

Webinar: Dynamic Pricing

MEEA Policy Team

March 27, 2020

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

Housekeeping

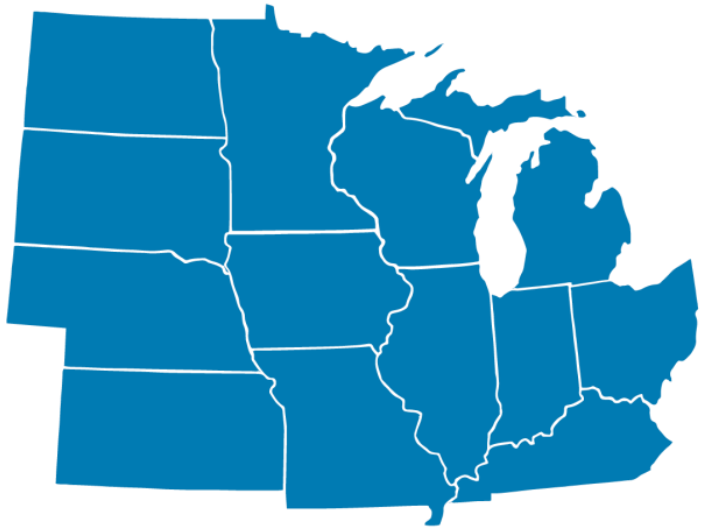
- Lines are muted
- Q&A at the end; enter questions in the “questions” box
- Slides and recording will be made available after the webinar
- Reach out if interested in MEEA’s Policy Committee

About MEEA

The Trusted Source on Energy Efficiency

We are a nonprofit membership organization with 160+ members, including:

- Utilities
- Research institutions
- State and local governments
- Energy efficiency-related businesses



As the key resource and champion for energy efficiency in the Midwest, MEEA helps a diverse range of stakeholders understand and implement cost-effective energy efficiency strategies that provide economic and environmental benefits.

Presenters

- Julia Friedman, Senior Manager, Regulatory Affairs, Oracle Utilities
- Elena Johnston, Senior Product Manager, Evergy
- Bethany Olsen, Smart Grid Program Manager, Elevate Energy
- Jeffrey Zethmayr, Director of Research, IL Citizens Utility Board

Rate, Rate, Do Tell Me

Time Varying Rates and the Role of Behavioral Science in Residential Peak Energy Management

- **Julia Friedman**

- March 27, 2020
- Day 15 of social distancing

Time Varying Rates

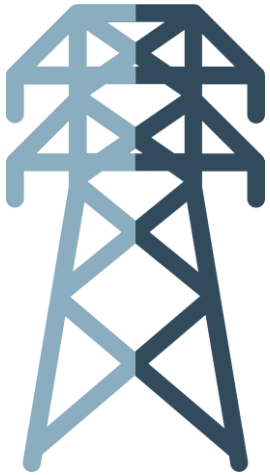
- **Time-of-use pricing (TOU)** –
- Applies to blocks of time (on- and off-peak, maybe intermediate peak)
- Hours of peak and off-peak may change seasonally
- Prices known ahead of time

Real-time pricing (RTP) – prices vary frequently over the day (usually hourly)

Variable Peak Pricing (VPP) – known peak and off-peak times, but prices may not be pre-determined

Critical peak pricing (CPP) -utilities call super peak events for a specific duration when they observe or anticipate very high wholesale market prices

Critical peak rebates (CPR) – reward instead of penalize customer during peak period. Like CPP, utilities call super peak events for a pre-determined time period, customer is rewarded for reducing consumption during that time.



10% of the US electric system is built to meet demand

in **1%** of the hours in a year

"You can't have a smart grid with dumb rates"

- Fred Butler, former NARUC President

Source: Fred Butler, chair of the association of state regulators in Peter Fox-Penner(2010): Smart Power Anniversary Edition; Navigant Consulting and Advanced Energy Economy (2015): Peak Demand Reduction Strategy, link

So let's do this!

- ✓Utilities have been and continue to offer residential TOU rates (~50% of all IOUs offer residential TOU)
- ✓We have the infrastructure (AMI, data analytics, billing systems, etc.)
- ✓Stakeholders (policymakers, environmental advocates, and others) are interested

- ✓*But 1.7% of all residential customers are enrolled on a TOU rate*

Data source: The National Landscape of Residential TOU Rates, The Brattle Group

Variable rates have a perception problem

Policymakers and regulators

+ Lower system costs

+ Reduced emissions

Utility company

+ Aligned delivery costs

- Angry customers

Utility customer

- Confusing rates

- Higher bills

- **Utility customers don’t enroll in variable rates**

One utility found **77%** of their customers would save on a variable rate.

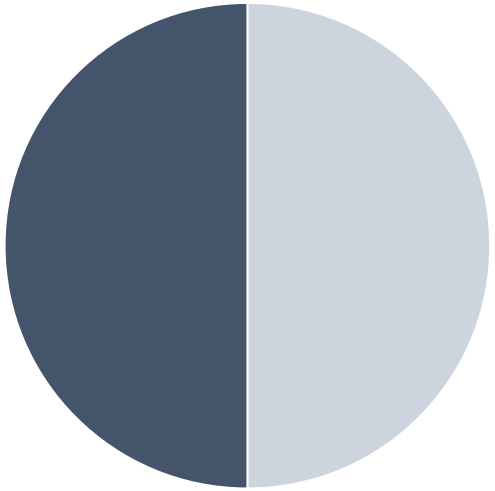
So they spent **$37M** on mass marketing.

1.5% of their customers enrolled.

- **Utility customers don’t understand variable rates**

69%

Many think it’s unfair to change prices with demand



Half the customers in a CA peak rebate program didn’t know they were enrolled

2X

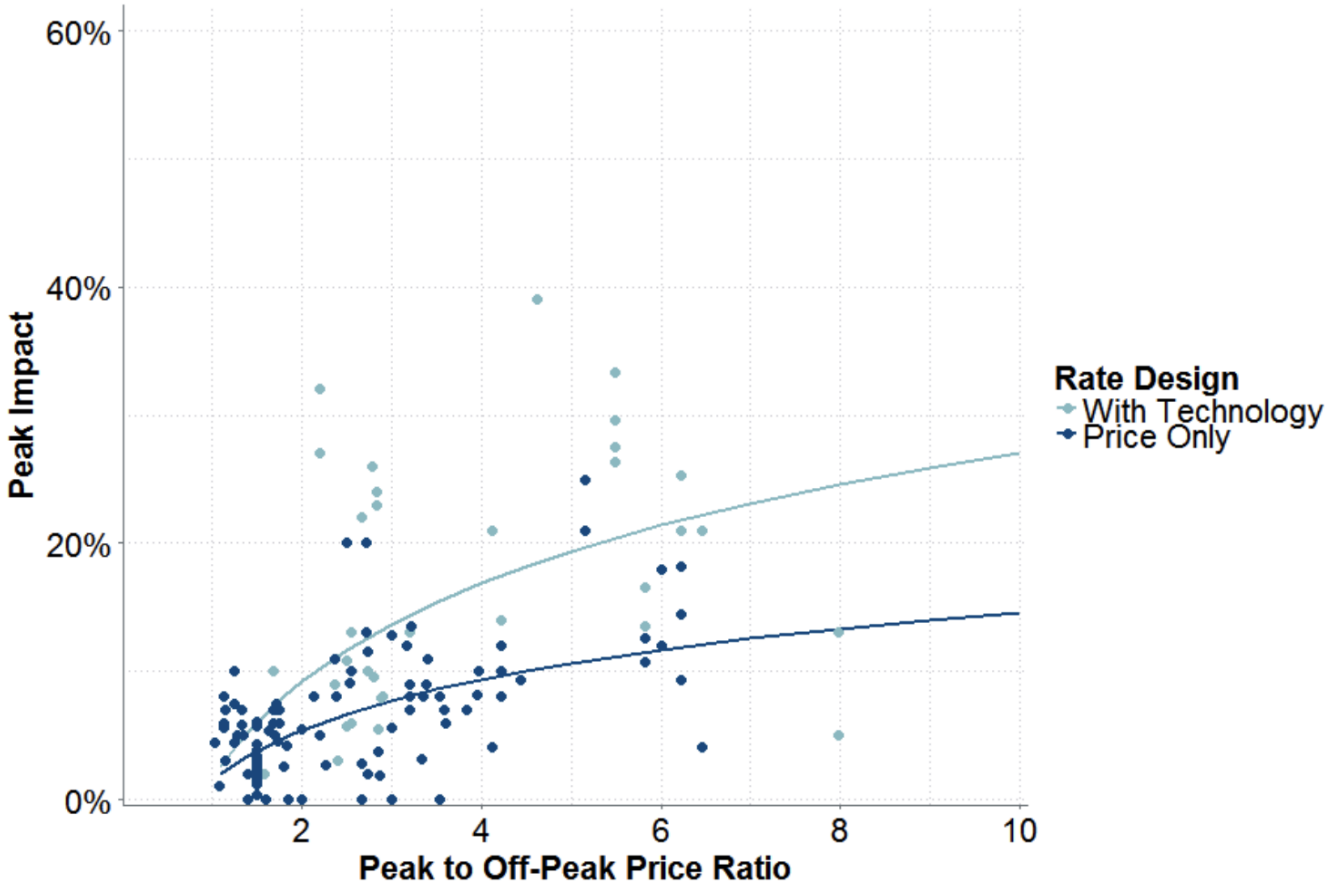
Twice as many customers think bills will increase
vs. decrease

“I don’t know how it works. I wish I did. I know they have peak hours and you should try to avoid them…

…It’s 2-4 or 3-5. Maybe 4-6. Somewhere in there. Yeah, I just don’t know...”

Amanda, UX Research Subject

Let's solve for the customer's needs *and achieve* incremental peak reduction



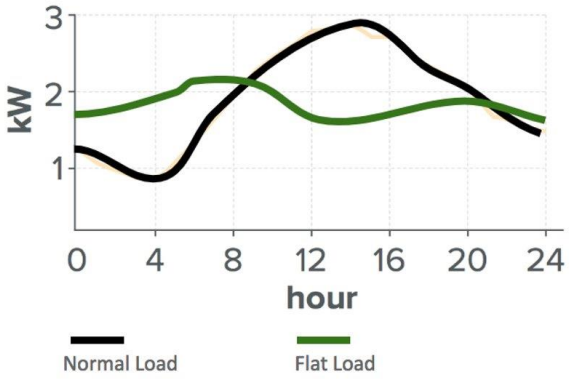
Enabling technologies, like smart thermostats and appliances, drive peak reduction that is additional to the price signal.

Can behavioral interventions do the same?

Source: "National Landscape of Residential TOU Rates", Brattle Group

Behavioral Load Shaping ena s two types of outcomes

Grid Impacts



Peak reduction

Load Shifting

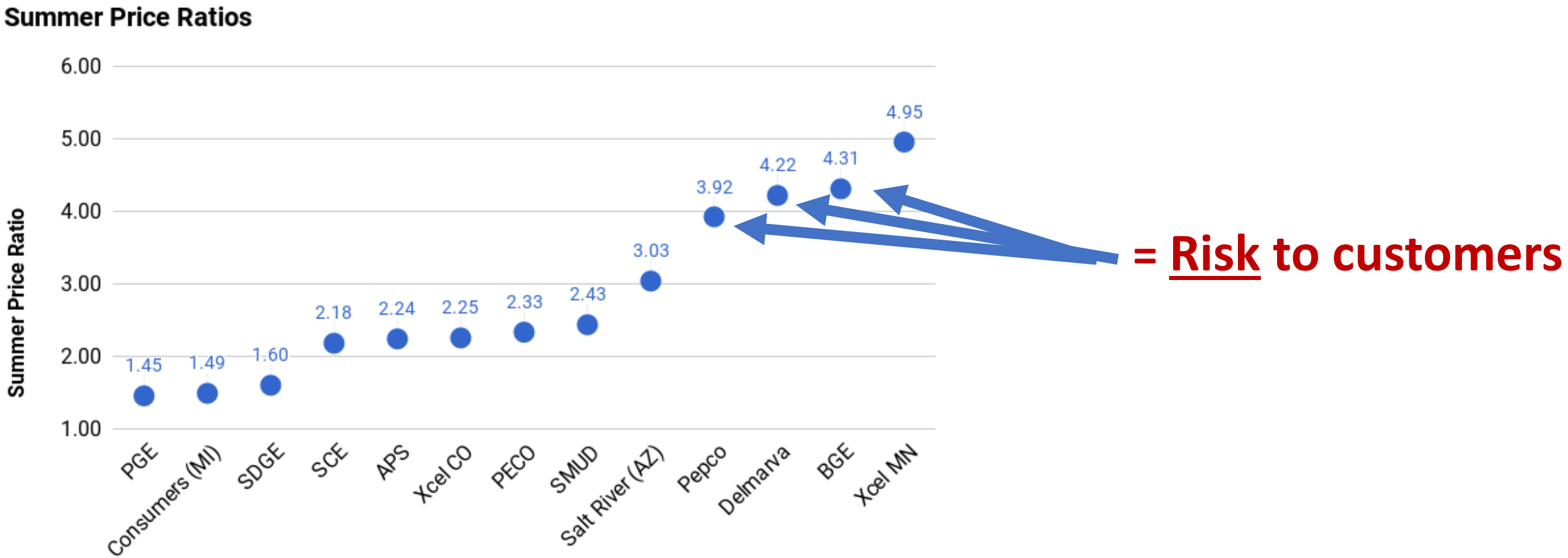
Engage Customers

Customer satisfaction

Reduce service costs

Manage customers' risk exposure

The higher the peak-to-off-peak ratio, the higher the risk (and reward) to customers



Behavioral Load Shaping launched in Maryland last spring.

"…give customers the opportunity to use the latest technology to better control their usage and participate in AMI-enabled offerings…While time-varying rates will result in customers paying higher rates for electricity usage during peak periods, and substantially lower rates during off-peak periods, ***the Commission finds that using AMI data-enabled messaging can lessen any downside risk and help customers have a successful experience with time-varying rates.***

Accordingly, the ***TOU pilot programs may proceed using the Oracle Behavioral Load Shifting*** *tool."*

- Maryland Public Service Commission, Letter Order, December 14, 2018

Safe harbor statement

- The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

Thank you!

- **Julia Friedman**
- Senior Manager, Regulatory Affairs
- julia.friedman@oracle.com

Evergy's Power of Choice Plans

March 27, 2020

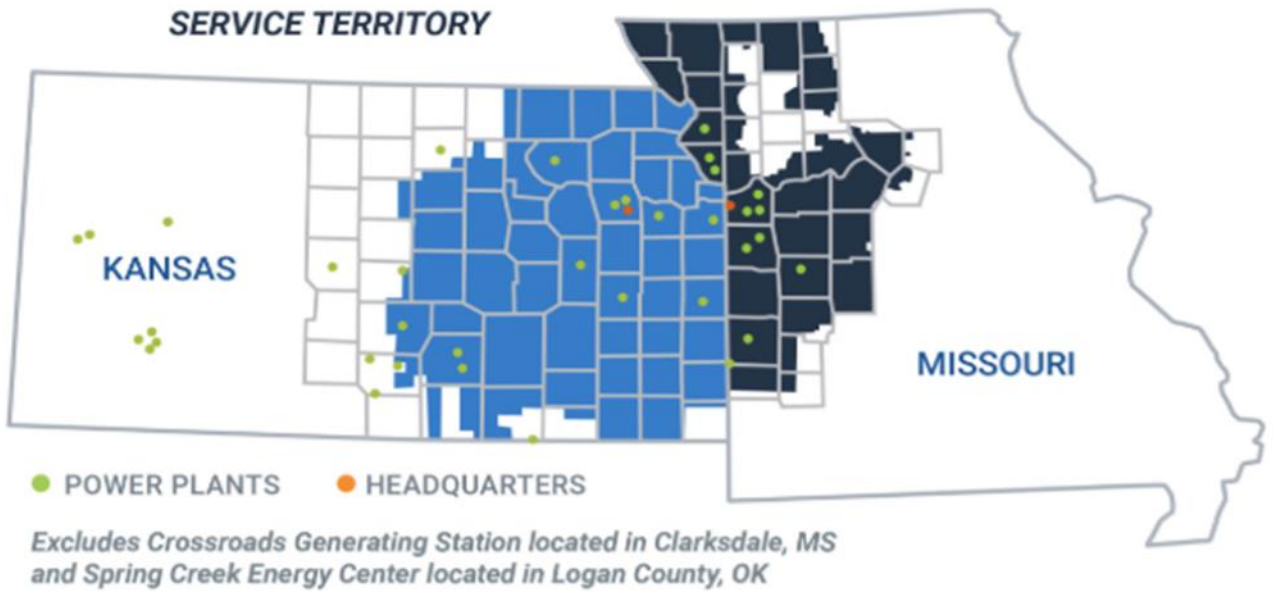
Introduction

Elena Johnston

Senior Product Manager

Evergy

linkedin.com/in/heyelena



KCP&L and Westar Merged to form **Evergy**

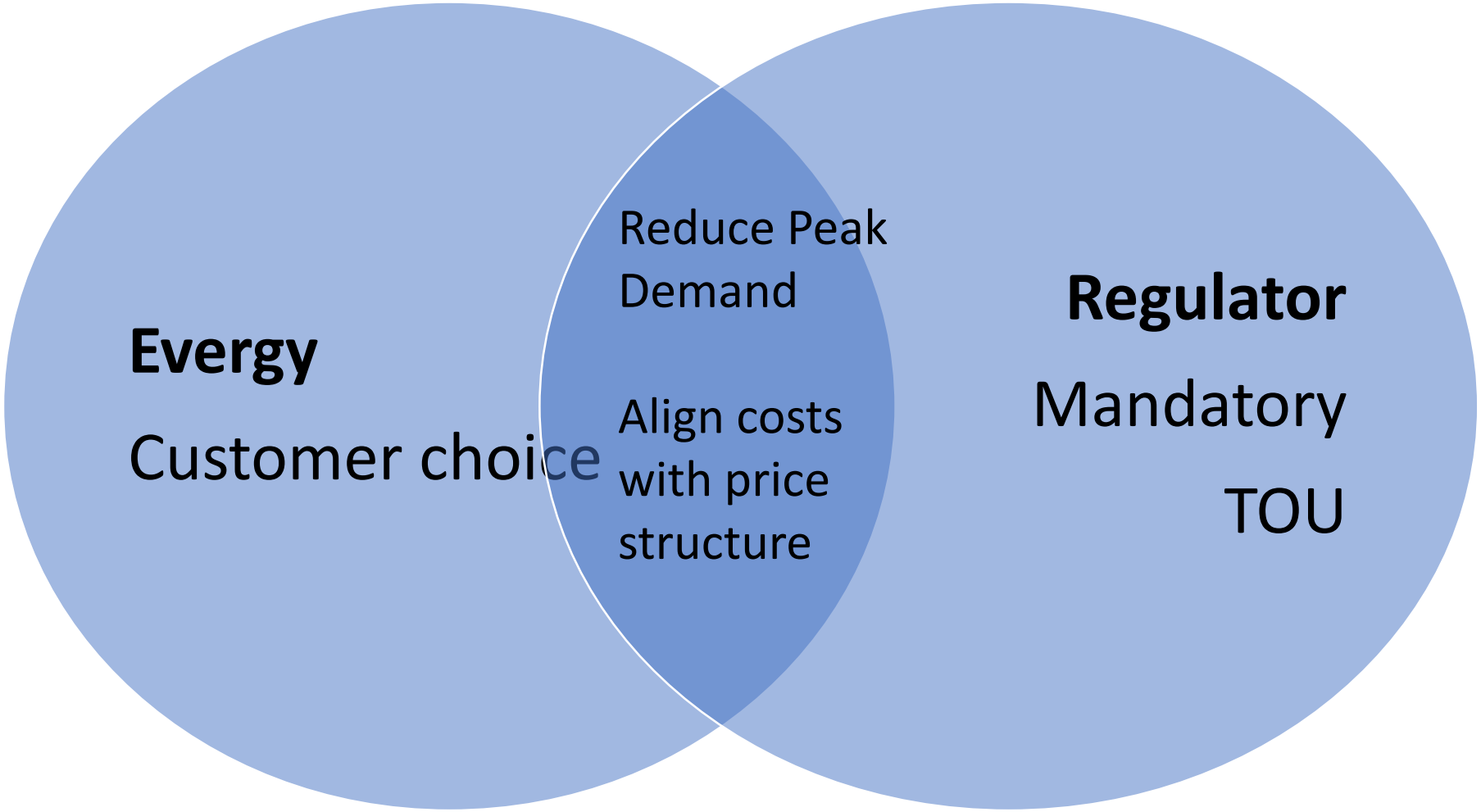
- 1.6M customers served
- 51k miles of owned and operated distribution lines
- 13k MW of generation

evergy

Agenda

1. Customer Choice vs Default Rates
2. Rate Plan Options, Project Scope, and Approach
3. Evergy's Engagement Strategy
4. Results, Lessons Learned, and What's Next

Evergy & Regulator has shared goals, but different paths



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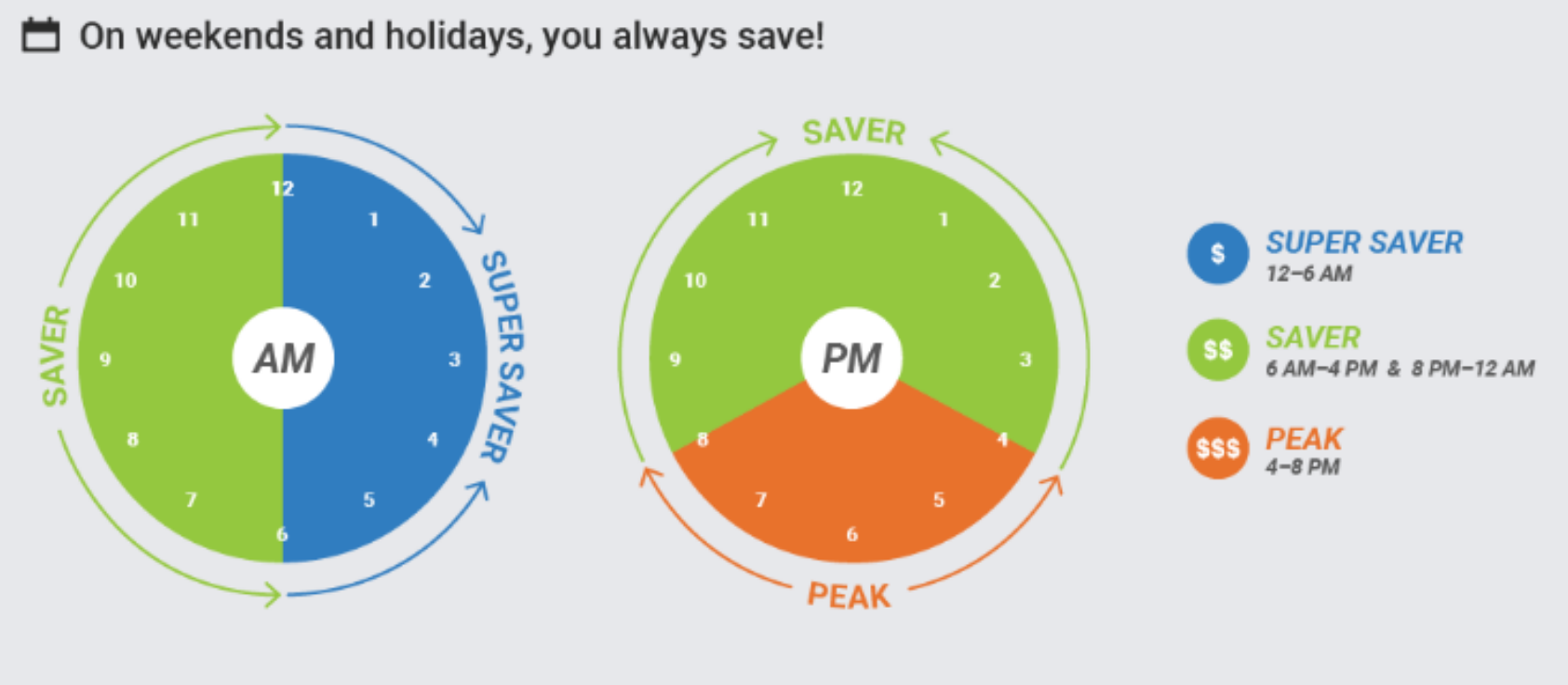
Residential Optional Rate Structures – Time of Use Plan

Missouri and Kansas – Time of Use Plan (MO 3,500 enrollment goal)



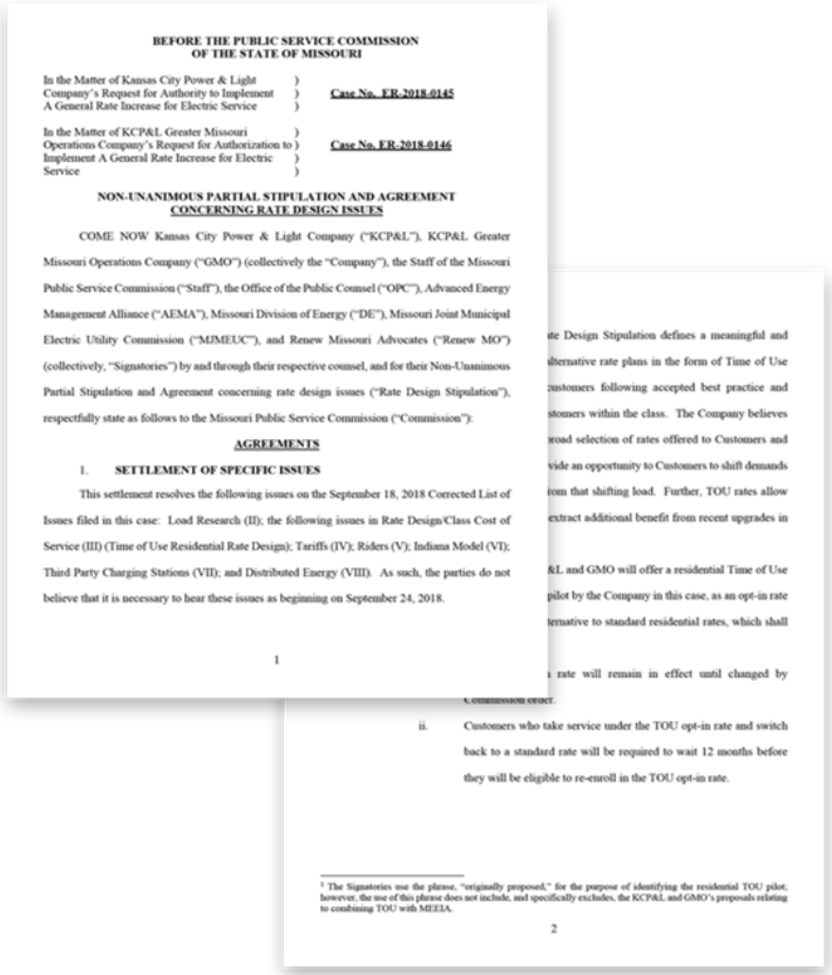
On weekdays, electricity is **6x** more expensive from 4 pm to 8 pm, compared to the Super Saver period

Residential Optional Rate Structures – Even Use Plan

Kansas – Even Use Plan (demand rate) – 1k enrollment cap

On weekdays, a **demand charge** is applicable between 4 pm to 8 pm, 1x per billing cycle

Project Scope



BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light Company's Request for Authority to Implement A General Rate Increase for Electric Service) Case No. ER-2018-0145

In the Matter of KCP&L Greater Missouri Operations Company's Request for Authorization to Implement A General Rate Increase for Electric Service) Case No. ER-2018-0146

NON-UNANIMOUS PARTIAL STIPULATION AND AGREEMENT CONCERNING RATE DESIGN ISSUES

COME NOW Kansas City Power & Light Company ("KCP&L"), KCP&L Greater Missouri Operations Company ("GMO") (collectively the "Company"), the Staff of the Missouri Public Service Commission ("Staff"), the Office of the Public Counsel ("OPC"), Advanced Energy Management Alliance ("AEMA"), Missouri Division of Energy ("DE"), Missouri Joint Municipal Electric Utility Commission ("MJMEUC"), and Renew Missouri Advocates ("Renew MO") (collectively, "Signatories") by and through their respective counsel, and for their Non-Unanimous Partial Stipulation and Agreement concerning rate design issues ("Rate Design Stipulation"), respectfully state as follows to the Missouri Public Service Commission ("Commission"):

AGREEMENTS

1. SETTLEMENT OF SPECIFIC ISSUES

This settlement resolves the following issues on the September 18, 2018 Corrected List of Issues filed in this case: Load Research (II); the following issues in Rate Design/Class Cost of Service (III) (Time of Use Residential Rate Design); Tariffs (IV); Riders (V); Indiana Model (VI); Third Party Charging Stations (VII); and Distributed Energy (VIII). As such, the parties do not believe that it is necessary to hear these issues as beginning on September 24, 2018.

1

te Design Stipulation defines a meaningful and
lternative rate plans in the form of Time of Use
ustomers following accepted best practice and
stomers within the class. The Company believes
road selection of rates offered to Customers and
vide an opportunity to Customers to shift demands
om that shifting load. Further, TOU rates allow
extract additional benefit from recent upgrades in

&L and GMO will offer a residential Time of Use
pilot by the Company in this case, as an opt-in rate
rnative to standard residential rates, which shall

rate will remain in effect until changed by
Commission order.

ii. Customers who take service under the TOU opt-in rate and switch back to a standard rate will be required to wait 12 months before they will be eligible to re-enroll in the TOU opt-in rate.

[1] The Signatories use the phrase, "originally proposed," for the purpose of identifying the residential TOU pilot; however, the use of this phrase does not include, and specifically excludes, the KCP&L and GMO's proposals relating to combining TOU with MEEIA.

2

Stipulated terms for opt-in MO TOU rate

1. Establish a global awareness, education and marketing plan to reach all customers
2. Enroll customers within the opt-in TOU rate plan, 3,500 enrollment goal by end of 2020
3. Shadow Billing Business Case
4. Evaluation, Measurement and Verification (EM&V)
5. Customer Research
6. Customer Behavior Metrics
7. Customer Feedback Mechanism
8. Stakeholder and Commission Engagement
9. TOU Rate Design Case

Approach

Team

- Formed a cross-functional team of 80+ subject matter experts across the company

Defined Goals

Innovate technologically

Productize rate options

Drive market awareness and adoption

Measure outcomes:

- Enrollments
  - Channel activity
- Marketing Performance
- Tools & Communications Engagement
- Customer Feedback
- Customer Behavior
- Evaluation, Measurement, & Verification

Research

Industry best practices

Design workshops

Customer

Shadow Billing

Partnerships

Agenda

1. Customer Choice vs Default Rates
2. Rate Plan Options, Project Scope, and Approach
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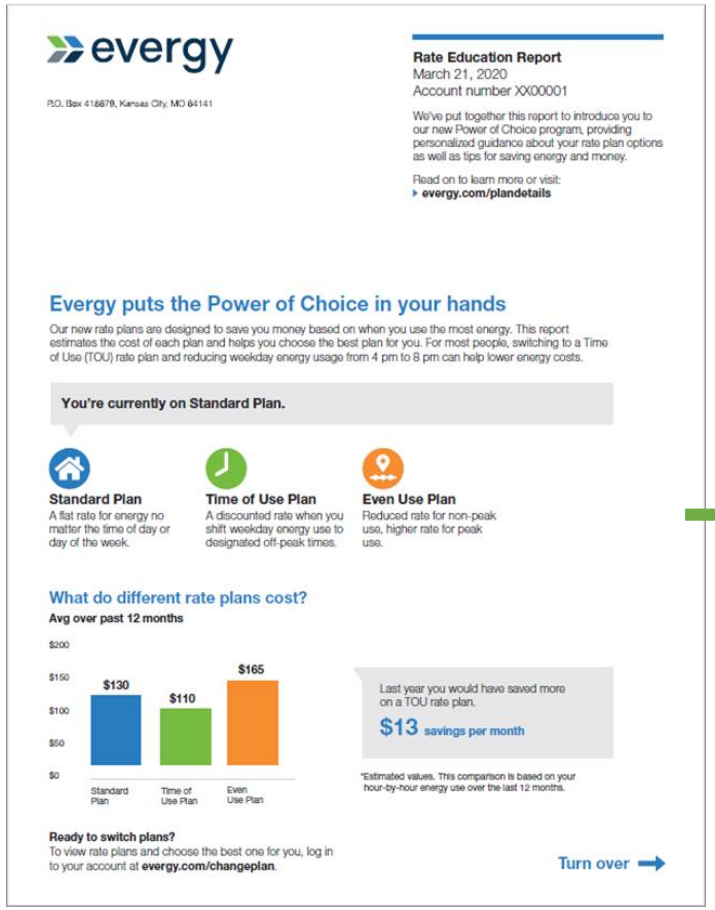
Engagement Strategy

Step 1: Rate Education Reports



evergy

P.O. Box 418679, Kansas City, MO 64141

Rate Education Report
March 21, 2020
Account number XX00001

We've put together this report to introduce you to our new Power of Choice program, providing personalized guidance about your rate plan options as well as tips for saving energy and money.

Read on to learn more or visit:
▸ **evergy.com/plandetails**

Evergy puts the Power of Choice in your hands

Our new rate plans are designed to save you money based on when you use the most energy. This report estimates the cost of each plan and helps you choose the best plan for you. For most people, switching to a Time of Use (TOU) rate plan and reducing weekday energy usage from 4 pm to 8 pm can help lower energy costs.

You're currently on Standard Plan.

Standard Plan
A flat rate for energy no matter the time of day or day of the week.

Time of Use Plan
A discounted rate when you shift weekday energy use to designated off-peak times.

Even Use Plan
Reduced rate for non-peak use, higher rate for peak use.

What do different rate plans cost?

Avg over past 12 months

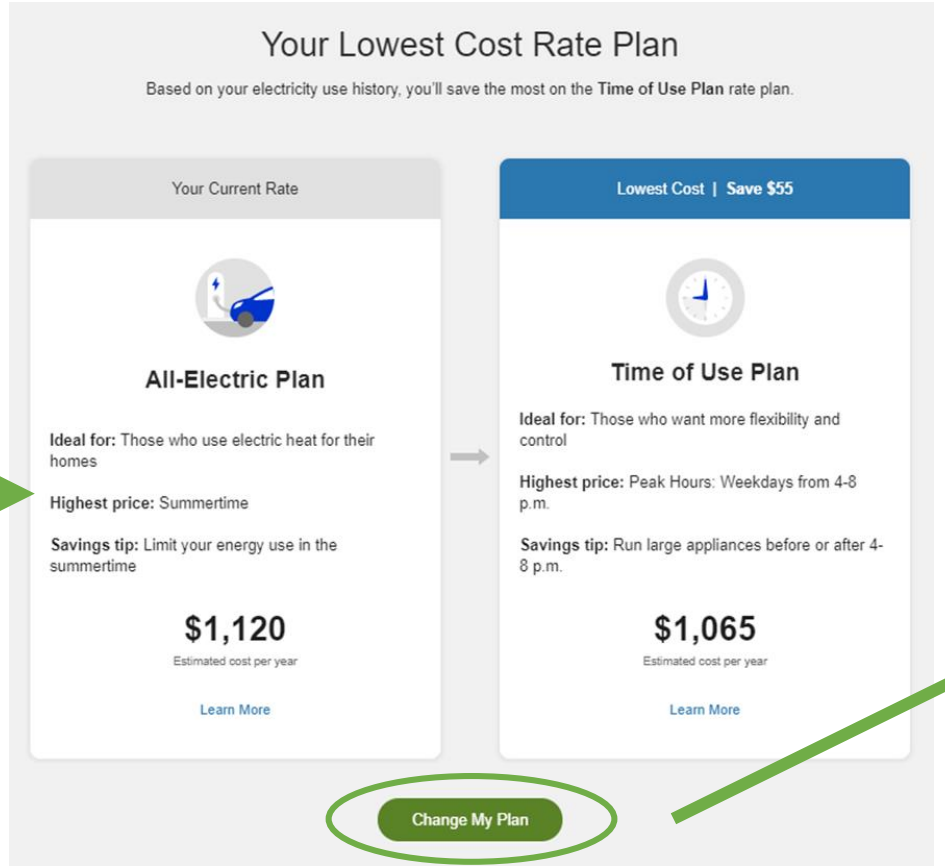
Last year you would have saved more on a TOU rate plan.
$13 savings per month

*Estimated values. This comparison is based on your hour-by-hour energy use over the last 12 months.

Ready to switch plans?
To view rate plans and choose the best one for you, log in to your account at **evergy.com/changeplan**.

Turn over

Step 2: Online Rate Analysis Tool



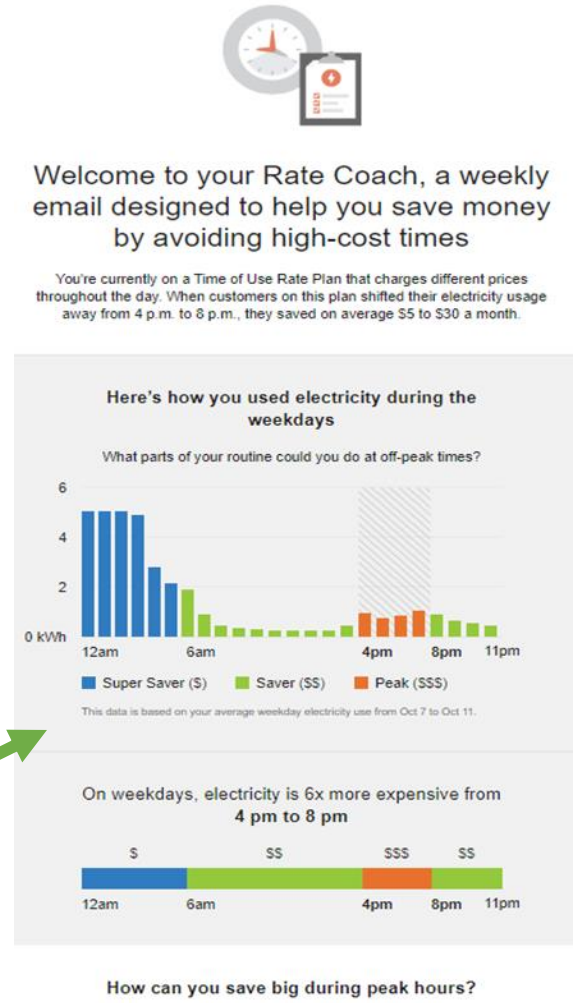
Your Lowest Cost Rate Plan

Based on your electricity use history, you'll save the most on the **Time of Use Plan** rate plan.

Your Current Rate	Lowest Cost | Save $55
All-Electric Plan	**Time of Use Plan**
Ideal for: Those who use electric heat for their homes	**Ideal for:** Those who want more flexibility and control
Highest price: Summertime	**Highest price:** Peak Hours: Weekdays from 4-8 p.m.
Savings tip: Limit your energy use in the summertime	**Savings tip:** Run large appliances before or after 4-8 p.m.
$1,120 Estimated cost per year	**$1,065** Estimated cost per year
Learn More	Learn More

Change My Plan

Step 3: Post-Enrollment Reports



Welcome to your Rate Coach, a weekly email designed to help you save money by avoiding high-cost times

You're currently on a Time of Use Rate Plan that charges different prices throughout the day. When customers on this plan shifted their electricity usage away from 4 p.m. to 8 p.m., they saved on average $5 to $30 a month.

Here's how you used electricity during the weekdays

What parts of your routine could you do at off-peak times?

This data is based on your average weekday electricity use from Oct 7 to Oct 11.

On weekdays, electricity is 6x more expensive from 4 pm to 8 pm

How can you save big during peak hours?

evergy™

Agenda

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Results

4,300+

Total Enrollments

95% of MO enrollment goal in 6 months

96%

Customers enrolled online

81%

Customers looked at Rate Analysis Tool before enrolling

75%

Unique open rate – Opower BLS emails

Evergy company average is ~40%

evergy

3 Key Lessons Learned

Rate comparison and educational tools are necessary

Recommend a multi-channel enrollment approach, but drive digital

Post-enrollment engagement is as critical as pre-enrollment

The Future of Rates at Evergy

We have digital infrastructure and engagement strategy for rates

Strategy and results help inform next rate cases in 2022/2023

Demonstrate that we know how to do opt-in engagement

Questions and Connect

Elena Johnston

Senior Product Manager

Evergy

linkedin.com/in/heyelena

Dynamic Electricity Rates in Illinois

Bethany K. Olso

Smart Grid Project Ma

evergy™

Our Mission: Smarter Energy Use for All

We give people the resources they need to make informed energy choices.

Getting energy use right saves money, increases comfort, creates jobs, and protects the environment.

We ensure the benefits of clean and energy efficient energy use reach those who need them most.

3rd Party Administrator – Our Role

- Customer service support – **dedicated call center**
- **Marketing** and **outreach**
- **Education** and enrollment
- Online **bill comparison tool** to show customers how they perform
- **High price alerts** and notifications to prepare customers for higher prices
- On-going customer communication to help existing customers maintain and **improve savings**

Dynamic Pricing in Illinois

Energy Smart Pricing Plan *(2003 – 2006)*

- 1,500 household pilot

ComEd Customer Applications Pilot *(2010)*

- 8,500 households
- Tested five different rates

COMED'S HOURLY PRICING PROGRAM

(2007 – present)

- Rate option: Real-time hourly pricing
- 34,000 households
- $23 million saved (19%)

Power Smart Pricing

Ameren ILLINOIS

(2007 – present)

- Rate option: Day-ahead hourly pricing
- 13,000 households
- $12 million saved (16%)
- $2.25 monthly participation fee

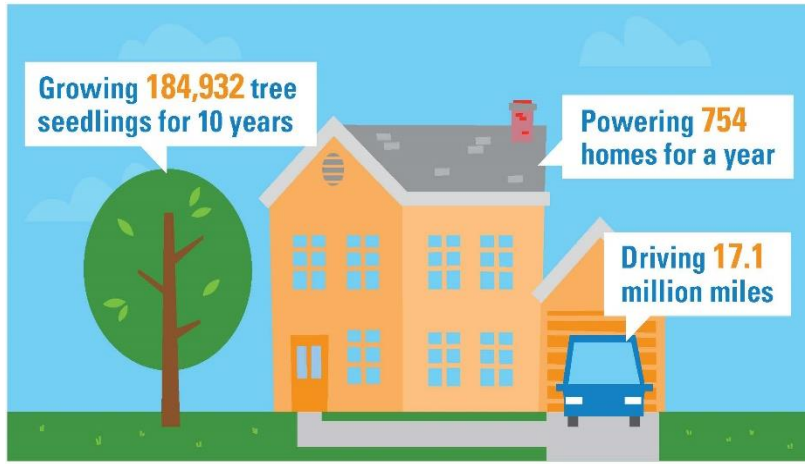
Benefits

Ameren Illinois Power Smart Pricing

Reduce over
10 million kWh
in energy use

Avoid over
15.7 million lbs.
in greenhouse gas emissions

That's the same as:

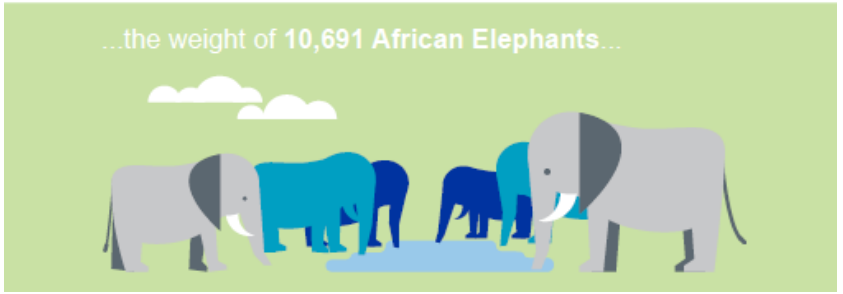


ComEd's Hourly Pricing Program

65 million kWh
reduced in
energy use

$21 million
saved on
energy bills

Together, Hourly Pricing participants have helped prevent **58,193 metric tons of CO_2e** from entering the atmosphere. That's equal to…

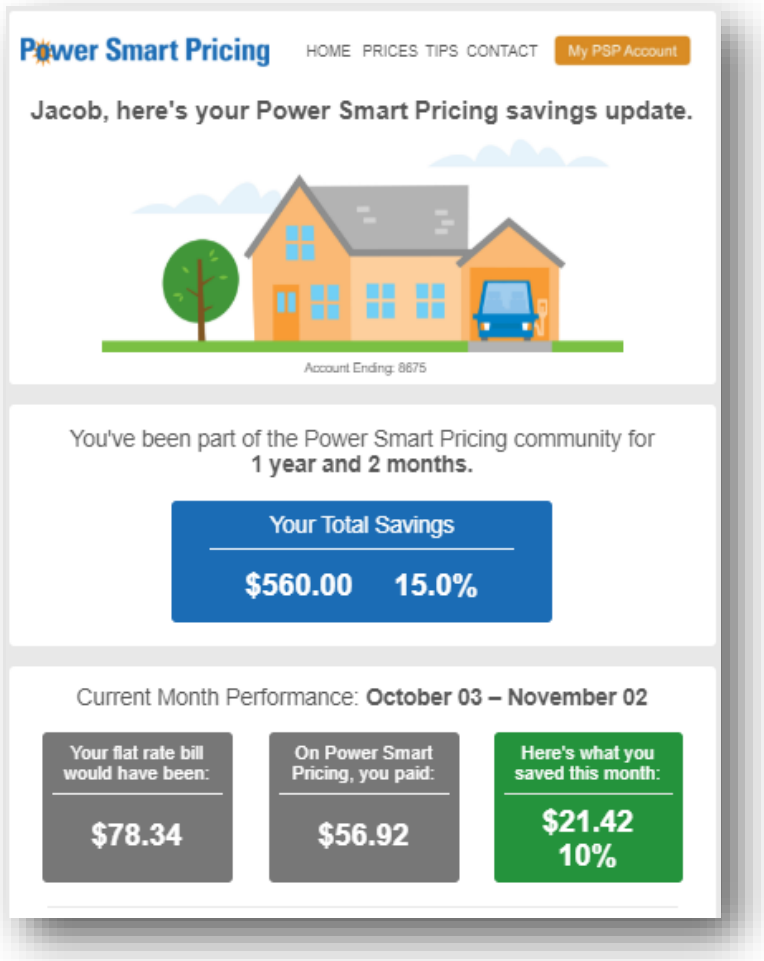


Who Can Benefit

- Real time prices would have saved money for 97 percent of customers in 2016 – *even if the customers made no changes to how they use electricity*
- Generates savings for low-income participants

Monthly Savings Reports

- Monthly bill comparison email



Annual Savings Reports

- Annual participant performance report

Your Performance Results

Program Totals

$2,786.68
Saved on Power Smart Pricing

19%
Saved on Power Smart Pricing

104
Months on Power Smart Pricing

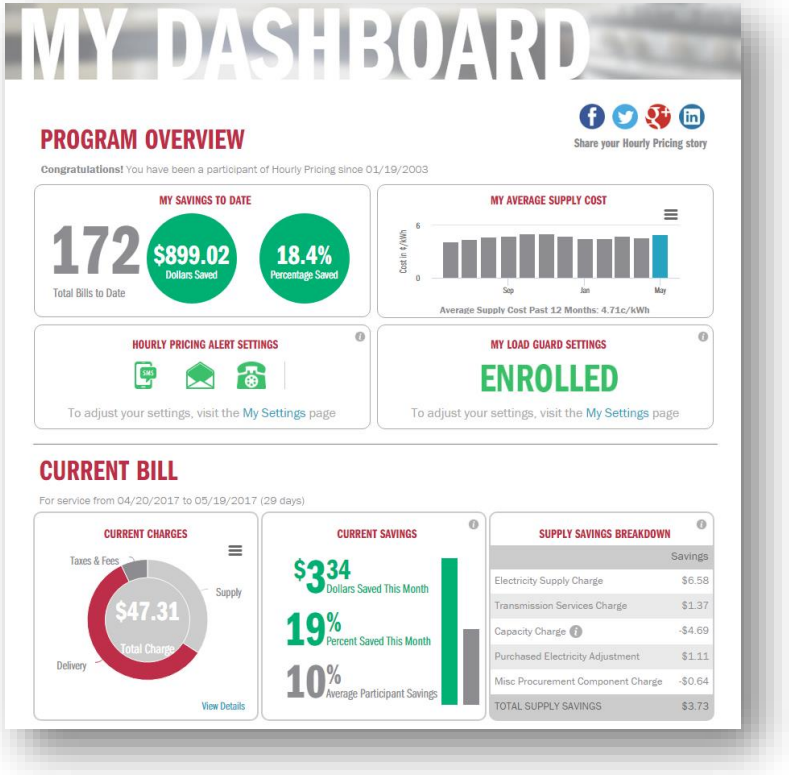
Your 2018 Monthly Breakdown

Month	Usage (kWh)	Dollars Saved	Percent Saved*
January	3,902	$4.87	3%
February	2,759	$50.72	36%
March	2,551	$49.78	39%
April	4,868	$55.72	24%
May	2,270	$32.99	29%
June	2,103	$2.40	2%
July	3,578	$12.60	8%
August	2,467	$10.79	10%
September	2,179	$15.48	15%
October	2,709	$6.18	5%
November	3,865	-$0.01	0%
December	2,974	$1.62	1%
2018 total	**36,225**	**$243.14**	**14%**

Savings comparisons are based on the Ameren Illinois standard flat rate. The monthly participation fee of $2.25 has already been deducted from your savings information to reflect your net savings on Power Smart Pricing.
*Savings percent calculated using charges related to Power Smart Pricing participation.

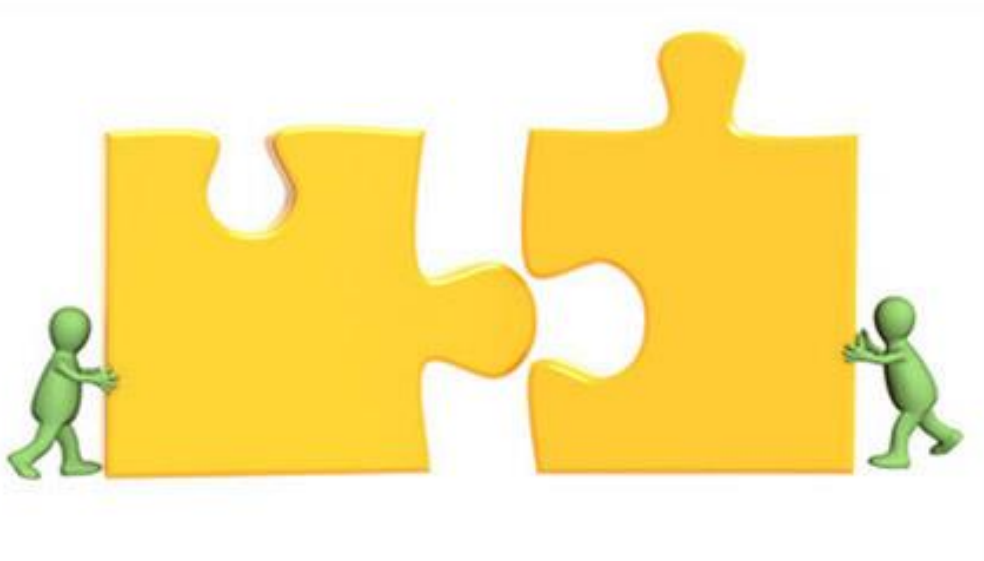
Digging Deeper into the Data

- Personalized Savings Portal
  - See total and monthly savings
  - Get a detailed breakdown of the line items on your bill
  - View and download their monthly, weekly, and daily electricity usage

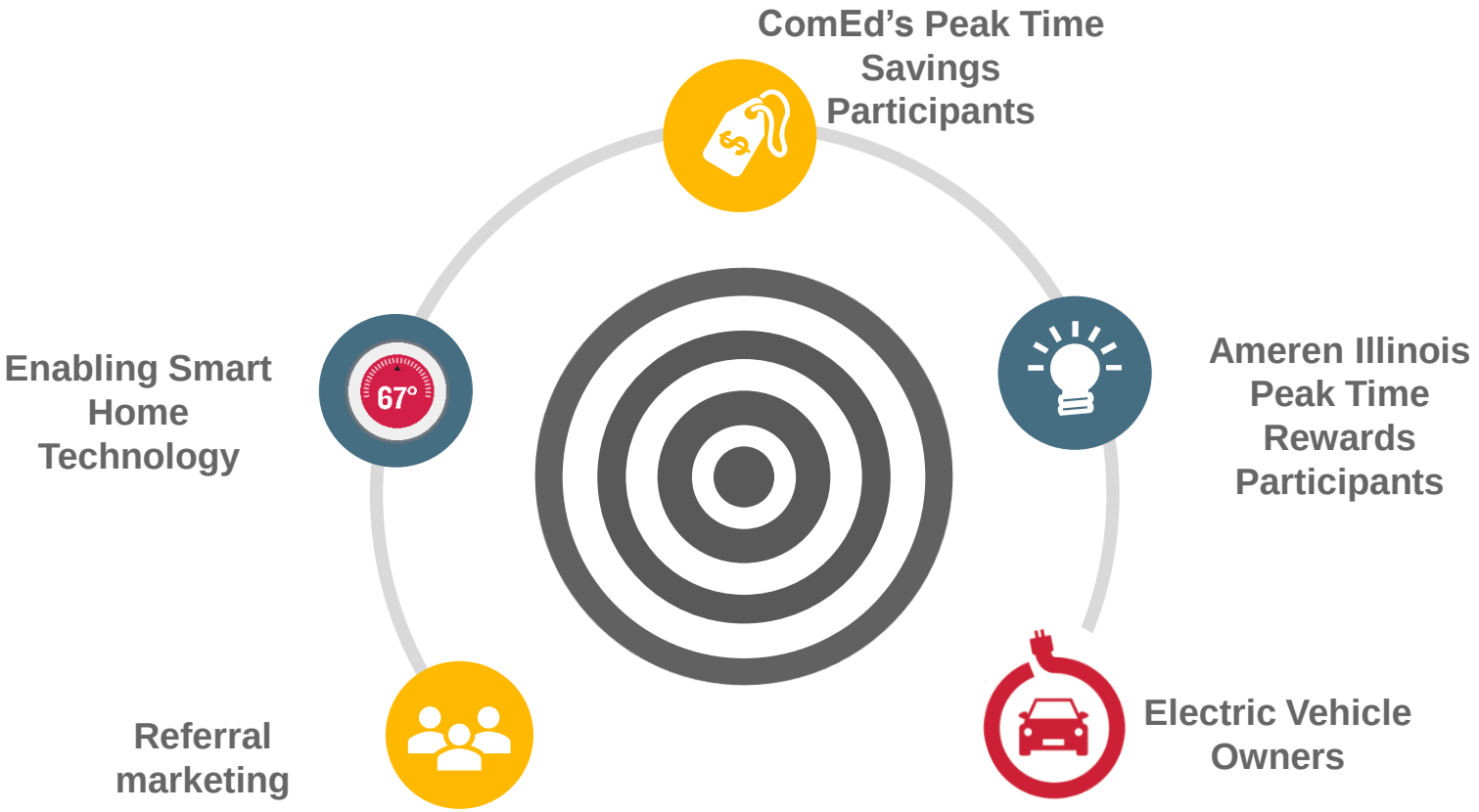


Dynamic Pricing Participation Made Easy

- Simplify the message
- Make the ask easy
- Develop new tools to engage and save

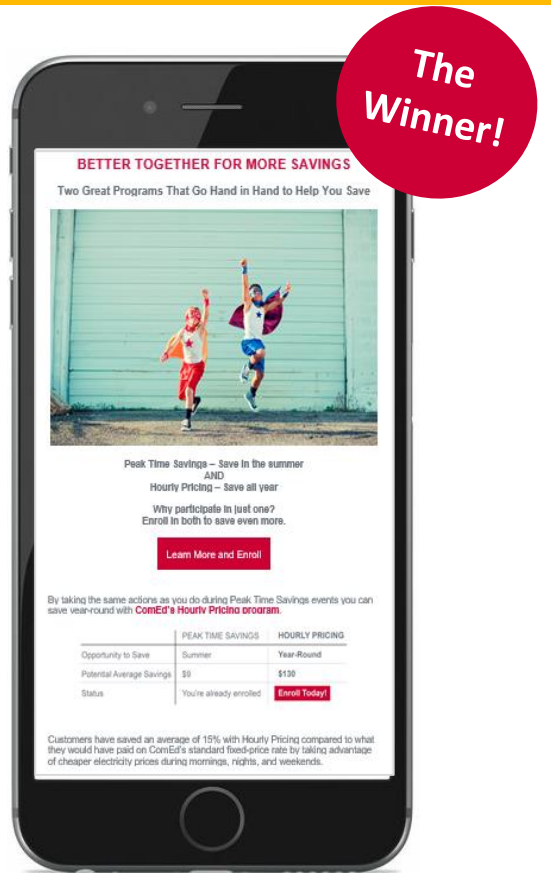


We Got Smarter Along with the Smart Grid



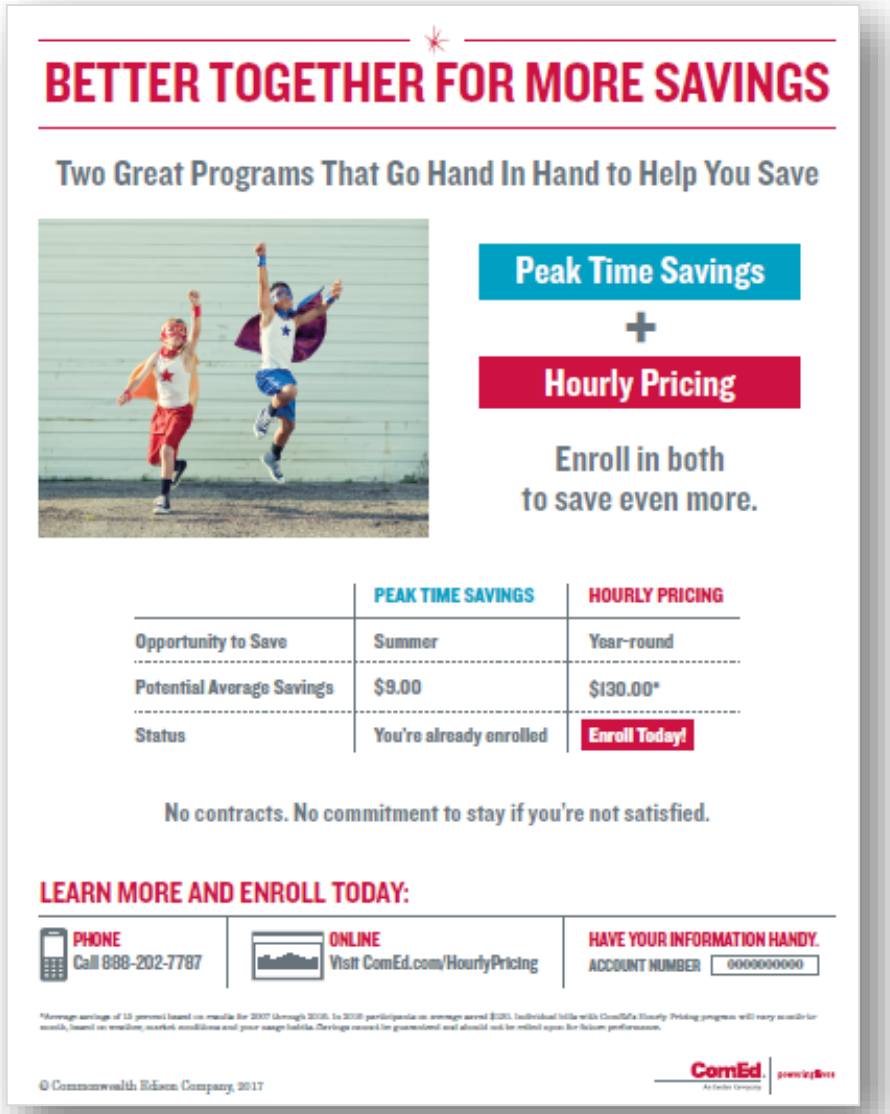
Refining the Message: Email A/B Testing

- Version A
- Prior winning message



- Version B
- New message and design

Applying the Results



BETTER TOGETHER FOR MORE SAVINGS

Two Great Programs That Go Hand In Hand to Help You Save

Peak Time Savings

+

Hourly Pricing

Enroll in both
to save even more.

	PEAK TIME SAVINGS	HOURLY PRICING
Opportunity to Save	Summer	Year-round
Potential Average Savings	$9.00	$130.00*
Status	You're already enrolled	Enroll Today!

No contracts. No commitment to stay if you're not satisfied.

LEARN MORE AND ENROLL TODAY:

PHONE
Call 888-202-7787

ONLINE
Visit ComEd.com/HourlyPricing

HAVE YOUR INFORMATION HANDY.
ACCOUNT NUMBER 0000000000

*Average savings of 15 percent based on results for 2007 through 2016. In 2016 participants on average saved $130. Individual bills with ComEd's Hourly Pricing program will vary month to month, based on weather, market conditions and your usage habits. Savings cannot be guaranteed and should not be relied upon for future performance.

ComEd. An Exelon Company

Be Like Mike

"Our vehicle's onboard timer is set for midnight every day, when the cost of electricity is lowest. Most times we pay next to nothing to fully charge our car."

- *Mike, Hourly Pricing participant, saved over $1,600*

"I like it and was important in helping to make my decision to go all electric."

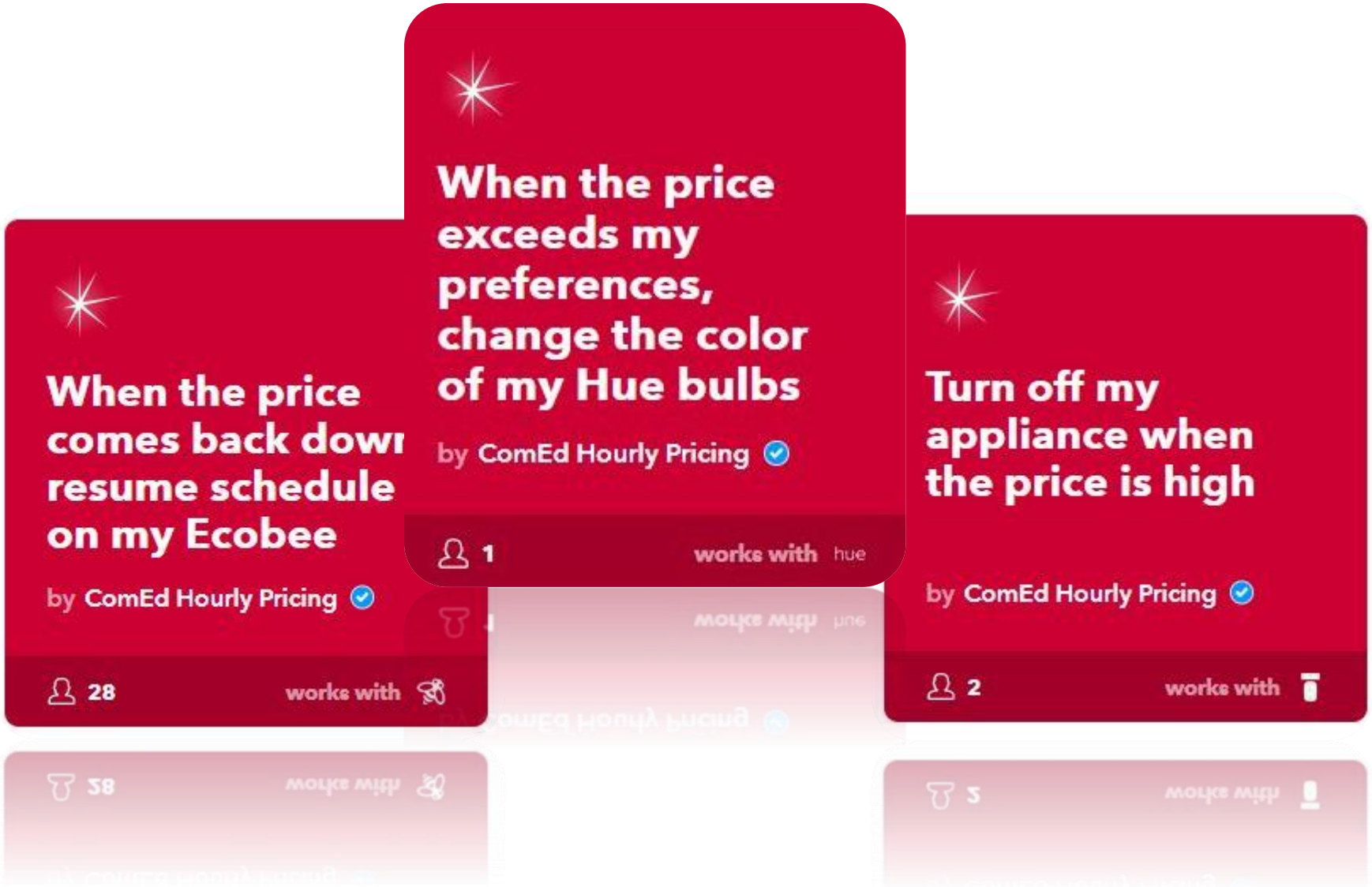
– Charles V.V., participant since 2011

Power Smart Pricing

Tools to Save

- Mobile App

Tools to Save



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Thank You!

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Elevate Energy

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CUB's Big Data Research

Jeff Zethmayr, Director of Research
Citizens Utility Board

Smart Meter Data

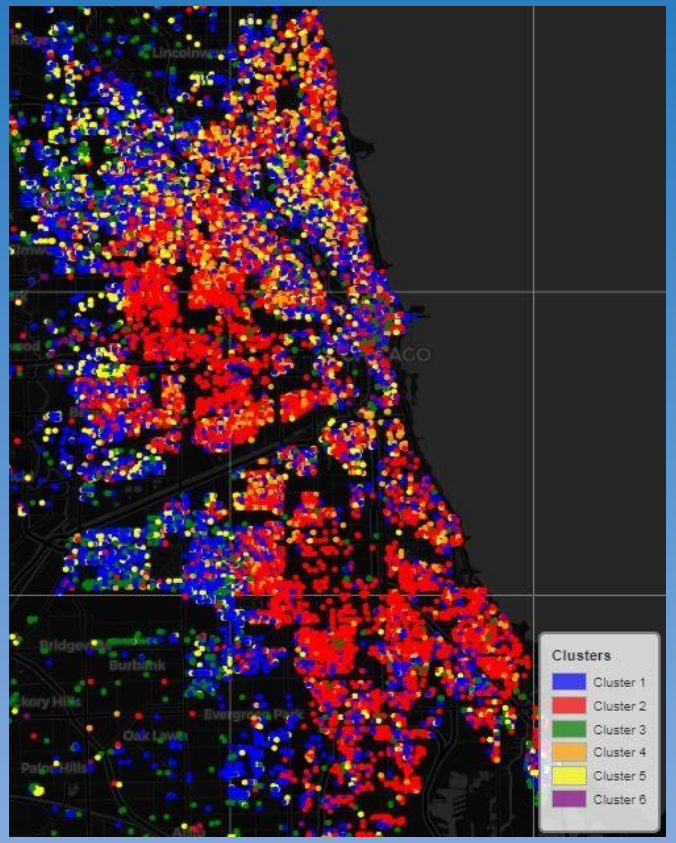
Photo: Chicago Tribune

- Half-hourly kWh usage readings for 1.5 million anonymous smart meters
- Data sets for some areas going back to 2016

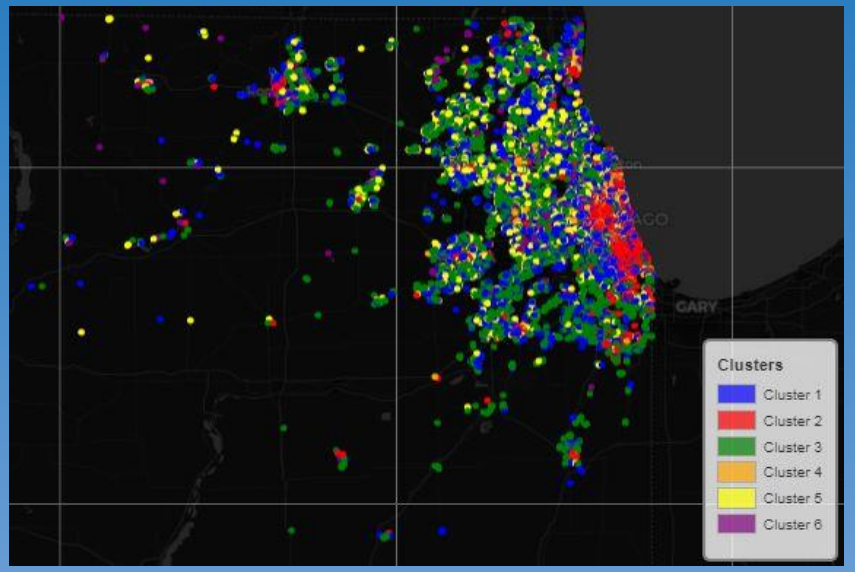
Geographic IDs

Meters are identified by 9-digit Zip Code

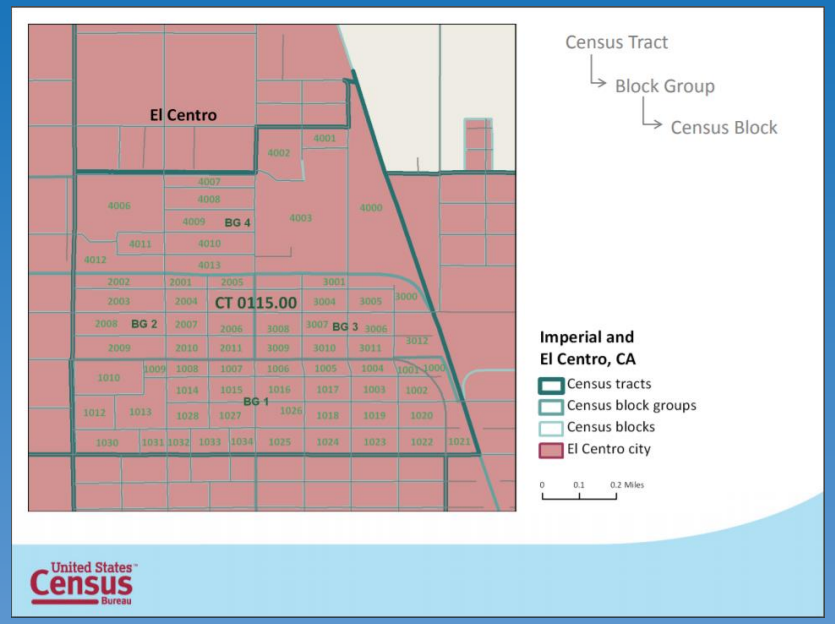
Chicago



Northern Illinois



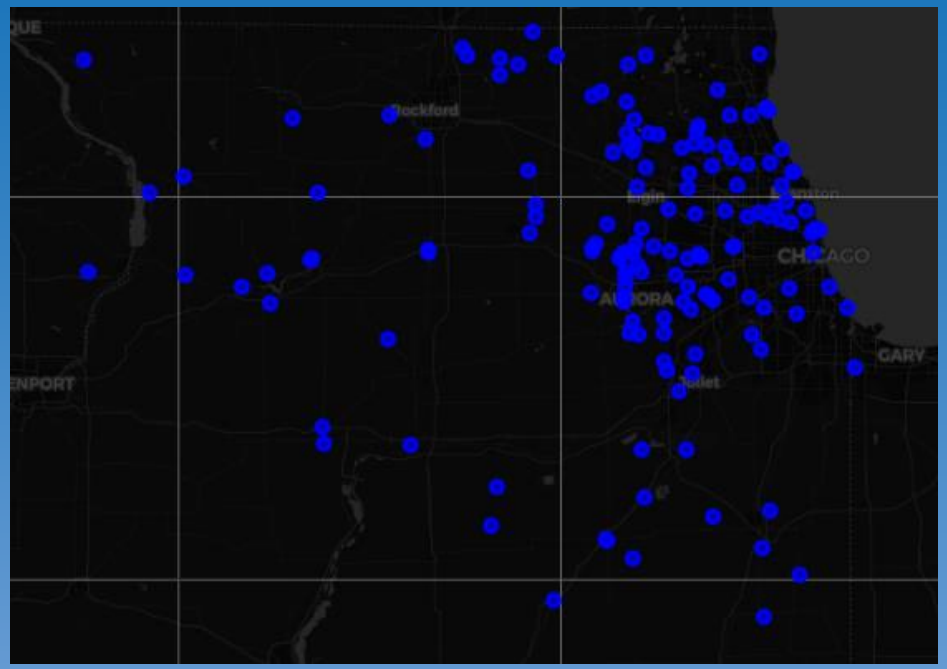
Census Data



- Matching Zip codes to Census Block Groups allows us to associate usage with local demographic data

Local Weather Data

Weather Stations

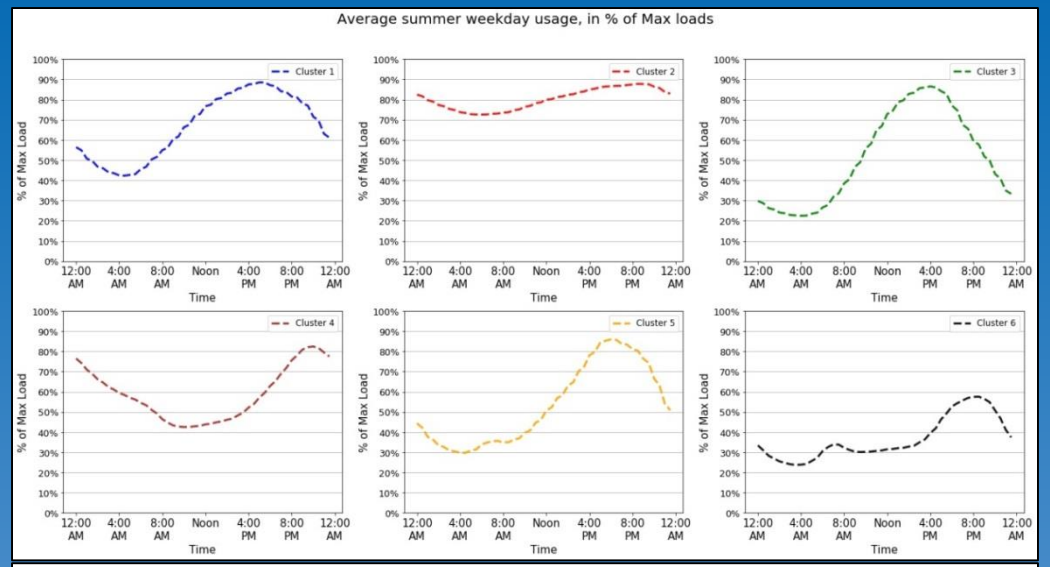


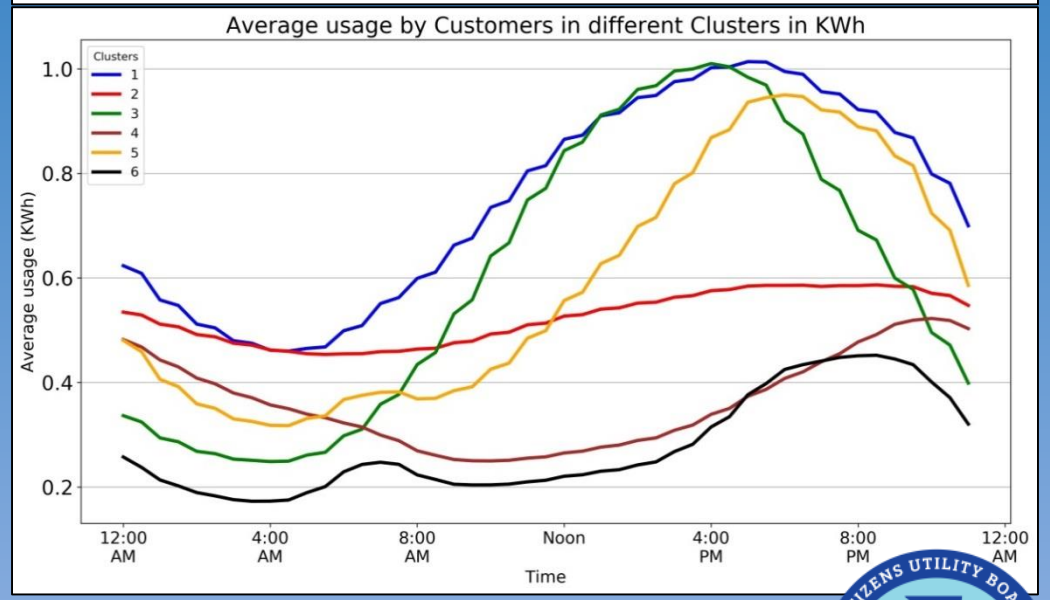
- Hourly weather readings from 166 weather stations allow us to associate usage with local weather

Recent Research

Customer Cluster Analysis

- Used **K-means Clustering** technique to separate customers according to average summer load shape
- **Logistic regression** tied cluster assignments to demographic factors based on local census data



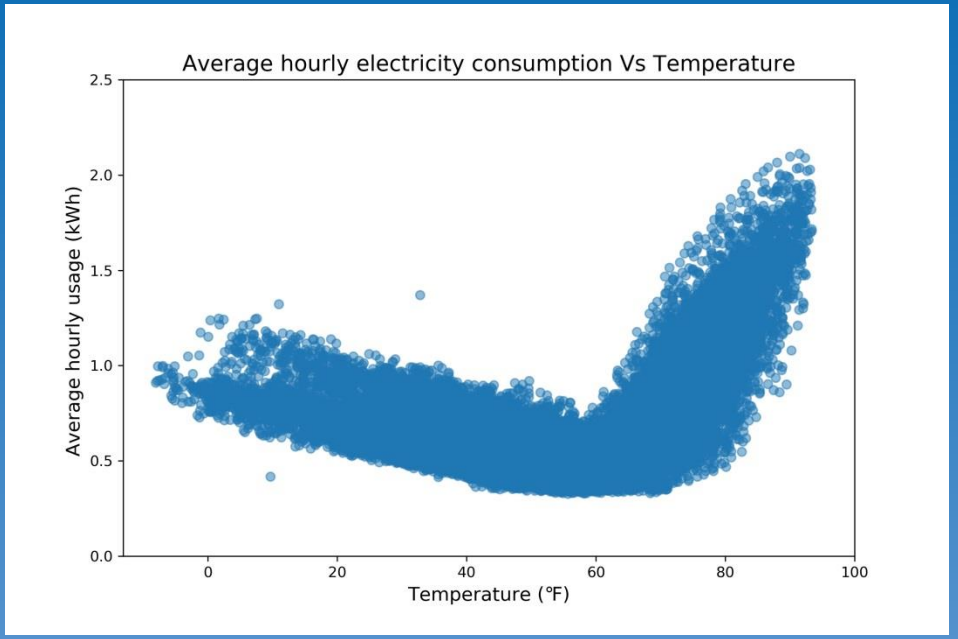


Conclusions

- Peakier summer usage – with higher grid savings potential – in suburbs and higher-income areas
- Flatter load shapes in low-income areas suggest common flat, volumetric rate designs may result in overpayment from these communities
- Importance of open data access in more jurisdictions

Consumer Cost of Climate Change

- Built a ‘degree days’ model to associate local temperature to predict electricity usage
- Projected local temperature increases through 2050 under worst case climate scenario
- Predicted total increase in usage and associated bill increases



Next Steps and Further Research

Cluster Research

- More investigation into rural areas
- Test rate design bill effects, quantify cross-subsidization

Cost of Climate Change

- Refining estimation methods, climate projections
- Incorporating GHG emissions estimates to project additional emissions from usage increase

Other Ideas

- Social equity of community efficiency investments
- Effectiveness of energy efficiency programs on reducing peak demand

Where to Learn More

bigenergydata.info

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Thank you!

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Q&A

Q&A

- **Q**: Are there any restrictions regarding customer ability to enroll/unenroll in a given period of time? For example, if a customer unenrolls from TOU, is there any restriction on timeframe in which they could re-enroll?

- Elena: Customers can unenroll from one of our optional plans at any time, but they cannot re-enroll in that plan for 12 months.
- Julia: Like Evergy's response, most of what we're seeing allows a customer to unenroll any time, but must then wait (usually a 12 month period) to re-enroll.
- Bethany: In Illinois, if customers opt out of an hourly rate option, they are unable to re-enroll in an hourly rate option for a period of 12 billing cycles. This applies to Ameren Illinois Power Smart Pricing and ComEd's Hourly Pricing.

Q&A

- **Q**: Is there a process in place for identifying customers that are enrolled but spending more, to contact them and provide guidance or confirm that want to continue with the program? How are negative customer experiences handled?
- Bethany: Yes, both ComEd's Hourly Pricing and Ameren Illinois Power Smart Pricing encourage customers to email or call the program support specialists to discuss program performance, energy usage patterns, and evaluate options to maximize savings, including discussing whether a customer/household would likely benefit more by pursuing a different rate option. All customers receive an annual savings report and depending on whether customers have an email address on file, they receive monthly emails with a savings update. Additionally, outreach is conducted to the small number of customers who are found to consistently not be saving with the programs to encourage a discussion about their options.
- Julia: Opower's Behavioral Load Shaping is being offered to all customers in the Evergy, Baltimore Gas & Electric, Pepco Maryland, and Delmarva Maryland pilots. It provides customers with a week over week email communication to inform customers of their usage during peak and off-peak hours, the savings or cost of the customers usage relative to the prior week, and coaches them on how they can save even more or start saving by changing some of their behaviors. For the pilots that we're involved in, we're seeing very high customer engagement rates and relatively low opt-out rates. The TOU insights are built into everything we offer so that customers get a consistent experience and the messages to get customers saving as much as they can on a TOU rate are reinforced.

Q&A

- **Q**: For those customers who are on TOU rates, is there any evidence that they reduce their energy usage overall? What about them being more likely to participate in traditional EE programs to offset the times when their energy is more expensive? Any evidence that customers are responding to price signals in that way? 2) Dynamic pricing can potentially dramatically alter the payback period for customers energy efficiency investments. Have there been any attempts to address that uncertainty/additional factors in estimating payback period for customers?

- Bethany: Yes, evaluations of program participants' energy usage shows an overall conservation effect of 1-6%. In survey responses, the majority of participants report regularly taking at least one action to shift heavy energy use to lower demand times as encouraged in program educational materials.
- Julia: This is something we're looking at for a particular customer population on a legacy TOU rate in Maryland - to see if Behavioral Load Shaping shifts load and reduces consumption. The pilot has not quite run for a year, and the price signal is weak so it's not an idea test, but we should know more this summer. To the second question, we can still assess customer's load shapes and other attributes to determine if they are good candidates for particular EE programs.

Q&A

- **Q**: Can't we just automate appliances and thermostats to respond to TOU rates? Why is behavioral change needed to support customers on TOU rates?

- Julia: Great question. I certainly think that automation has a role to play in implementing TOU rates, but even in an automated world, a customer has to make numerous decisions to achieve the benefits of a TOU rate. These decisions include: installing a smart meter and smart appliances, opting in to a voluntary TOU rate or not opting out of a default TOU rate, adhering to the automated changes in the settings of their smart thermostat and appliances, adhering to changes automated adjustments to account for seasonal rate transitions, and resist calling the utility every month to explain their bill. In short, customers need to understand and continuously say "yes" to an automated response to TOU rates. This requires personalized customer education and behavioral coaching, like Oracle's Behavioral Load Shaping offering.

Q&A

- **Q**: Can Behavioral Load Shaping work with demand rates?

- Julia: Another excellent question. Yes, it can. There is a demand component to one of Evergy's rate offerings that we are currently working with and we're in the process launching BLS with a large client in the Southwest who is rolling out a time varying rate with a demand component. The Opower suite of rate education and engagement tools educates customers about demand, includes new demand reducing tips, and includes weekly demand coaching so that customers understand the demand charges on their bill at the end of the month.