Webinar: Dynamic Pricing

MEEA Policy Team
March 27, 2020
• 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
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.
• 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

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

- 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
- Twice as many customers think bills will increase vs. decrease

69%

2X
“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 enables two types of outcomes:

- **Grid Impacts**
- **Engage Customers**

**Peak reduction**

**Load Shifting**

**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

= Risk 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
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
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

**Evergy**
- Customer choice
- Reduce Peak Demand
- Align costs with price structure

**Regulator**
- Mandatory
- TOU
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
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 weekends and holidays, you always save!

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

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Engagement Strategy

Step 1: Rate Education Reports

Step 2: Online Rate Analysis Tool

Step 3: Post-Enrollment Reports
Agenda

1. Customer Choice vs Default Rates
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4. Results, Lessons Learned, and What’s Next
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%
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. Olson
Smart Grid Project Manager
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**
(2007 – present)
- Rate option: **Day-ahead** hourly pricing
- 13,000 households
- $12 million saved (16%)
- $2.25 monthly participation fee

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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:

- Growing 184,932 tree seedlings for 10 years
- Powering 754 homes for a year
- Driving 17.1 million miles

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 CO₂e from entering the atmosphere. That’s equal to...

... the weight of 10,691 African Elephants...
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 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

<table>
<thead>
<tr>
<th>Month</th>
<th>Usage (kWh)</th>
<th>Dollars Saved</th>
<th>Percent Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>3,002</td>
<td>$48.87</td>
<td>3%</td>
</tr>
<tr>
<td>February</td>
<td>2,759</td>
<td>$50.72</td>
<td>36%</td>
</tr>
<tr>
<td>March</td>
<td>2,551</td>
<td>$48.78</td>
<td>39%</td>
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<tr>
<td>April</td>
<td>4,068</td>
<td>$55.72</td>
<td>24%</td>
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<tr>
<td>May</td>
<td>2,270</td>
<td>$32.99</td>
<td>29%</td>
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<tr>
<td>June</td>
<td>2,103</td>
<td>$2.40</td>
<td>2%</td>
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<tr>
<td>July</td>
<td>3,578</td>
<td>$12.68</td>
<td>8%</td>
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<tr>
<td>August</td>
<td>2,467</td>
<td>$10.79</td>
<td>10%</td>
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<tr>
<td>September</td>
<td>2,179</td>
<td>$15.48</td>
<td>15%</td>
</tr>
<tr>
<td>October</td>
<td>2,799</td>
<td>$6.18</td>
<td>5%</td>
</tr>
<tr>
<td>November</td>
<td>3,865</td>
<td>-$0.01</td>
<td>0%</td>
</tr>
<tr>
<td>December</td>
<td>2,974</td>
<td>$1.62</td>
<td>1%</td>
</tr>
</tbody>
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2018 total: 36,225 $243.14 14%
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

ComEd’s Peak Time Savings Participants

Ameren Illinois Peak Time Rewards Participants

Electric Vehicle Owners

Enabling Smart Home Technology

Referral Marketing

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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**

*Enroll in both to save even more.*

<table>
<thead>
<tr>
<th>PEAK TIME SAVINGS</th>
<th><strong>Opportunity to Save</strong></th>
<th><strong>Summer</strong></th>
<th><strong>Year-round</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Potential Average Savings</strong></td>
<td><strong>$0.00</strong></td>
<td><strong>$30.00</strong>*</td>
</tr>
<tr>
<td></td>
<td><strong>Status</strong></td>
<td>You're already enrolled</td>
<td>Enroll Today</td>
</tr>
</tbody>
</table>

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

**Hourly Pricing**

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**Learn More and Enroll Today**

Phone: Call 888-292-7797  Online: Visit ComEd.com/HourlyPricing  Have your information handy: Account number

© Commonwealth Edison Company, 2017
“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
Tools to Save

• Mobile App
Tools to Save

When the price exceeds my preferences, change the color of my Hue bulbs
by ComEd Hourly Pricing

Turn off my appliance when the price is high
by ComEd Hourly Pricing
Thank You!

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CUB’s Big Data Research

Jeff Zethmayr, Director of Research
Citizens Utility Board
Smart Meter Data

- 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**
Matching Zip codes to Census Block Groups allows us to associate usage with local demographic data.
Local Weather Data

- 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
citizensutilityboard.org

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Thank you!

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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:** 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: 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:** 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: 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.