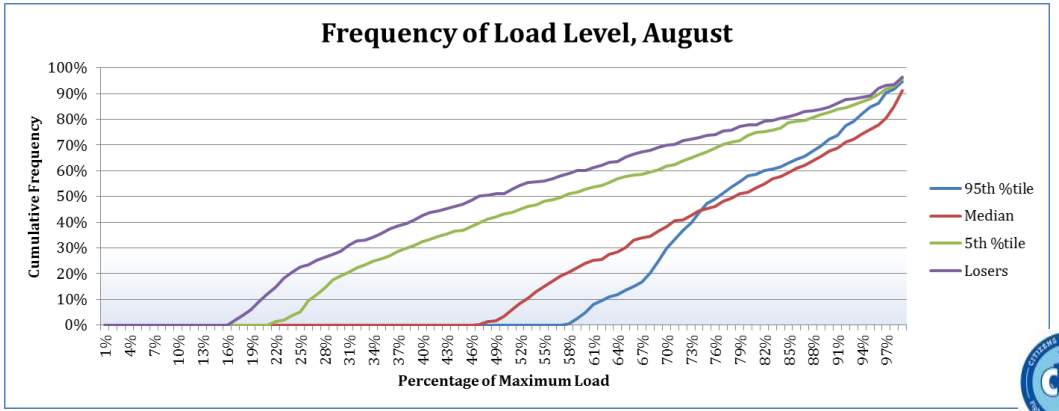
Per Capita $ Savings and Average % of Bill Savings consistent across study area

LOAD SHAPE & SAVINGS- SUMMER

COSTS AND BENEFITS OF RTP

- Comparable average usage between high and low savers
- Visibly flatter load shape for top 5% of savers and median customers
- Later peak as well, a focus for further analysis
- Flat load shape is observable in load frequency curve as well

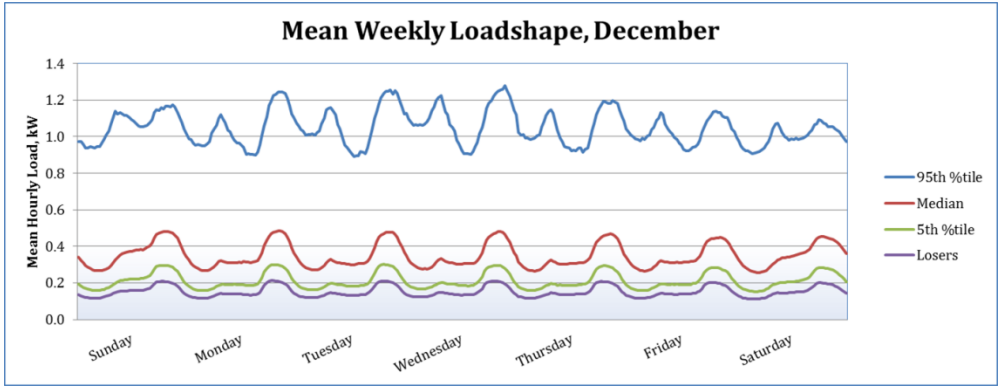


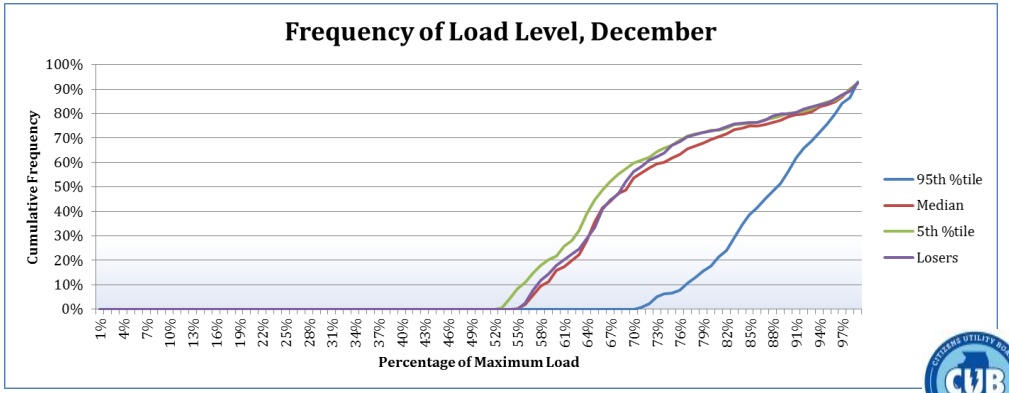


LOAD SHAPE & SAVINGS - WINTER

COSTS AND BENEFITS OF RTP

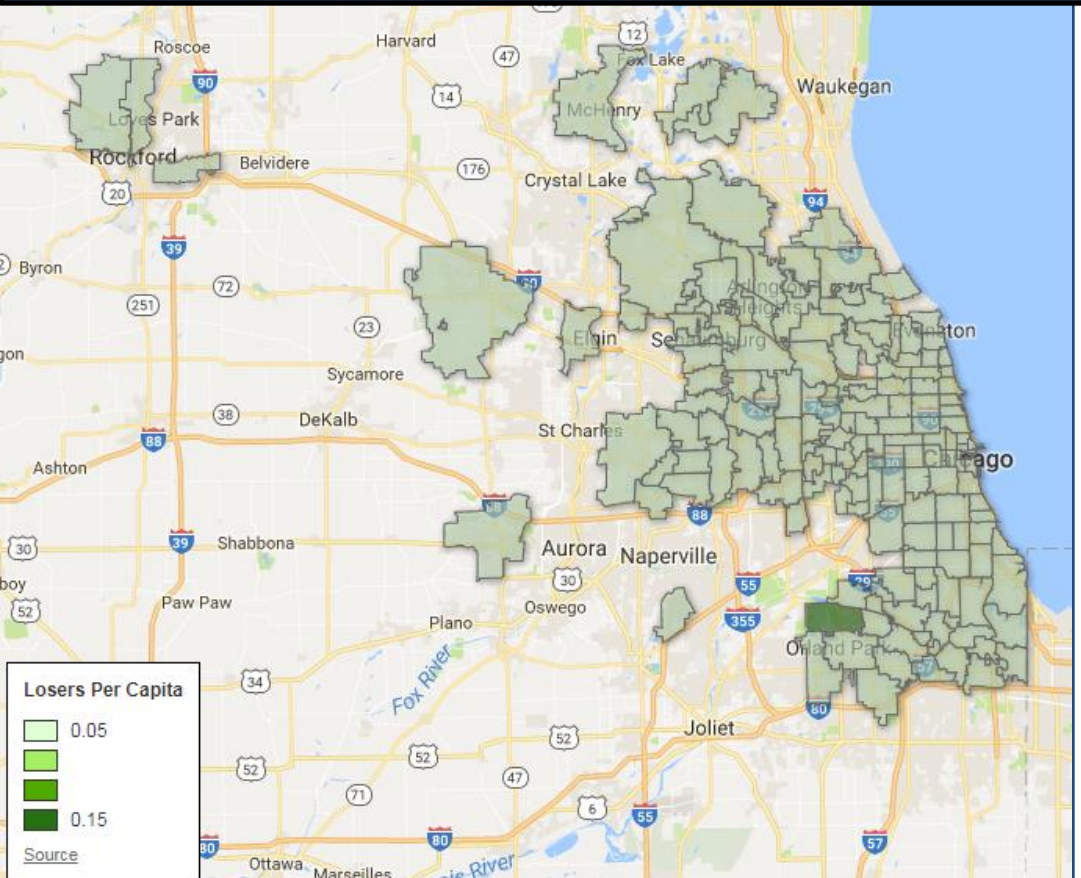
- High savers use more in winter months.
- Likely due to prevalence of Space Heat customers in high percentile saving group
  - Flatter load shape
  - Annual usage more weighted to winter month, when average prices are lower
  - Space Heat customers 5% of overall sample, 20% of top 5th %tile
- As in summer months, high savers exhibit flatter average load shape by percent of peak





WHO LOSES OUT?

COSTS AND BENEFITS OF RTP



- Non-savers distributed throughout study area
  - More investigation needed!
- Median Zip Code contains 13 total non-savers
  - 1.5 losers in 100
- Orland Park – 10 losers/100 higher than next highest

UPDATED NUMBERS!

THE LATEST COSTS AND BENEFITS OF RTP

- 83% of customers would have saved during the period from 3/20 - 2/21 (COVID era).
- 77% of customers would have saved in the prior, non-COVID period (3/19 - 2/20).

SO WHAT?

COSTS AND BENEFITS OF RTP

- RTP is appropriate for more consumers than we thought
- Investigate and promote opt-in RTP, advance underlying state policy, and consider transition to opt-out for EV owners
- Help consumers manage their peak load
- Advance data access policies to allow this approach in other states

CHARGE FOR LESS

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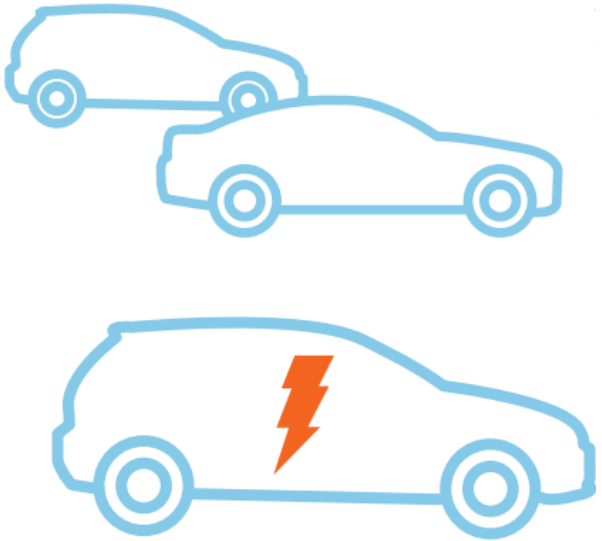


METHODOLOGY

CHARGE FOR LESS

	Battery Size	Max Charge Rate (L2)	kWh/100m	Range
Prius Prime (PHEV)	8.8 kWh	3.3 kW	25.9 EV/1.38 Hybrid	30 EV/640 Hybrid
Bolt (EV)	60 kWh	7.7 kW	28	230
Tesla (EV)	75	11.5 kW	26	310

METHODOLOGY

CHARGE FOR LESS

	Daily Miles Traveled			
PHEV	15 (Light)	30 (Average)	50 (Heavy)	100 (Lyft/Uber)
Bolt	15 (Light)	30 (Average)	50 (Heavy)	100 (Lyft/Uber)
Tesla	15 (Light)	30 (Average)	50 (Heavy)	100 (Lyft/Uber)

Product	Charge Rate
ChargePoint CT4000 L2	7.2 kW
ChargePoint Express 200 DC	50 kW

FINDINGS

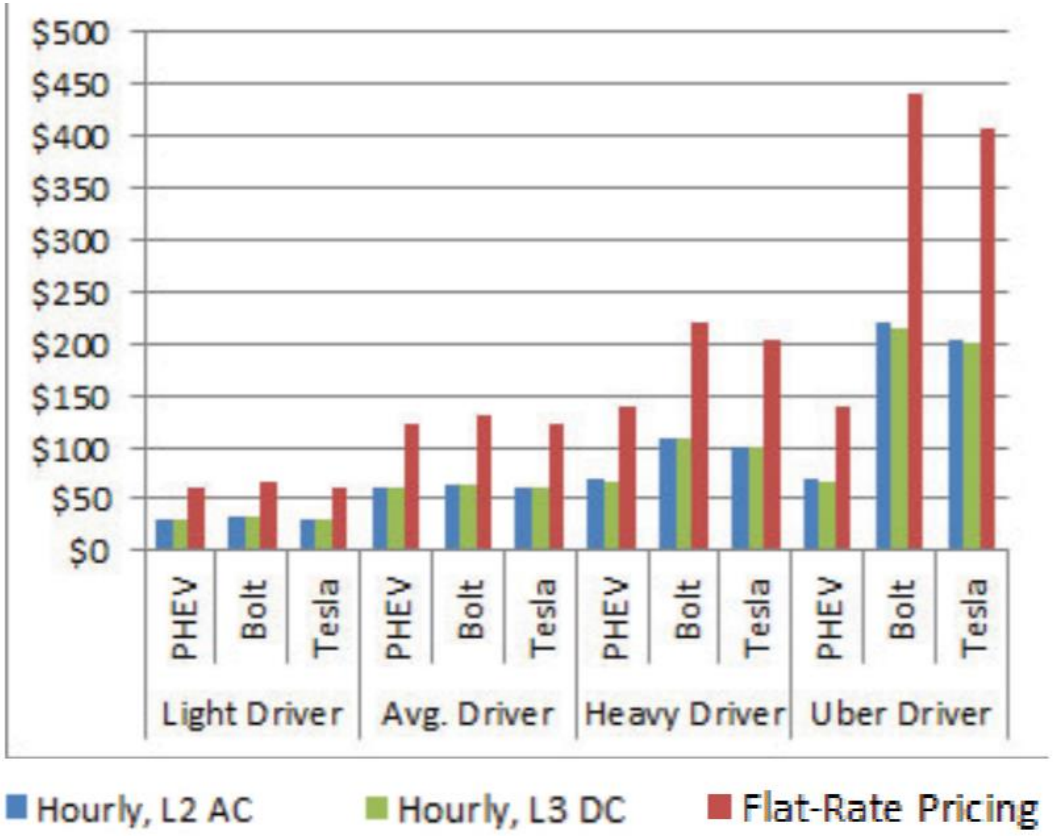
CHARGE FOR LESS

- Ameren's Power Smart Pricing program could have helped EV drivers reduce the annual cost for charging their vehicles by 50 – 51%, compared with what they would have paid under Ameren's traditional electric prices.

- The potential savings ranged from $31 to $220 over the year studied, 2018.

FINDINGS – FUEL COST COMPARISON

CHARGE FOR LESS



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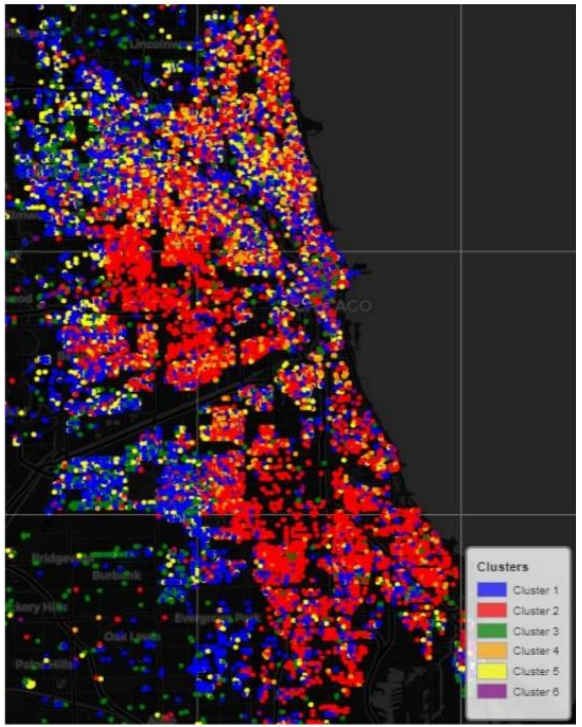


SIX UNIQUE LOAD SHAPES

METHODOLOGY

- Applied k-means clustering to energy usage data for 2.5 million residential customers of Commonwealth Edison and Ameren Illinois

- Matched resulting 6 clusters to Census Block Group level demographic data

FINDINGS

SIX UNIQUE LOAD SHAPES

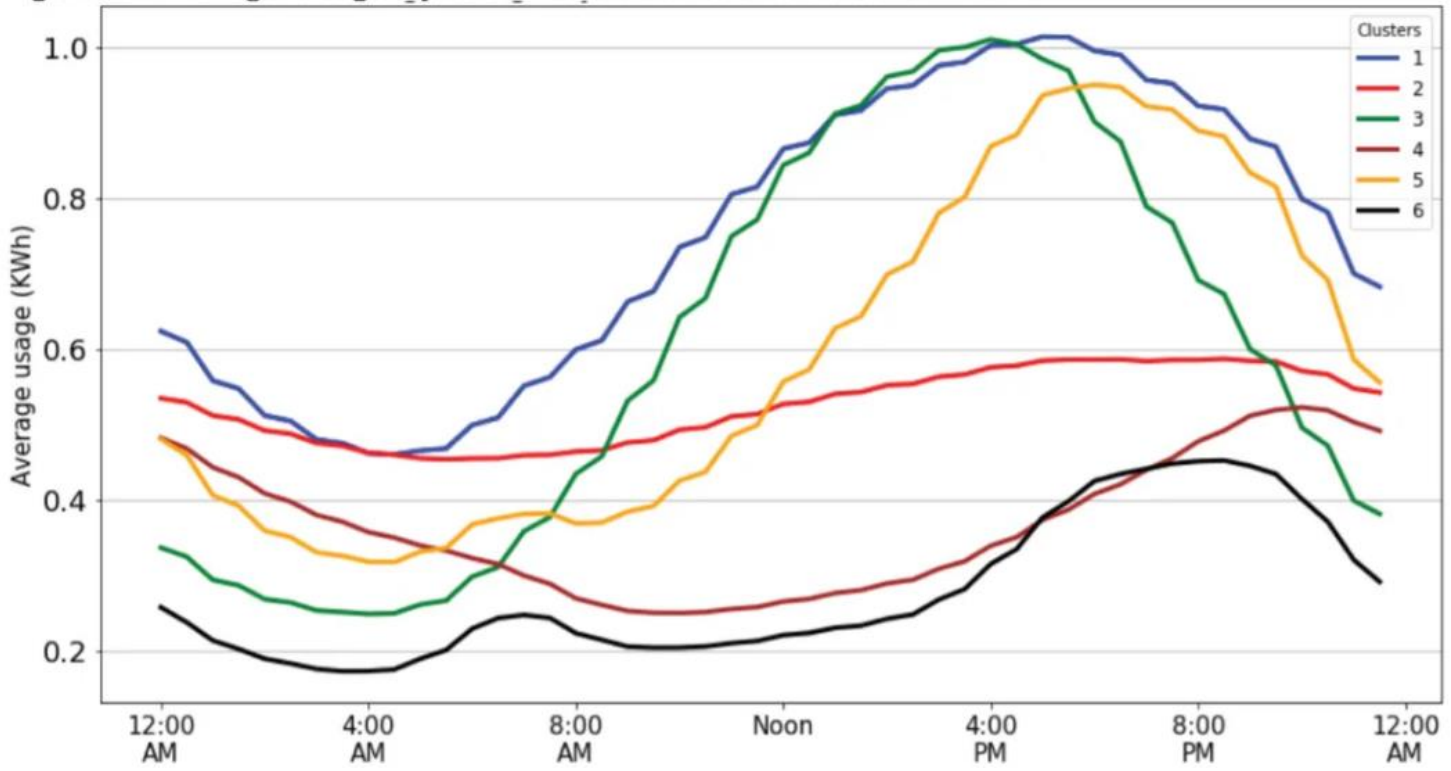
- Flatter load shapes were more likely in urban and low-income areas, with high-volume, peak usage more likely in high-income/suburban areas.

- Highlights inequitable cross-subsidization intrinsic to current rate design in Illinois.

FINDINGS

SIX UNIQUE LOAD SHAPES

Figure 5: Average usage by customers in different clusters in KWh



FINDINGS

SIX UNIQUE LOAD SHAPES

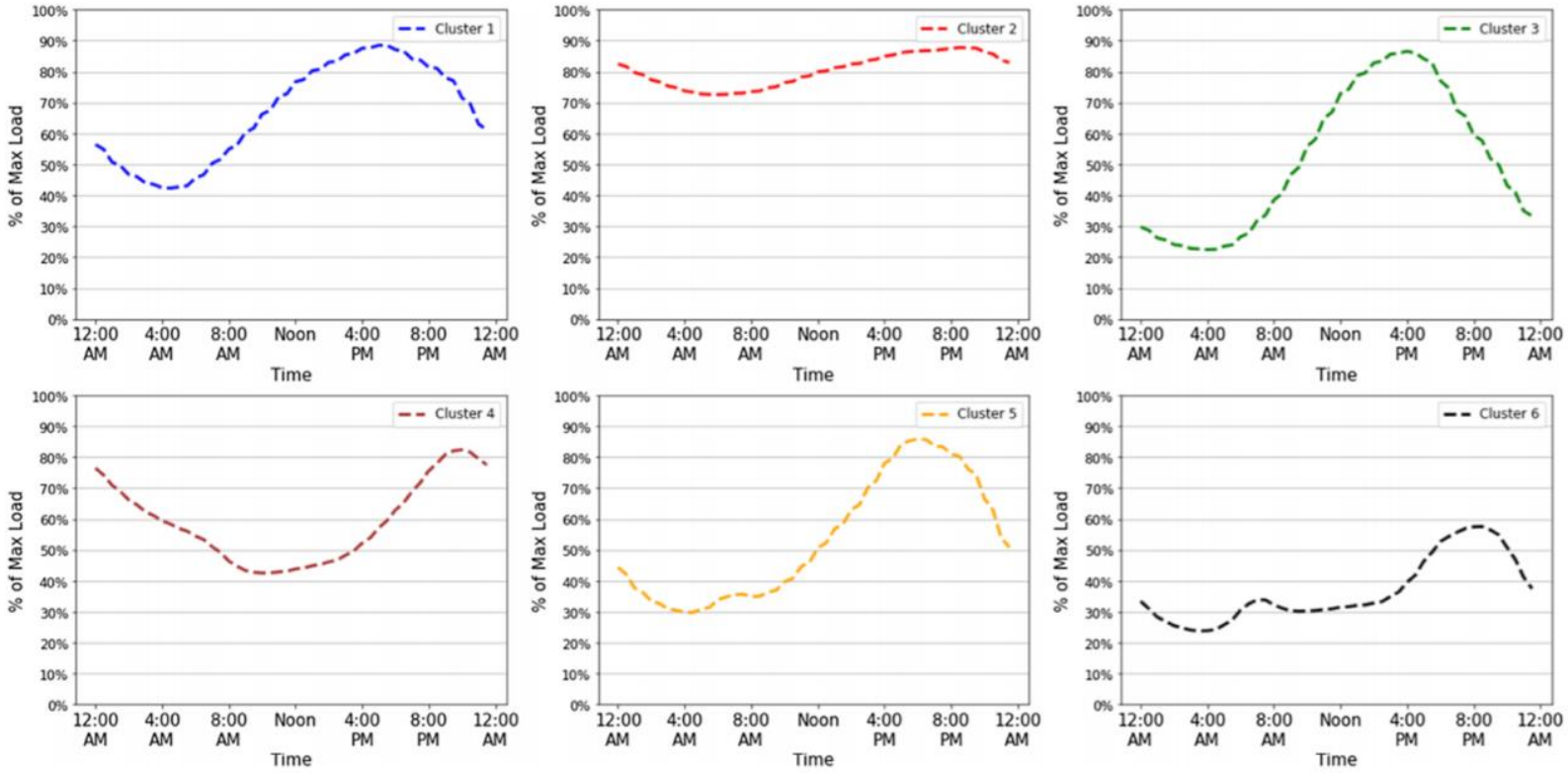


Fig. 1. Average summer weekday usage, in % of max loads.

RESEARCH TAKEAWAYS

- RRTP appropriate for more consumers than we thought
- Need to advance data access policies to allow this research in other states
- Investigate and promote opt-in RTP, advance underlying state policy, and consider transition to opt-out for EV owners
- Under common rate design, customers with flatter load-shapes (who tend to be lower-income) are subsidizing higher-income, higher-usage customers with peakier load-shapes

THANK YOU!

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COSTS & BENEFITS OF RTP: http://citizensutilityboard.org/wp-content/uploads/2017/11/FinalRealTimePricingWhitepaper.pdf

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