MASSACHUSETTS
**DEPARTMENT OF ENERGY RESOURCES**

# Implementation & Protections

**Expert Presentation Series | July 21, 2025**

This expert level presentation series session will provide the Massachusetts Electric Rate Task Force an opportunity to learn from experts and/or other jurisdictions on the above topic.

*Note: The contents of this presentation do not necessarily reflect the views or positions of the Massachusetts Department of Energy Resources.*


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# Massachusetts Electric Rate Task Force Goals

**The Rate Task Force brings together diverse stakeholders to reimagine how electric rates and the regulatory framework can drive an affordable, equitable, and decarbonized energy future.**

Through targeted conversations, expert presentations, and thoughtful exploration of complex issues, the Task Force aims to deepen understanding, surface critical questions, clarify challenges, and build the foundation for durable regulatory reform and action.

The Rate Task Force will use the Massachusetts Interagency Rates Working Group's Long-Term Ratemaking Study and Recommendations as a starting point for discussion and knowledge building on rate designs, ratemaking, and regulatory mechanisms.

**Build technical knowledge**

Provide an opportunity for **knowledge-building** by and amongst stakeholders, including those who have not traditionally been involved

**Develop shared understanding**

Converge towards **shared understandings** of the challenges and priorities

**Today's Focus**

**Facilitate open, inclusive dialogue**

Engage in **open, inclusive dialogue** about complex ratemaking and regulatory issues outside of a regulatory proceeding

**Frame critical questions and opportunities**

Empower stakeholders to identify **critical questions and opportunities** for the advancement of rate design and ratemaking reform

# Ground Rules & Engagement

## This work is complex – and your insight matters; let's focus on learning, listening, and shaping together!

**Participation, Engagement, & Respect**

- Everyone's perspective is valuable – this space works best when all voices are heard
- Respect differences in background, experience, and priorities
- Bring curiosity – ask questions and offer potential answers
- Focus on understanding others' goals and values, not just their positions
- It's okay not to have a solution – help us shape the right questions

**Collaboration, Not Consensus**

- This body is deliberative, it is not a decision-making space
- We don't need to agree on everything, but we should work toward shared understanding
- Where we disagree, help clarify what the tension is and why it matters

**Transparency & Trust**

- We'll be clear about how input is used
- Share what you can; identify when you're speaking on behalf of your organization or personally
- Materials, summaries, and key findings will be shared openly to support accountability

**Focus & Productivity**

- Stay on topic and honor the scope of the Task Force
- Raise related concerns, but help us stay anchored in the rate design and regulatory issues at hand
- Use the structures provided (i.e., expert sessions, targeted conversations, office hours) to deepen discussion
- Avoid discussion about open and ongoing proceedings at the DPU

# Expert Presentations

## I. Dr. Nock's IRWG Recommendations

**Peoples Energy Analytics & Carnegie Mellon University, Dr. Destenie Nock**

Present on the Dr. Nock's recommendation to the IRWG on the Near- and Long-Term Reports

## II. Lessons and Strategies for Implementing Time-Varying Rates (TVR)

**Synapse Energy Economics, Melissa Whited**

Present on customer acceptance, cautionary tales, and other recommendations for implementing default time-varying rates.

## III. Reflections on California's TOU Transition

**California Public Utilities Commission, Paul S. Phillips**

Present on current and future pricing strategies for electrification, decarbonization, and affordability in California

## IV. Advanced Metering Infrastructure (AMI) and TVR Implementation

**Massachusetts Electric Distribution Companies**

Present the impacts of time of use rates on existing policies and incentive programs that incentivize solar and storage resources in the Commonwealth

**Reminder**

Expert presentation sessions are not for substantive deliberation amongst participants. Questions for each speaker will be taken as time allows.

# Nock IRWG Recommendations based on the Near- and Long-Term Report

Dr. Destenie Nock

Professor - Carnegie Mellon University

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**The IRWG does not endorse the services of the Company.*

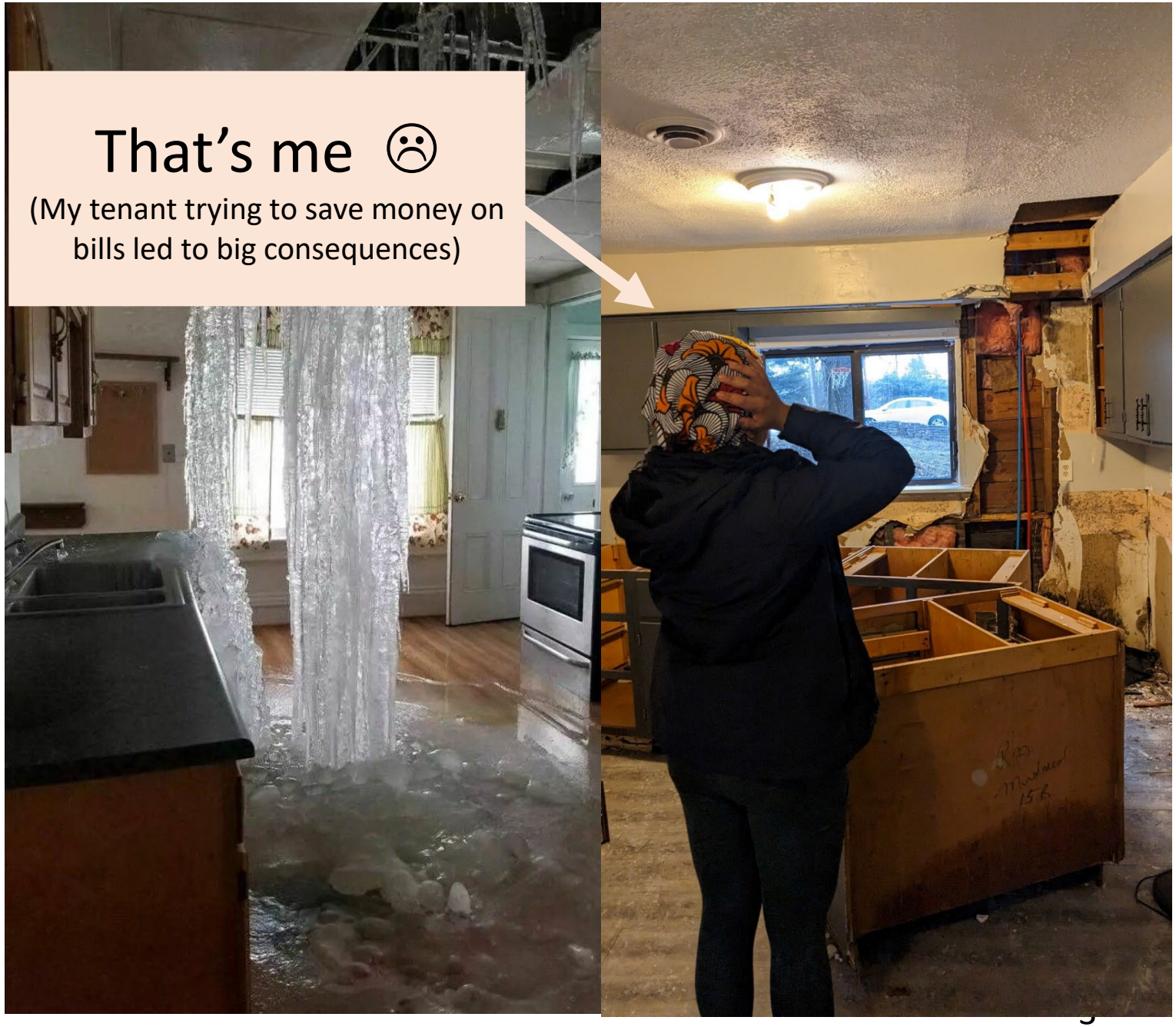
# Executive Summary

I reviewed the Near-Term and Long-Term Rate Strategy Report, focusing on its structure around energy rates and the identified potential impact on diverse households.

Based on my assessment, I have several recommendations to ensure that the Near- and Long-Term Rate Strategy adequately addresses energy affordability, protects vulnerable groups, and incorporates a more data-driven and holistic approach.

# My Lived Experience Combined With My Technical Training Informs My Approach

2022 Christmas cold snap led to the entire duplex losing access to water



# Overview of Near-Term Recommendations

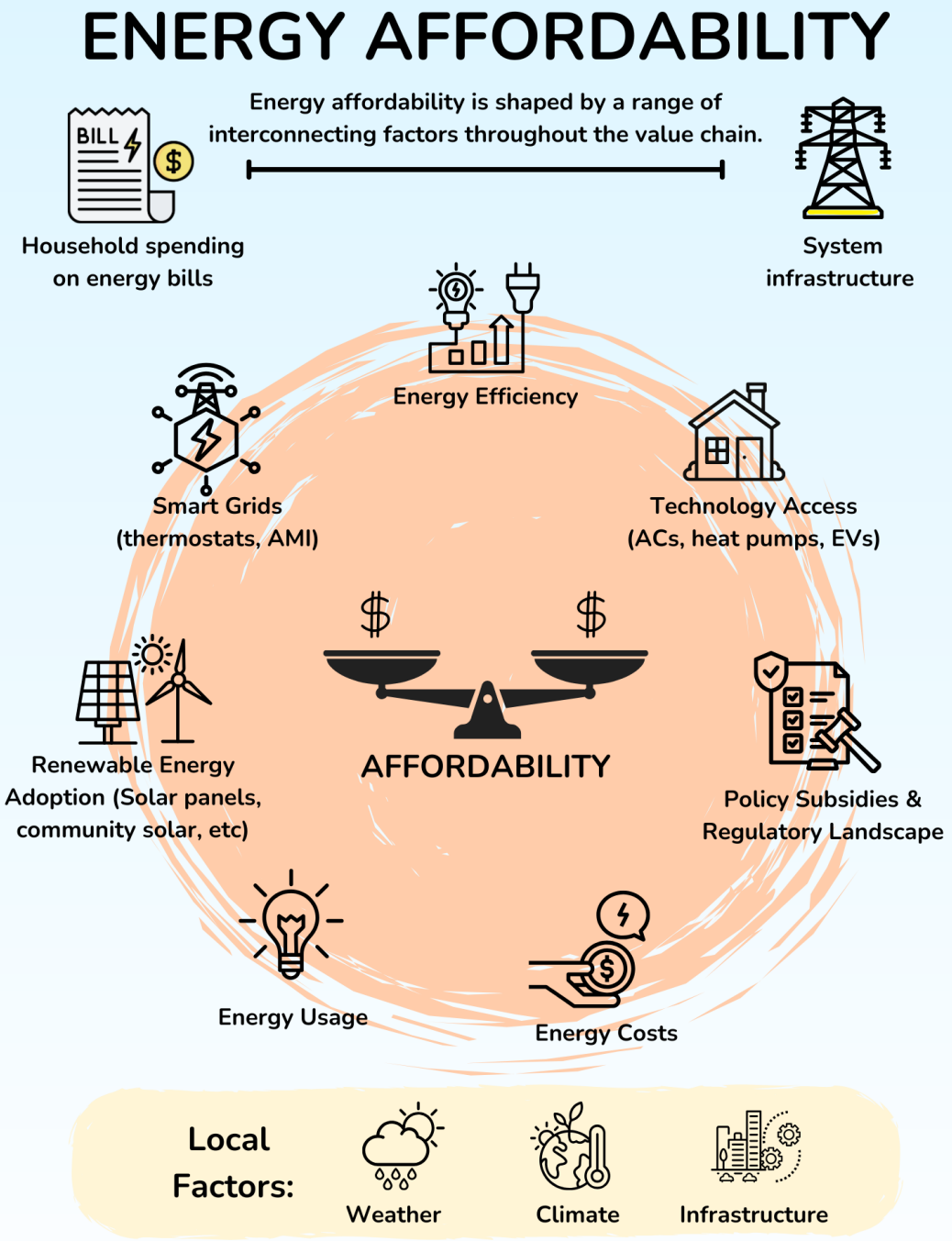
1. **Inclusion of a Clear Definition of Energy Affordability**
2. **Increased Demographic Designations**
3. **Enhanced Data-Driven Methods to Assess Rate Impacts and Target At-Risk Customers**
   - **Protections for Low- and Moderate-Income Households**
4. **Holistic View of Housing-Related Energy Burdens**
5. **Integrated Approach for Supporting At-Risk Customers**
6. **Support for Upfront Costs of Fuel Switching**

# N1. Definition of Energy Affordability

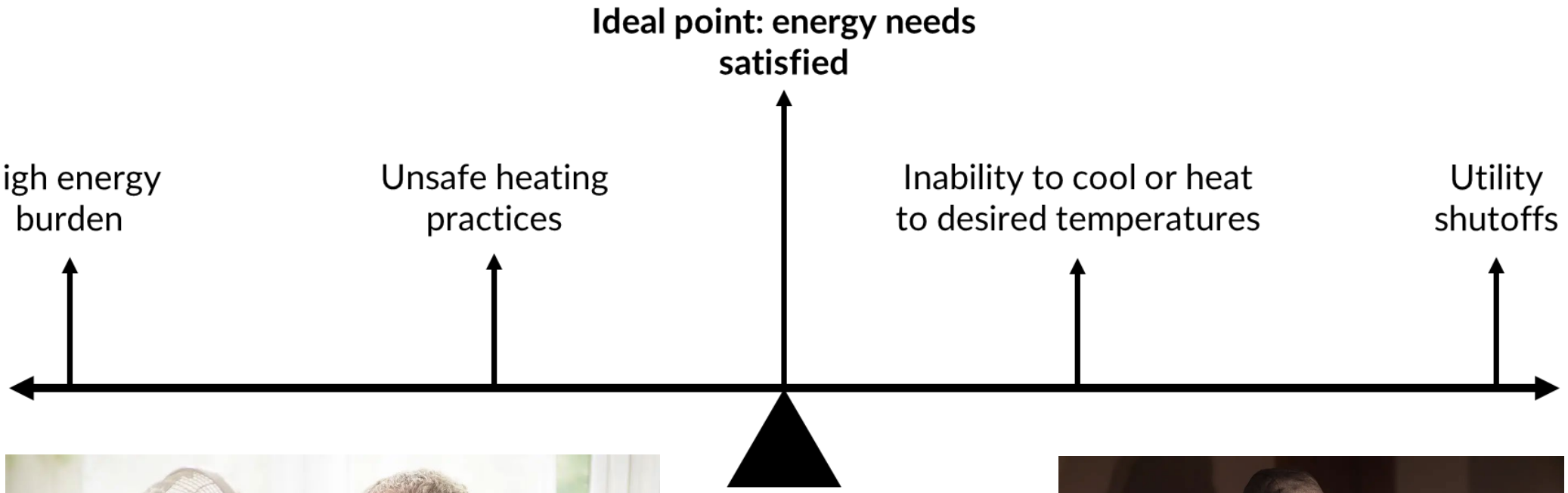
Energy affordability is the ability of households to access reliable and sufficient energy services without compromising their financial well-being.

It encompasses energy costs, energy usage, efficiency, access to modern energy technologies, and the influence of policies and rate structures.

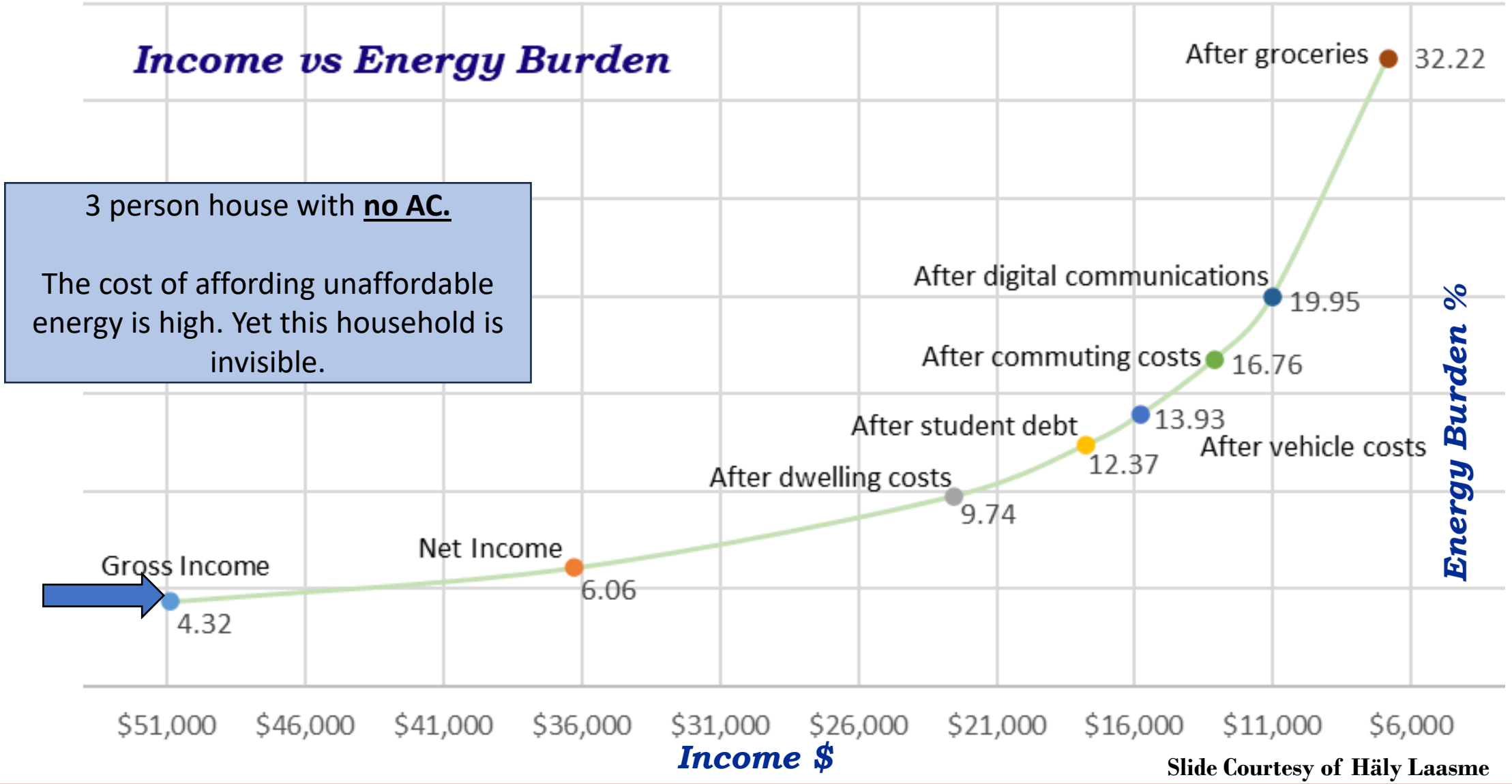
***More comprehensive definition in the near-term recommendations***



# Households make tradeoffs between energy and other necessities




# Energy Burden misses the big picture and true fraction

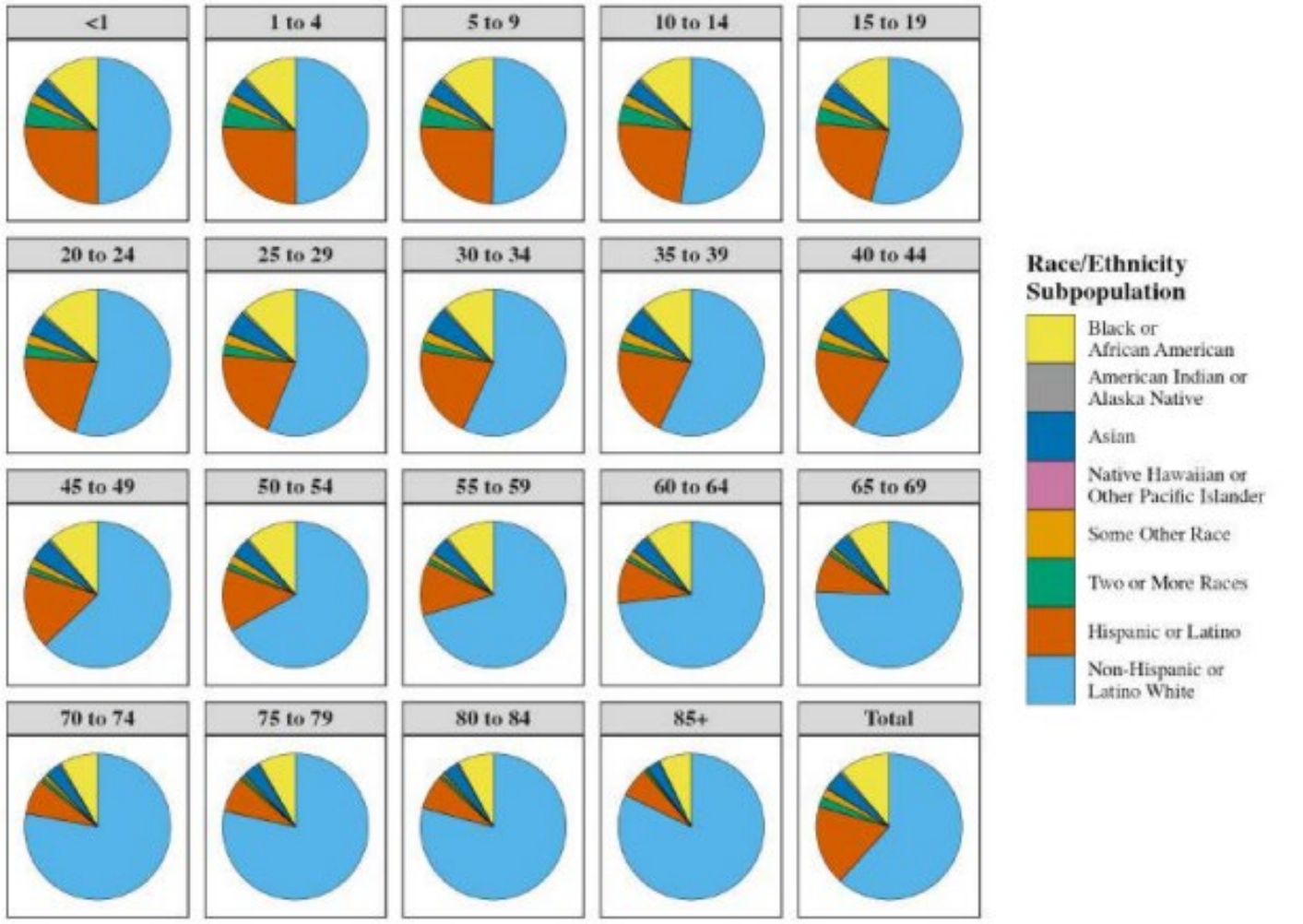



Slide Courtesy of Häly Laasme

# N2. Why Should We Increase Demographic Designations

- Currently the analysis focuses on analyzing rate impacts across income and housing types.
- What is the risk of ignoring age and race interactions?

# In Older Populations Minorities are Not As Prevalent

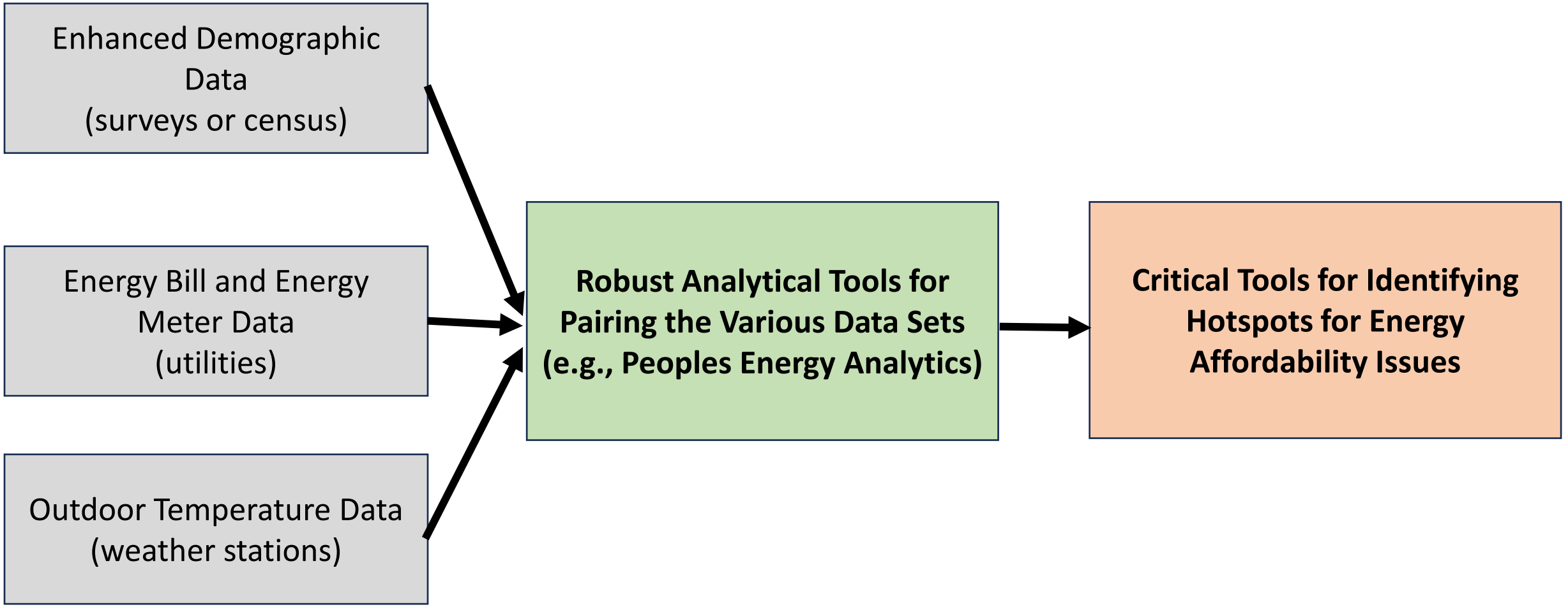



*Sources*: Population data are from the U.S. Census Bureau [66].
*Notes*: Data characterize 2017. Age subgroup population breakdown by race/ethnicity considering totals across CONUS. Subpopulations are defined by the U.S. Census Bureau (see Supplementary Table 8). All race/ethnicity groups are adapted to be mutually exclusive. Hispanic is Hispanic or Latino ethnicity, comprised of any racial group. Hispanic or Latino persons are differentiated from racial groups.

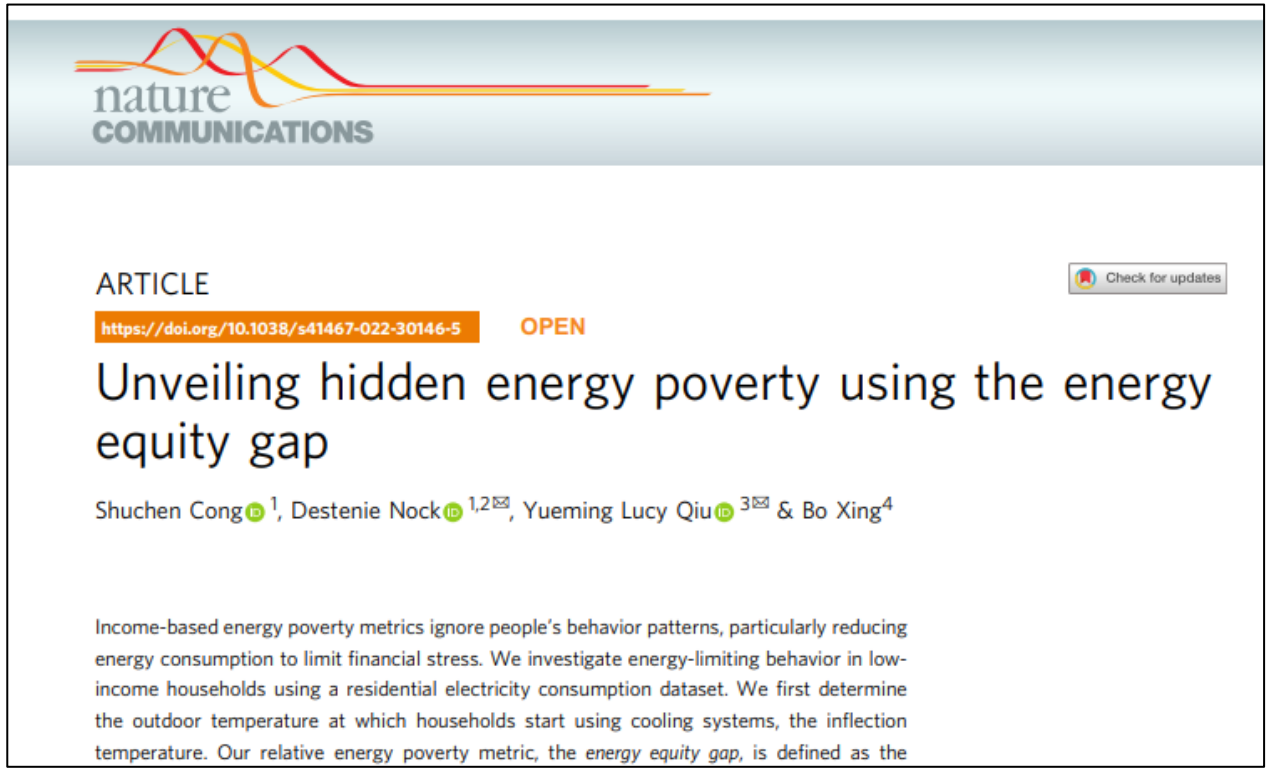
# To Increase Demographic Designations

- Utilities should collect data via surveys or census tracts
- This has been done in multiple utilities:
  - Salt River Project in AZ deployed a survey to their customers
  - Peoples Gas in Pittsburgh, PA worked with Peoples Energy analytics to tie census data to their households and then analyzed natural gas usage across the heating season.

# N3. Enhanced Data-Driven Methods to Assess Rate Impacts and Target At-Risk Customers



# Example of a Data Driven Method for Holistic Analysis of Energy Affordability



nature COMMUNICATIONS

ARTICLE

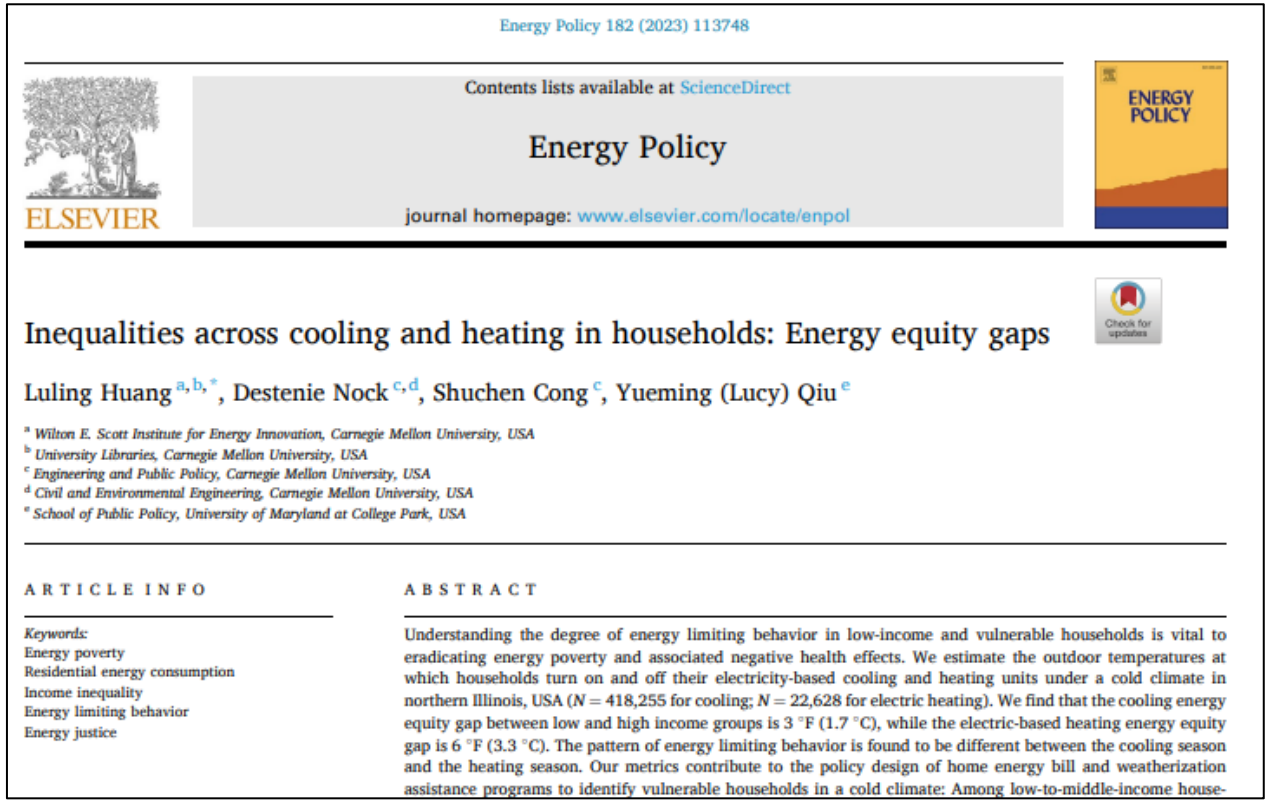
Check for updates

https://doi.org/10.1038/s41467-022-30146-5 OPEN

## Unveiling hidden energy poverty using the energy equity gap

Shuchen Cong [1], Destenie Nock [1,2✉], Yueming Lucy Qiu [3✉] & Bo Xing [4]

Income-based energy poverty metrics ignore people's behavior patterns, particularly reducing energy consumption to limit financial stress. We investigate energy-limiting behavior in low-income households using a residential electricity consumption dataset. We first determine the outdoor temperature at which households start using cooling systems, the inflection temperature. Our relative energy poverty metric, the *energy equity gap*, is defined as the



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## Inequalities across cooling and heating in households: Energy equity gaps

Luling Huang [a,b,*], Destenie Nock [c,d], Shuchen Cong [c], Yueming (Lucy) Qiu [e]

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[b] University Libraries, Carnegie Mellon University, USA
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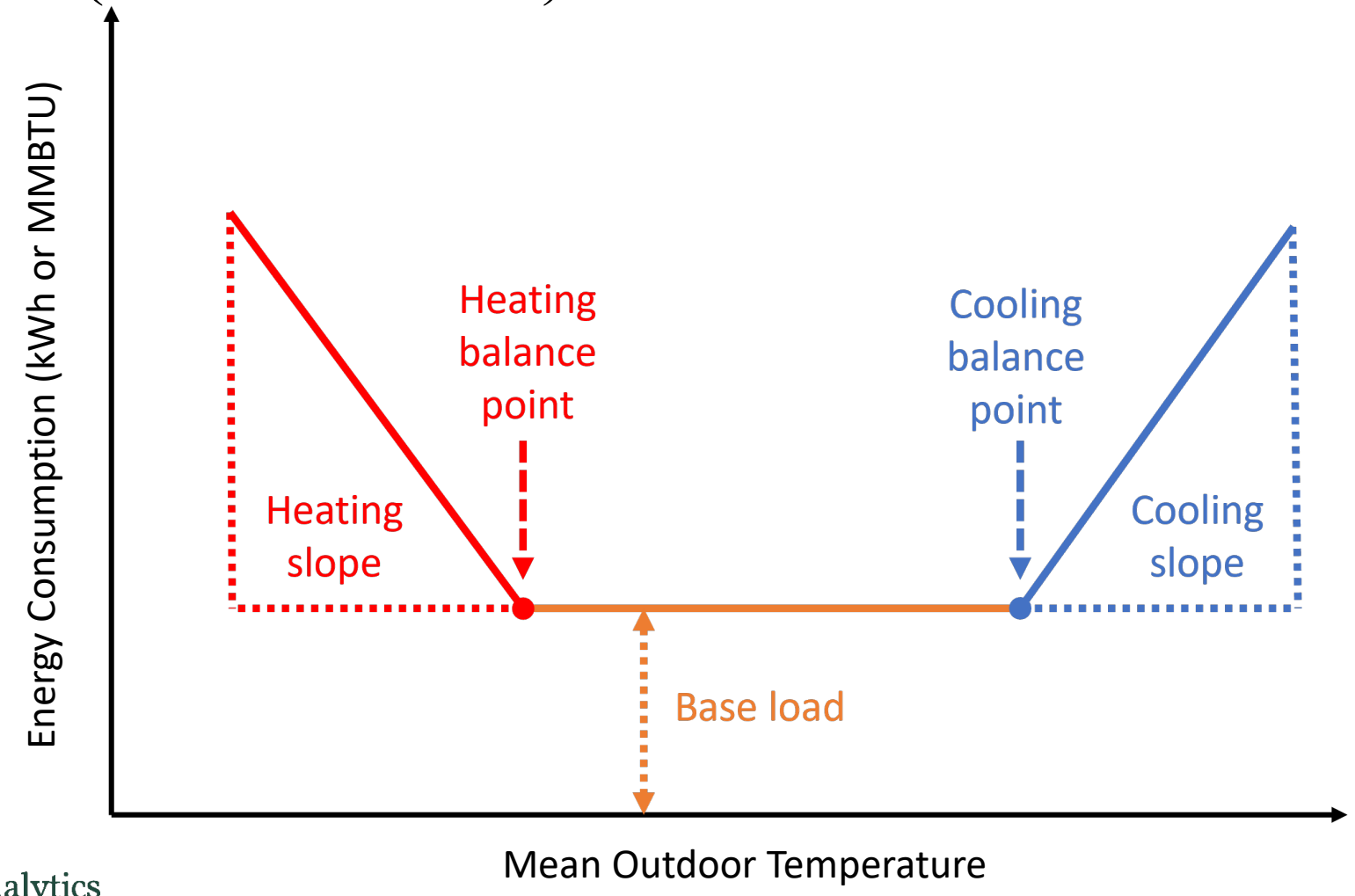
ARTICLE INFO

*Keywords:*
Energy poverty
Residential energy consumption
Income inequality
Energy limiting behavior
Energy justice

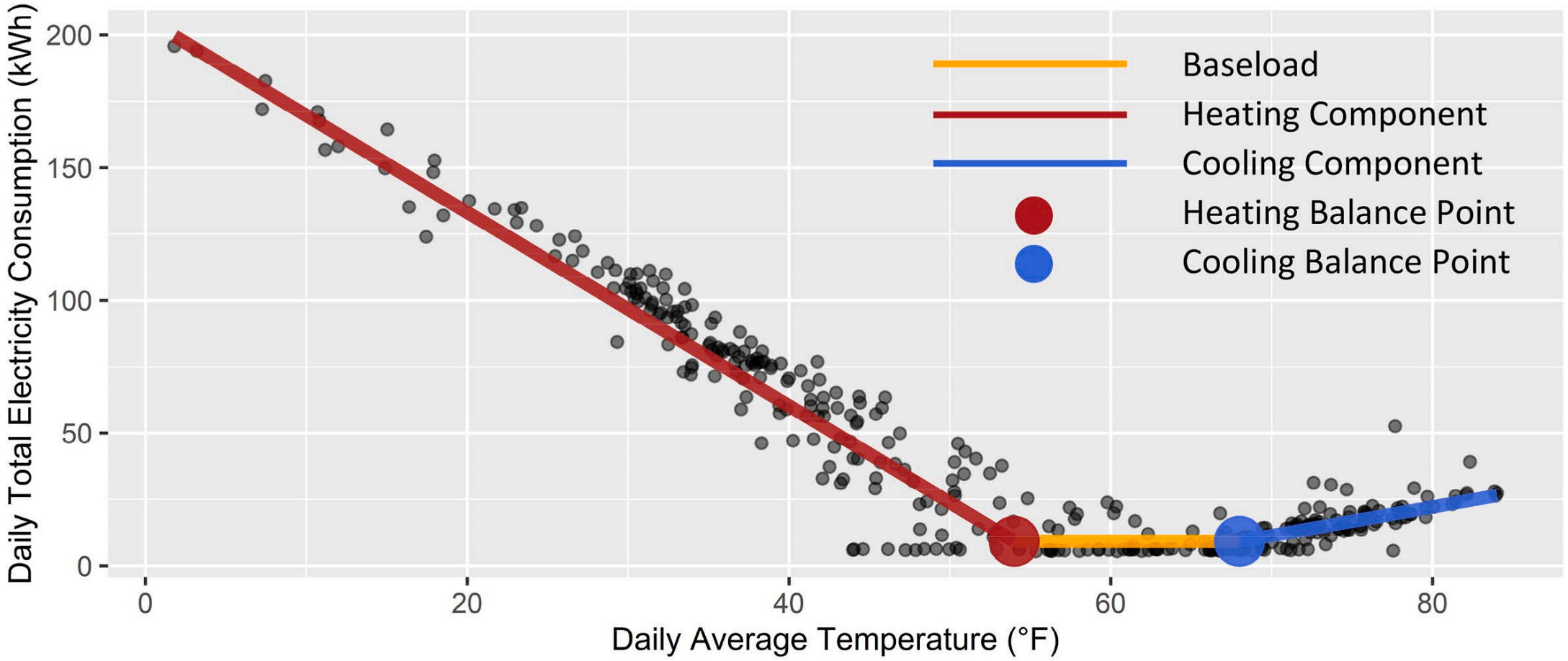
ABSTRACT

Understanding the degree of energy limiting behavior in low-income and vulnerable households is vital to eradicating energy poverty and associated negative health effects. We estimate the outdoor temperatures at which households turn on and off their electricity-based cooling and heating units under a cold climate in northern Illinois, USA ($N = 418{,}255$ for cooling; $N = 22{,}628$ for electric heating). We find that the cooling energy equity gap between low and high income groups is 3 °F (1.7 °C), while the electric-based heating energy equity gap is 6 °F (3.3 °C). The pattern of energy limiting behavior is found to be different between the cooling season and the heating season. Our metrics contribute to the policy design of home energy bill and weatherization assistance programs to identify vulnerable households in a cold climate: Among low-to-middle-income house-

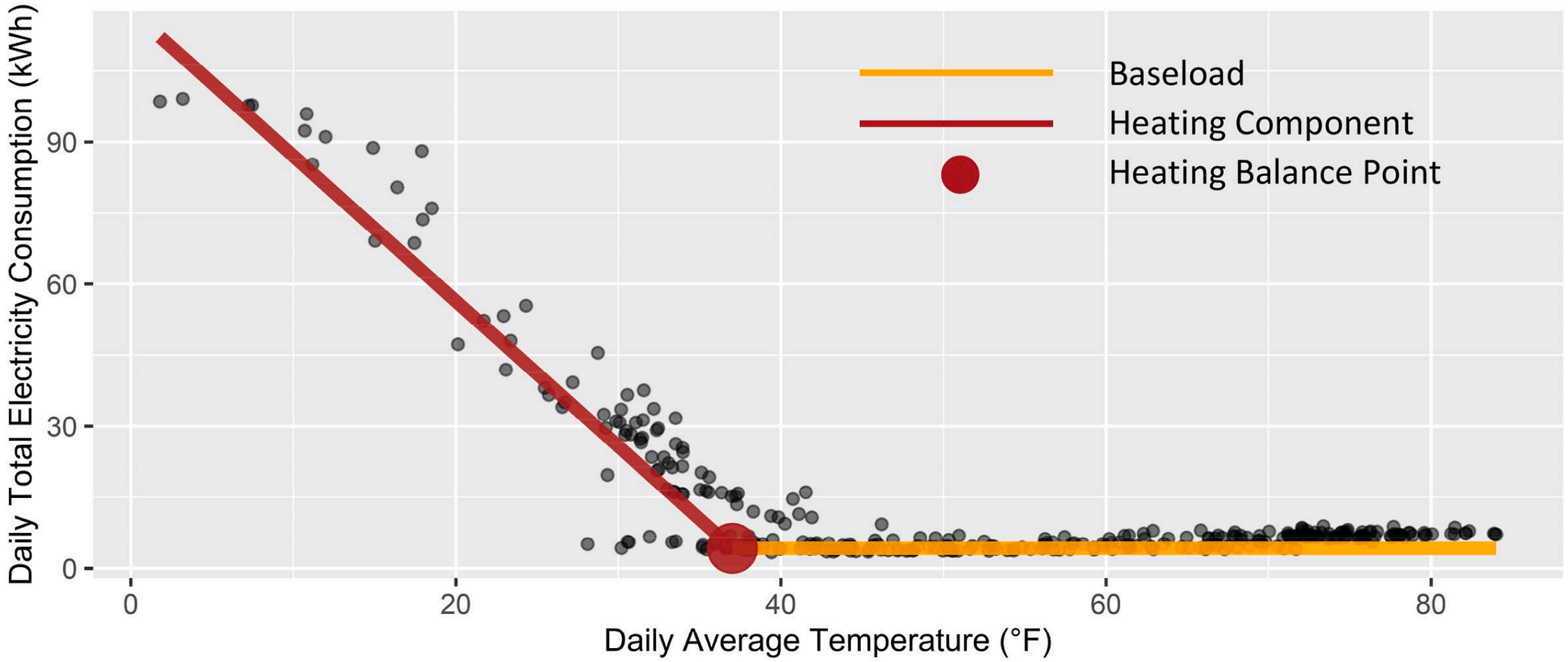
# Meter Data at household level can be used to understand energy consumption behavior for individual households and heating and cooling use (or lack thereof).



# Household with electric heating but no central AC (most likely a window unit)

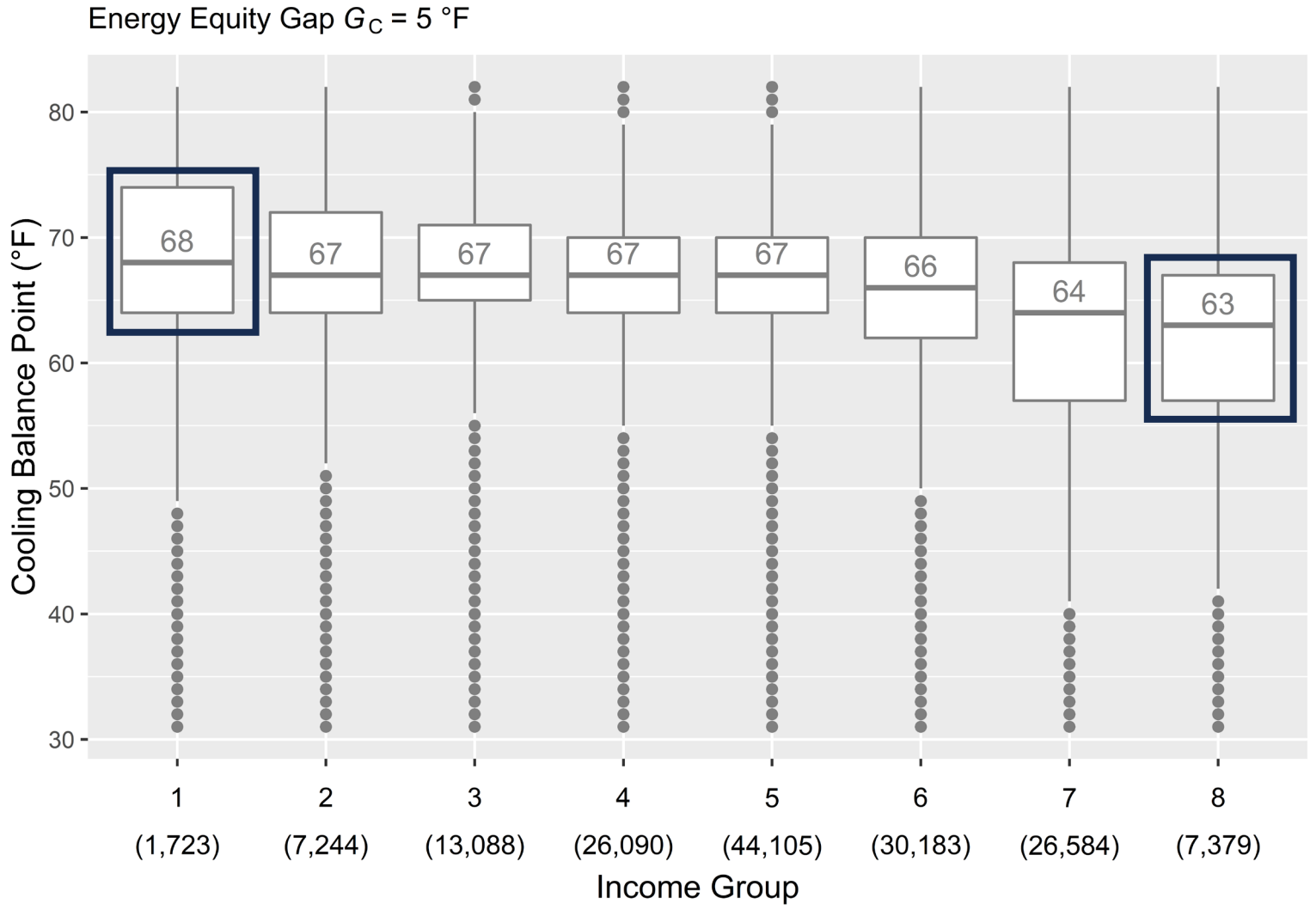


# Household at risk of heat stroke (no AC)



# Chicago: the energy equity gap (EEG) for cooling

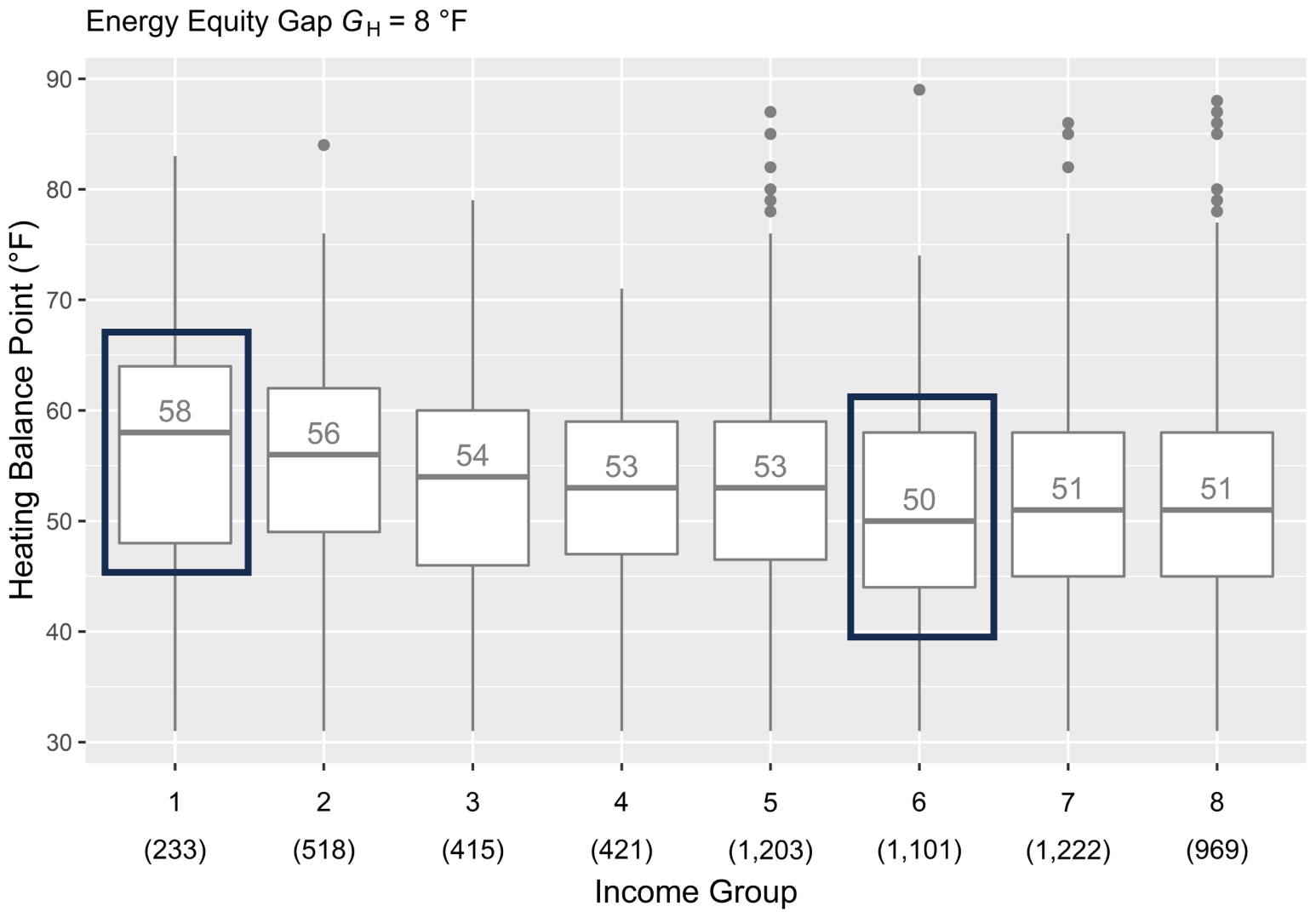
- Smart meter data for over 150,000 households
- $EEG = \max(\text{inf}\_temp_{median}) - \min(\text{inf}\_temp_{median})$




*Huang et al (under revision)*

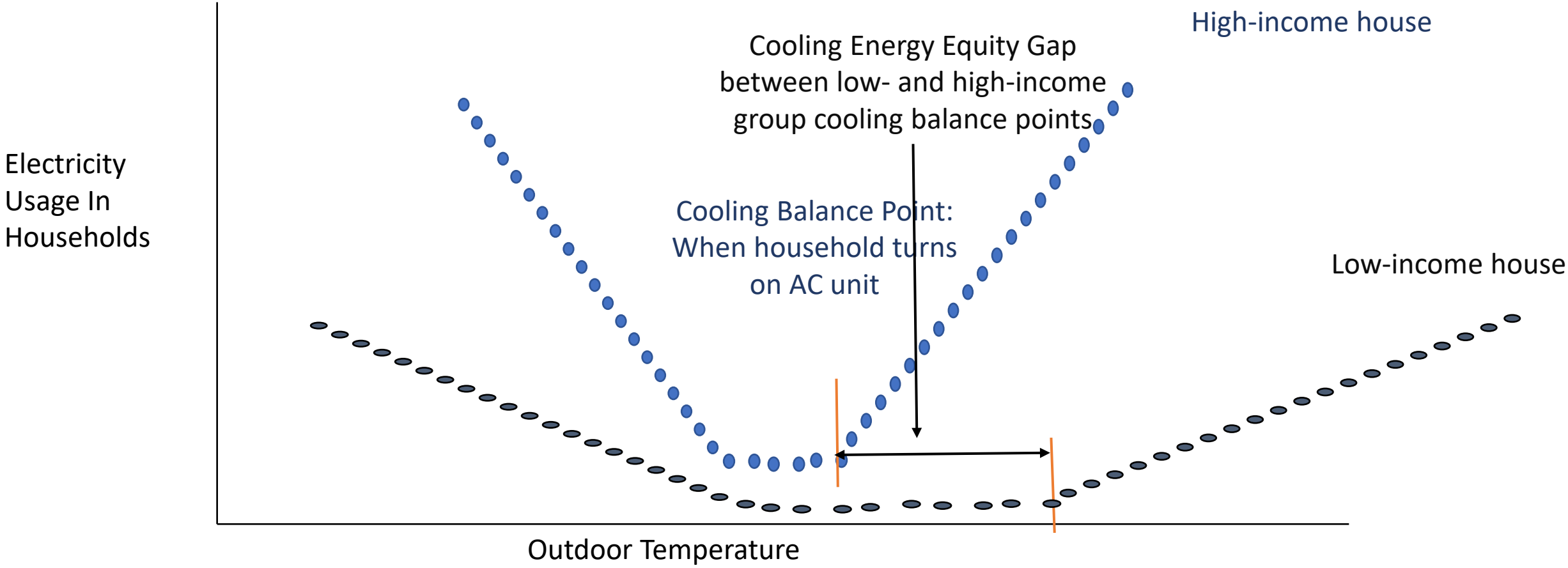
# Chicago: In heating the low income groups start using earlier.

- Smart meter data for over 20,000 households
- Low income groups start using heating earlier in the winter in Chicago
- Housing characteristics and lack of insulation



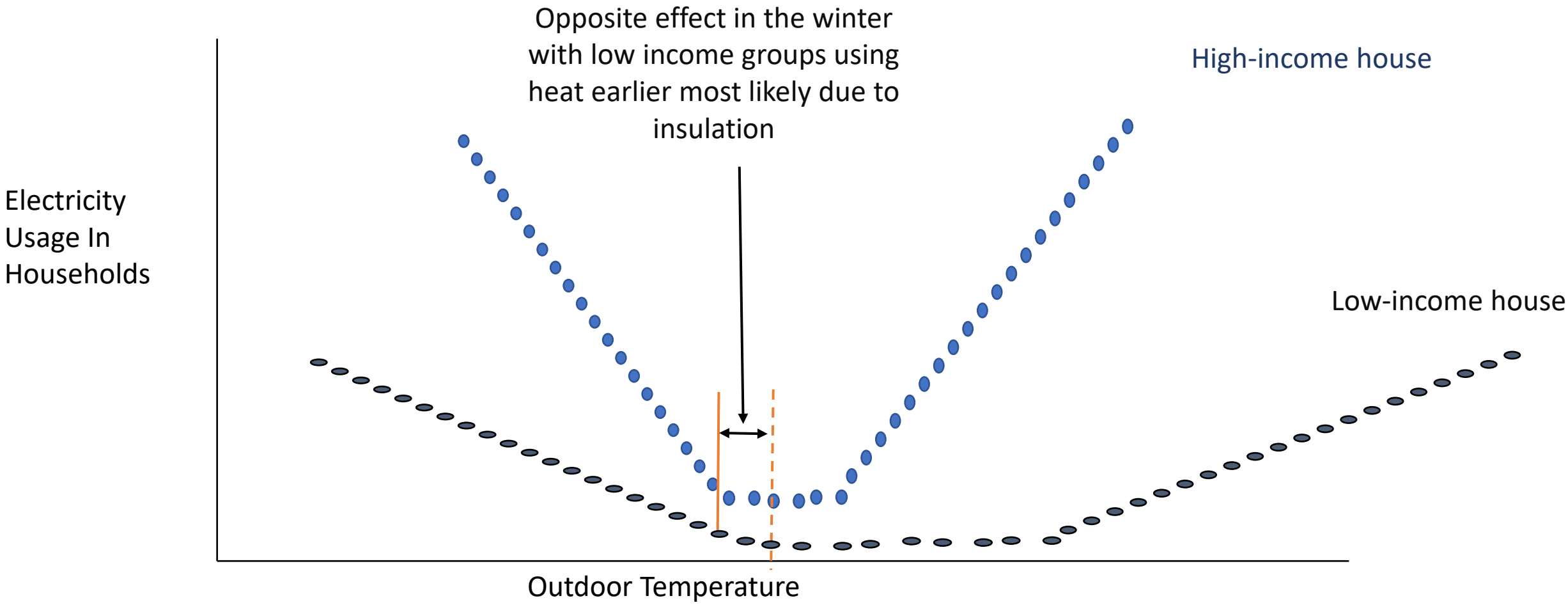

*Huang et al (under revision)*

# Energy Equity Gap



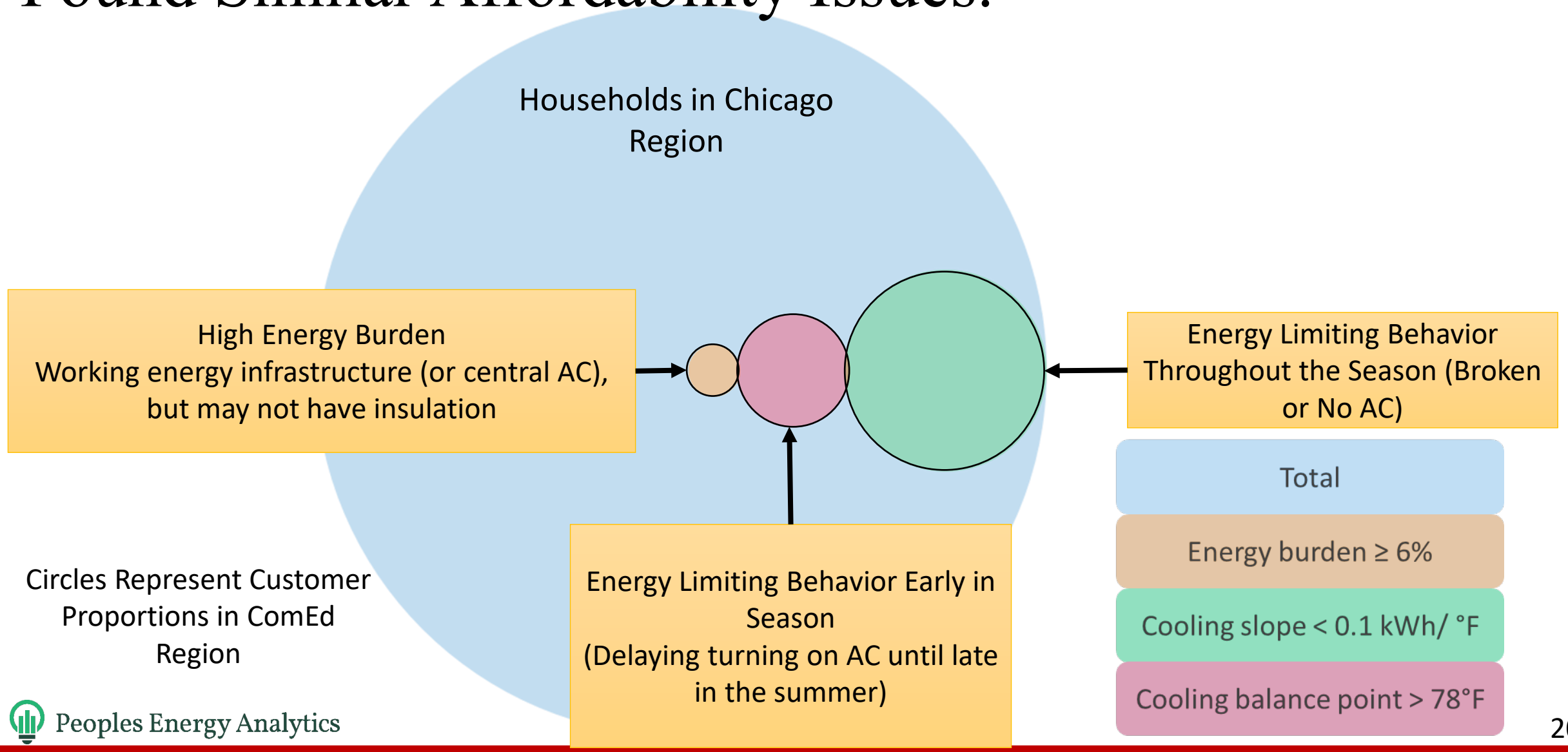

*(Cong et al 2022 in Nature Communications and Huang et al (2023))*

# Energy Equity Gap

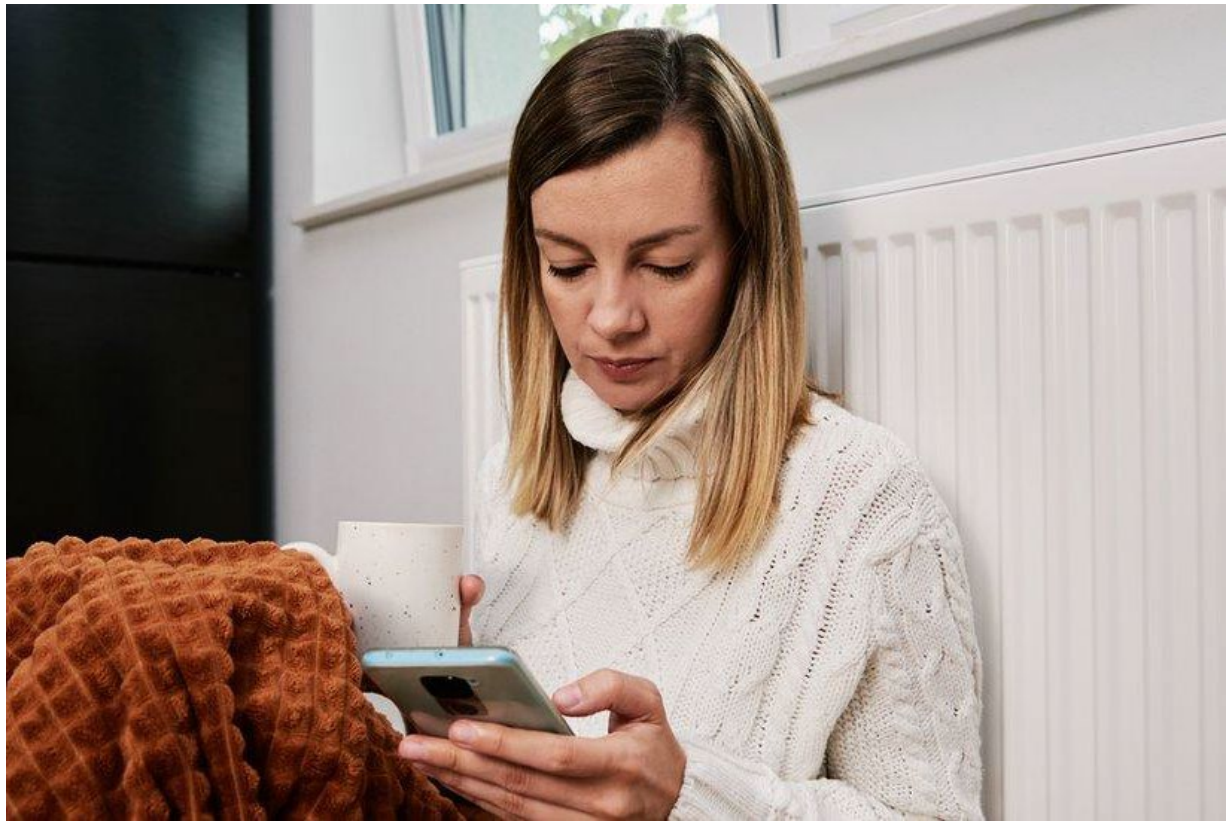



*(Cong et al 2022 in Nature Communications and Huang et at (2023))*

# When My Team Replicated the Analysis In Chicago We Found Similar Affordability Issues.

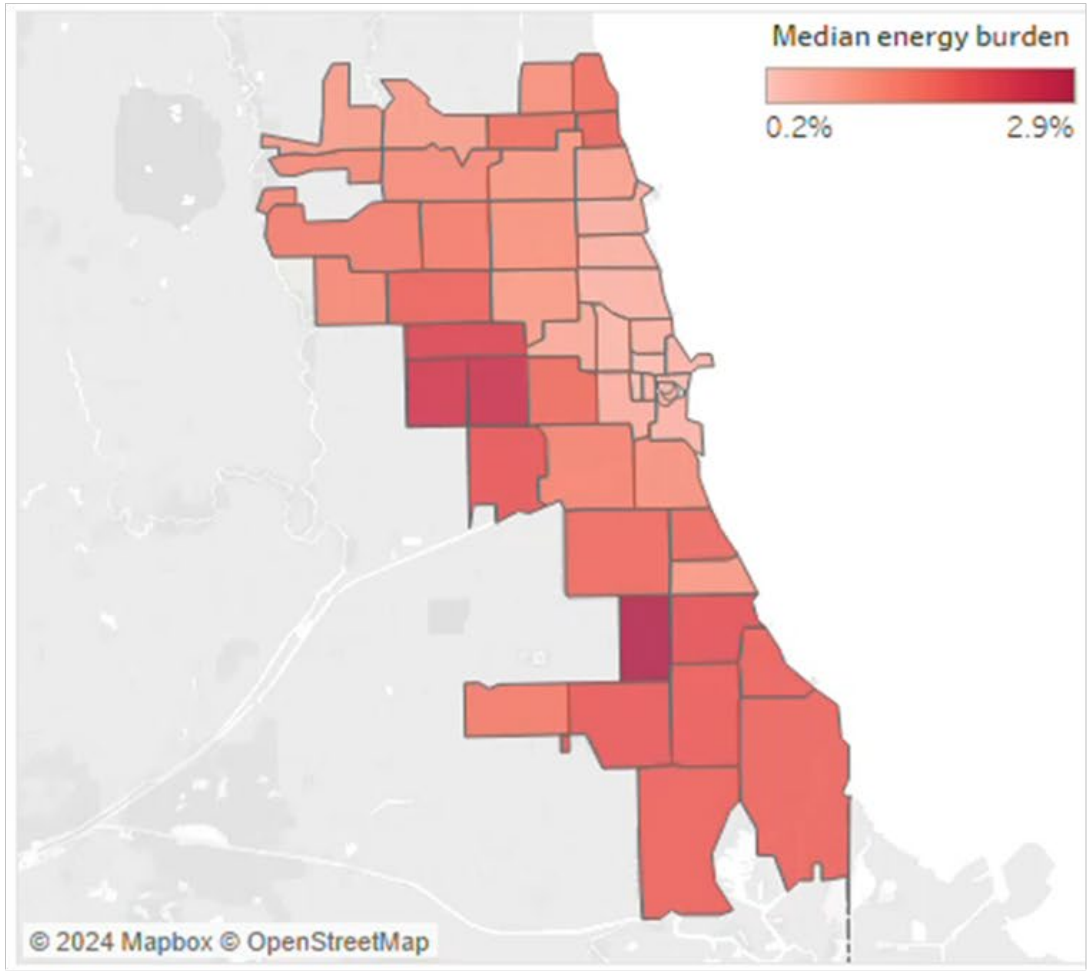


# There needs to Be A Holistic Approach and Better Targeting (Near Term Recommendation 4 and 5)

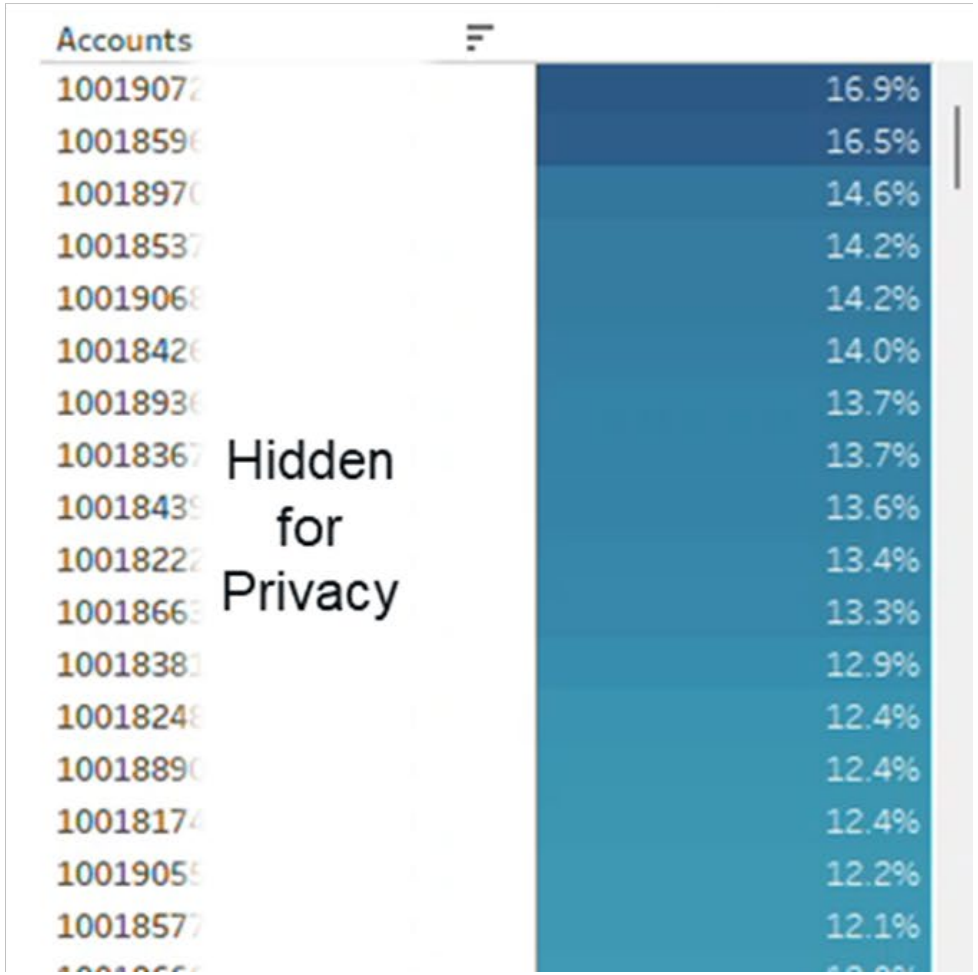


# Customer classification dashboard

## **Zip Codes** – High Financial Risk




## **Accounts** – High Financial Risk

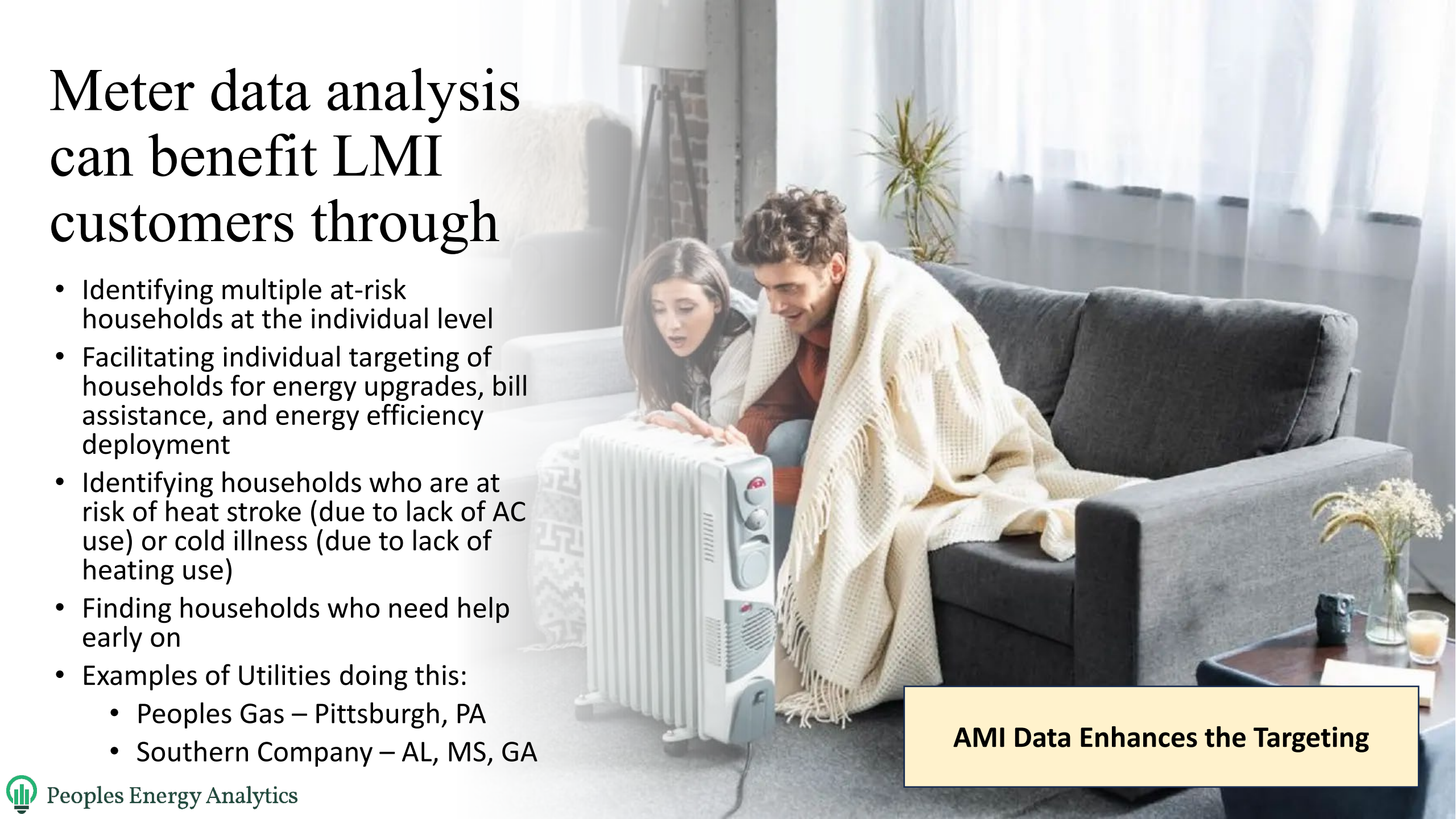



Peoples Energy Analytics

*Dashboards are created for six risk categories

# Meter data analysis can benefit LMI customers through

- Identifying multiple at-risk households at the individual level
- Facilitating individual targeting of households for energy upgrades, bill assistance, and energy efficiency deployment
- Identifying households who are at risk of heat stroke (due to lack of AC use) or cold illness (due to lack of heating use)
- Finding households who need help early on
- Examples of Utilities doing this:
  - Peoples Gas – Pittsburgh, PA
  - Southern Company – AL, MS, GA



**AMI Data Enhances the Targeting**

# Overview of Long-Term Recommendations

1. **Time-Varying Rate (TVR) price signals should be communicated in a way that is meaningful to customers, such as in terms of monthly bill impact;**
2. **The Commonwealth should ensure equitable access to the technologies that facilitate participation in load shifting;**
3. **Data-driven approaches should be used to monitor energy-limiting behavior in the summer and winter after TVR is implemented to identify impacts to affordability and enable the provision of targeted protections;**
4. **Non-shiftable loads (e.g., medical devices) or lack of access to load shifting enabling technology should be identified (this can be done with AMI data), and alternative rate structures that do not increase energy burden should be made available for those households.**

# Why This Matters

- Rising energy costs strain household budgets.
- Time-Varying Rates (TVR) are being expanded but risk unintended affordability impacts.
- Vulnerable populations may face higher burdens without safeguards.

# L1. TVR price signals should be communicated in a way that is meaningful to customers

**Recommendation:**
Use monthly bill impact estimates, not just technical jargon.

**Why:**

- Customers understand dollars, not kilowatt-hours or dollars/kWh.
- Clear communication builds trust and participation.
- **Example:**
  *"Your new rate plan could save you $65/month if you pre-cool your home in the summer using a programmable thermostat."*

# L2. The Commonwealth should ensure equitable access to the technologies that facilitate participation in load shifting;

**Recommendation:**
Provide affordable access to enabling technologies such as:

- Smart thermostats
- Load management devices
- Energy storage (where applicable)

**Why:**

- Without tools, low-income households can't shift use—leading to higher bills.

# L3. Data-driven approaches should be used to monitor energy-limiting behavior in the summer and winter after TVR is implemented

**Recommendation:**
Track energy-limiting behavior post-TVR rollout:

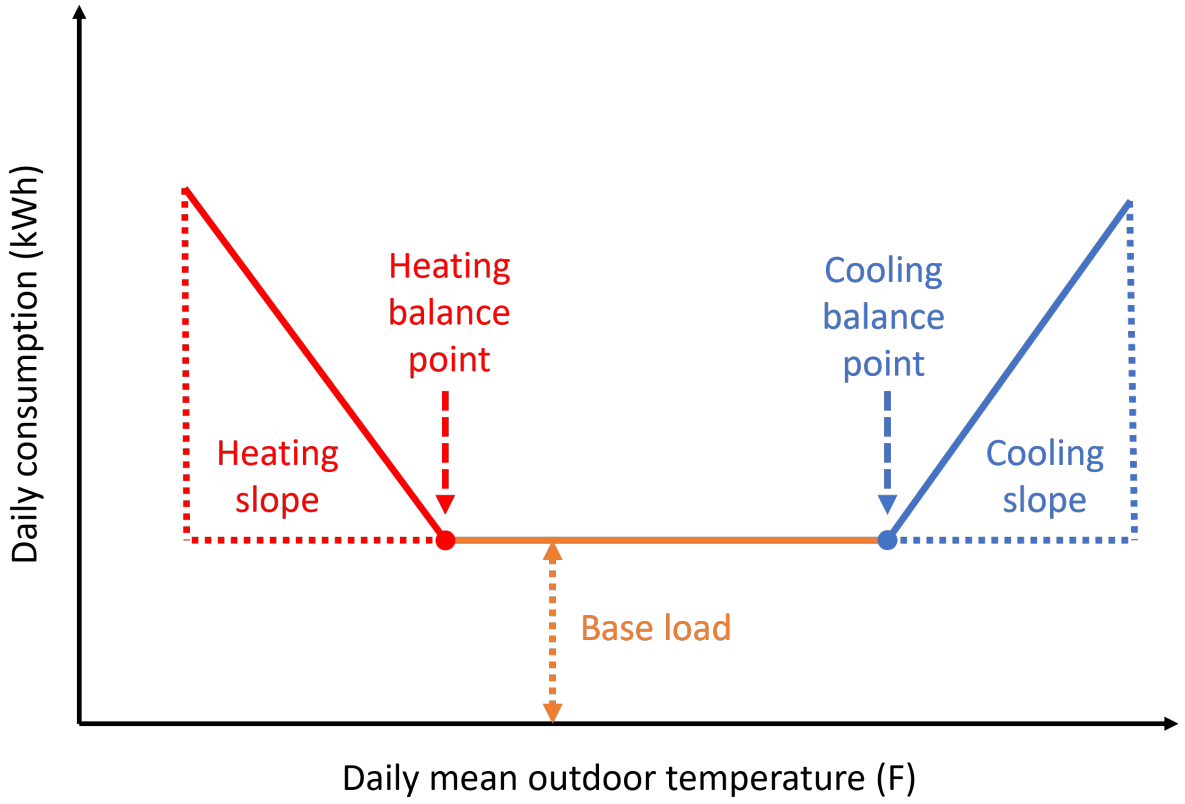
- Monitor for summer & winter hardships
- Use Monthly Meter or AMI (Advanced Metering Infrastructure) data to identify distress signals

**Purpose:**
Enable targeted protections and adjust programs in real time.

# L3. Data-driven approaches should be used to monitor energy-limiting behavior in the summer and winter after TVR is implemented

With each substantial rate change (either a net increase from a rate case, or a change in rate design enabled by AMI (i.e., implementing TVR), an analysis be conducted using historic (at least three years) and post-hoc data (at least annually) to track energy burden and energy limiting behavior.

The data analytics should involve calculating energy burdens and energy limiting behavior (early and late season data, for both cooling and heating).



# L4. Non-shiftable loads (e.g., medical devices)

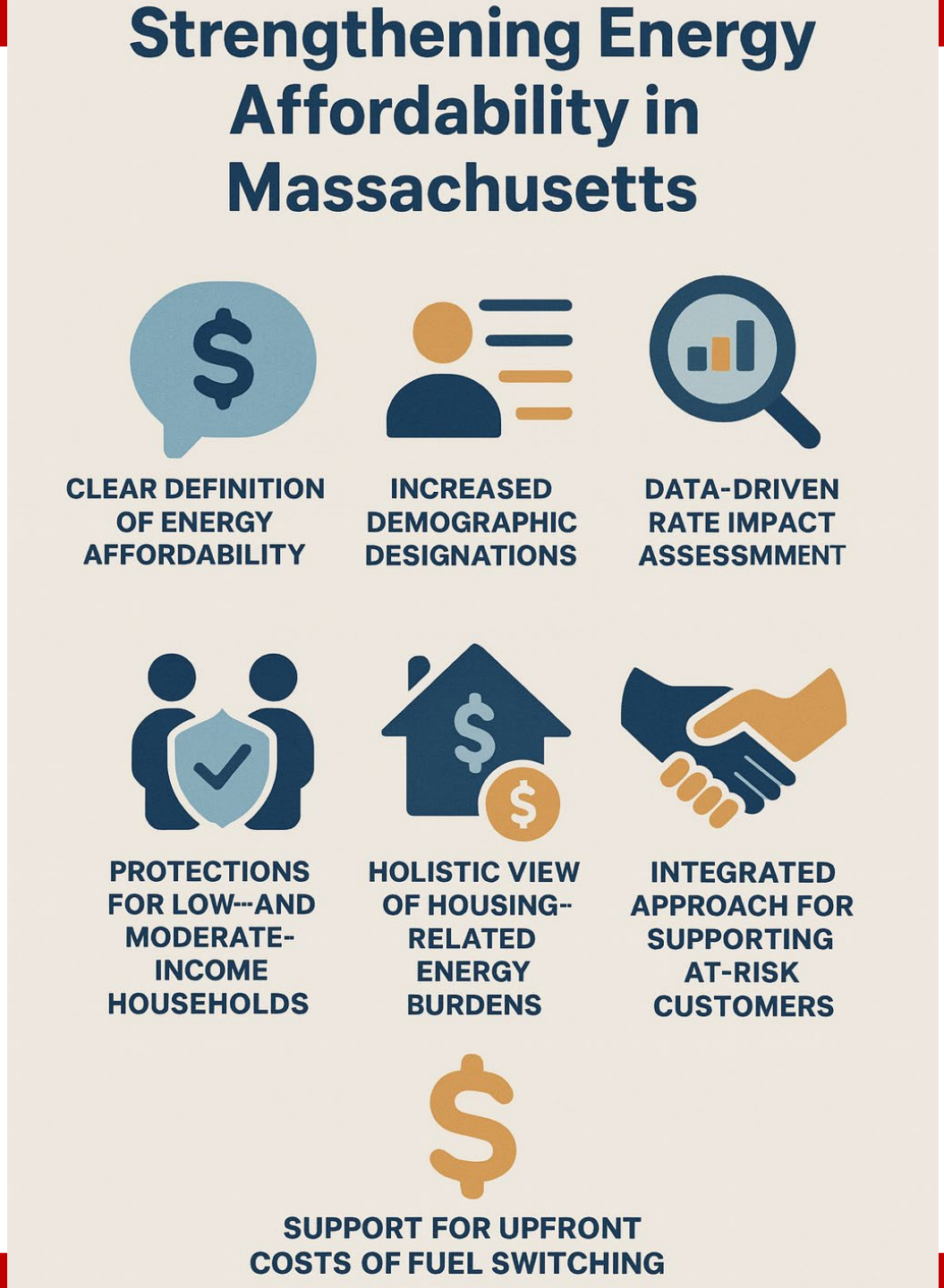
**Recommendation:**
Identify households that cannot shift energy use, such as:

- Medical device users
- Households without smart tech access

**Solution:**
Offer alternative rate structures to prevent rising energy burdens for these groups.

*A man at home uses electricity-dependent medical equipment to help with mucus buildup from cystic fibrosis.* ***RyanJLane/E+ via Getty Images***

# Recap of Near-Term Recommendations



# Recap of Long-Term Recommendations

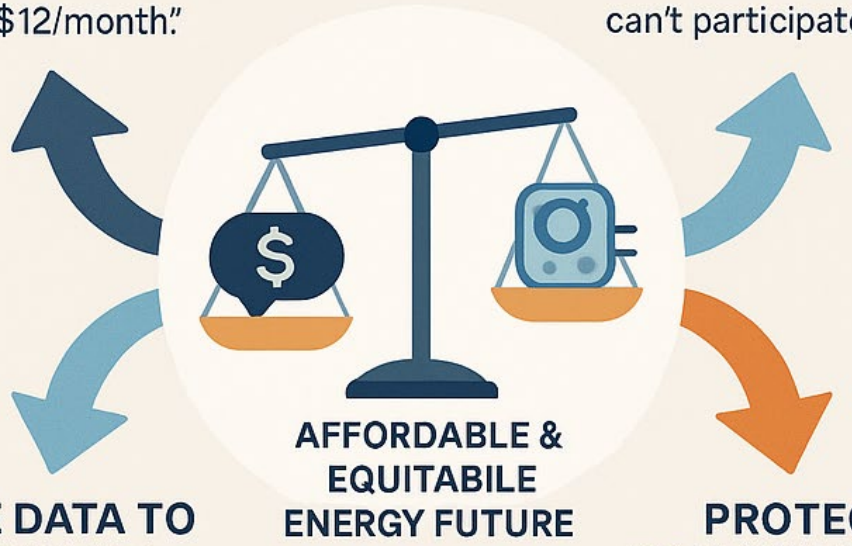
## Building Equitatle Time-Varying Rates in Massachusetts

### COMMUNICATE PRICE SIGNALS CLEARLY

Show monthly bill impacts.
not just technical rate changs.
Example. “Shift use
to save $12/month.”

### ENSURE EQUITABLE TECHNOLOGY ACCESS

Provide access to load-
shifting tools
Without tech, housholds
can’t participate fairly




### USE DATA TO MONITOR AFFORDABILITY IMPACTS

Use AMI data to track hardship
signals in real time
Adjust protections based
on usage patterns

### PROTECT NON-SHIFTABLE LOADS

Identify essential loads
that cannot be shifted
Offer alternative rate options
to prevent higher energy burdens

# Conclusions

- Critical tools for understanding hot spots for energy affordability issues include:
  - Energy bill and meter data at monthly or daily level (energy utilities)
  - Additional demographic data (state, census, or utilities)
  - Good analytical methods to pair bill and demographic data (internal data teams or consultants)

- Examples of this in practice include companies collaborating with Peoples Energy analytics (e.g., Peoples Gas (Pittsburgh, PA) and Southern Company (AL, GA, MS)).

Peoples Energy Analytics

## Building Equitatle Time-Varying Rates in Massachusetts

**COMMUNICATE PRICE SIGNALS CLEARLY**

Show monthly bill impacts.
not just technical rate changs.
Example. "Shift use
to save $12/month."

**ENSURE EQUITABLE TECHNOLOGY ACCESS**

Provide access to load-shifting tools
Without tech, housholds can't participate fairly


**USE DATA TO MONITOR AFFORDABILITY IMPACTS**

Use AMI data to track hardship signals in real time
Adjust protections based on usage patterns

**PROTECT NON-SHIFTABLE LOADS**

Identify essential loads that cannot be shifted
Offer alternative rate options to prevent higher energy burdens

# Conclusions

- The recommendations provided here aim to strengthen Near- and Long-Term Rates Strategy by making it more equitable, data-informed, and focused on long-term affordability.
- Multiple utilities are implementing the data-centric approach to identifying and addressing energy affordability issues (e.g., Peoples Gas (monthly meter data) who is collaborating with Peoples Energy Analytics).
- By adopting these recommendations, the plan can help make the transition to electrification more accessible and sustainable for all households, particularly those most vulnerable to rising energy costs and energy-related hardships.

# Contact and Acknowledgements


- Destenie Nock
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  - BlueSky: @Destenie


Peoples Energy Analytics


- The research fueling the recommendation is funded in part by the Sloan Foundation and NSF.



- Huang, L., Nock, D., Cong, S., & Qiu, Y. L. (2023). Inequalities across cooling and heating in households: Energy equity gaps. Energy Policy, 182, 113748.
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- Cong, S., Nock, D., Qiu, Y. L., & Xing, B. (2022). Unveiling hidden energy poverty using the energy equity gap. Nature communications, 13(1), 2456.
- Cong, S., Ku, A. L., Nock, D., Ng, C., & Qiu, Y. L. (2024). Comfort or cash? Lessons from the COVID-19 pandemic's impact on energy insecurity and energy limiting behavior in households. Energy Research & Social Science, 113, 103528.

# Lessons and Strategies for Implementing Time-Varying Rates

Presentation to the Massachusetts Electric Rate Task Force

July 21, 2025

Melissa Whited

Vice President, Synapse Energy Economics, Inc.

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# Synapse Energy Economics

- Founded in 1996 by Bruce Biewald and Jean Ann Ramey
- Leader for public interest and government clients in providing rigorous analysis of the electric power and natural gas sectors
- Staff of 40+ includes experts in energy, economic, and environmental topics

# Customer acceptance

Widely-accepted rate design principles include "public acceptability" of rates "with a minimum of unexpected changes seriously adverse to existing customers."

- *James Bonbright, Principles of Public Utility Rates, Columbia University Press, 1961, page 291.*

- Opt-In TOU rates present little risk to customers

- Mandatory or default TOU rates can result in significant backlash.

**How can Massachusetts ensure a successful roll-out of TOU rates, particularly if a default enrollment approach is followed?**

# Cautionary Tales with Default TOU

- **Missouri:** High on-peak to off-peak differential engendered significant backlash, including from elected officials. State legislators threatened "bipartisan legislation to protect consumers from unnecessary rate hikes and government mandates." -*Letter to Chairman Rupp from state senators Cindy O'Laughlin and John Rizzo, August 7, 2023.*
- **Minnesota:** "After backlash, Xcel retreats from Minnesota plan for higher peak rates, lower overnight costs." - *Minnesota Star Tribune, August 22, 2024*
- **Colorado:** Following roll-out of default TOU, surveys show that only 20% of customers have a favorable view of TOU rates and "issues related to transparency, fairness, trust, monopoly status, greed, lack of choice, and financial impact." *– Opinion Dynamics survey, filed in Proceeding No. 24AL-0377E, Hearing Exhibit 600, Attachment AB-5*

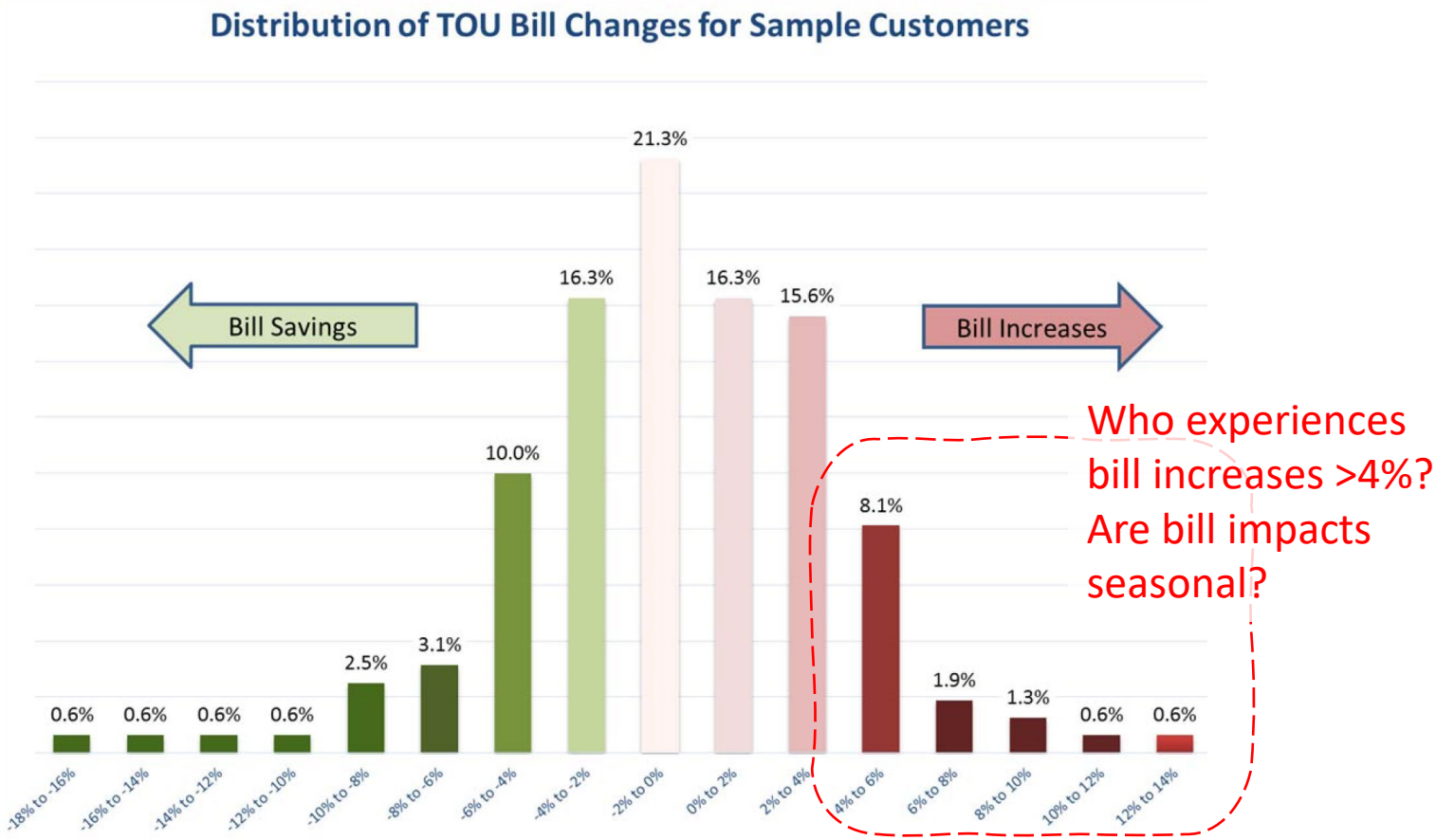
# Recommendations for Implementing Default Time-Varying Rates

# If moving to default time-varying rates…

1. **Understand the impacts** on vulnerable customers
2. Provide resources to mitigate bill impacts, and potentially **exempt** medically-reliant and low-income customers
3. Begin with **mild differentials** to avoid rate shock and allow customers to acclimate
4. Develop robust **customer education and tools**

# 1. Model the bill impacts

- Bill impacts are not uniform. Collect load research data. What are the impacts on vulnerable customers? Who are the structural winners and losers?




*Source: Xcel Minnesota, Docket No. E002/M-17-775*

# 2. Mitigate bill impacts for vulnerable customers

- Consider exempting vulnerable customers from default TOU, depending on extent of modeled bill impacts
  - *Example:* California exempts certain populations from default TOU:
    - Customers who require **medical devices** that use electricity
    - Low-income customers **in hot climate zones**
- Offer temporary bill protection (or extended bill protection) for low-income customers (e.g., 1 or 2 years)
- Targeted outreach through other programs (such as Mass Save) to provide greater access to no-cost load-shifting tools like smart thermostats
- Follow-up with surveys to ensure vulnerable groups understand TOU rates

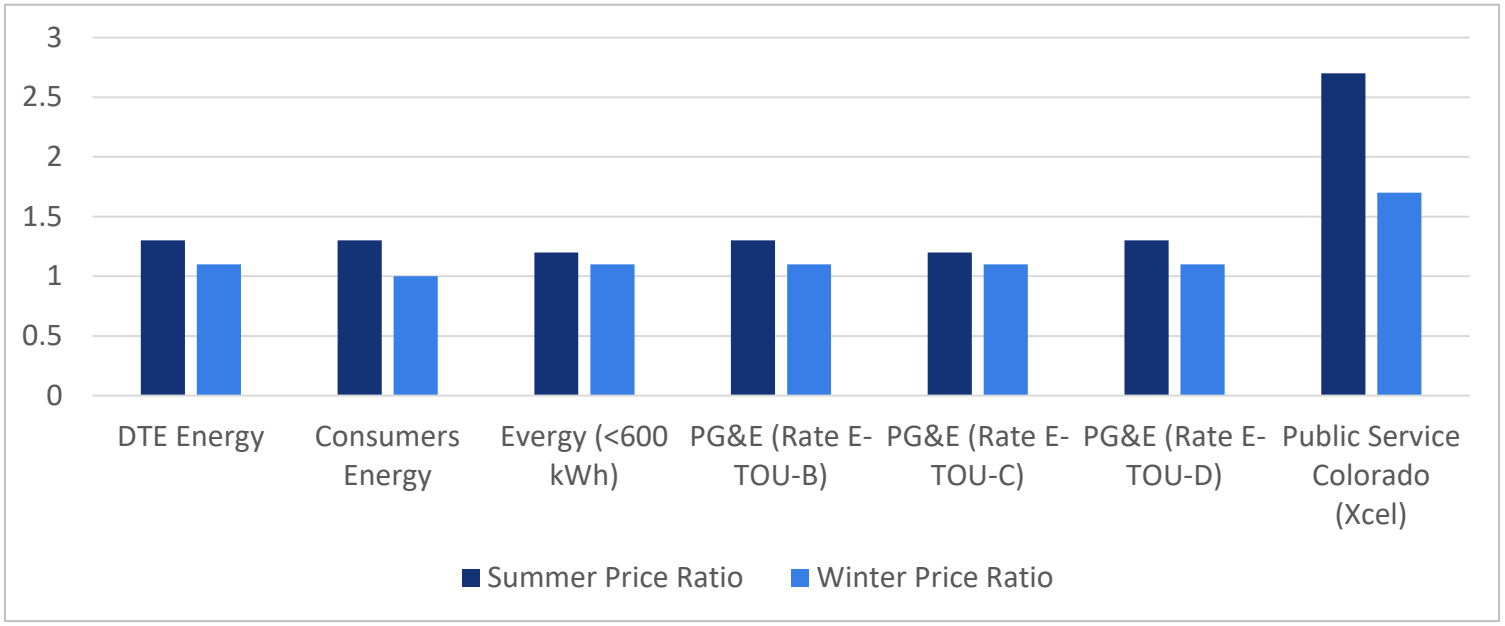

*Source: CPUC D.19-07-004, July 11, 2019*

# 3. Begin with mild price differentials

- Evergy's proposed 4:1 on-peak to off-peak price ratio resulted in customer opposition and intervention from legislators
- In California, rates were introduced as "TOU-Lite."

  "The purpose of this mild differential is to be an introductory rate that allows for customers to learn and understand the new rate structure before they are subject to differentials that could produce significant rate shock for the unaware." *- CPUC in D.15-07-001*
- Most default or mandatory TOU rates have price ratios < 2:1

**Default TOU Price Ratios**



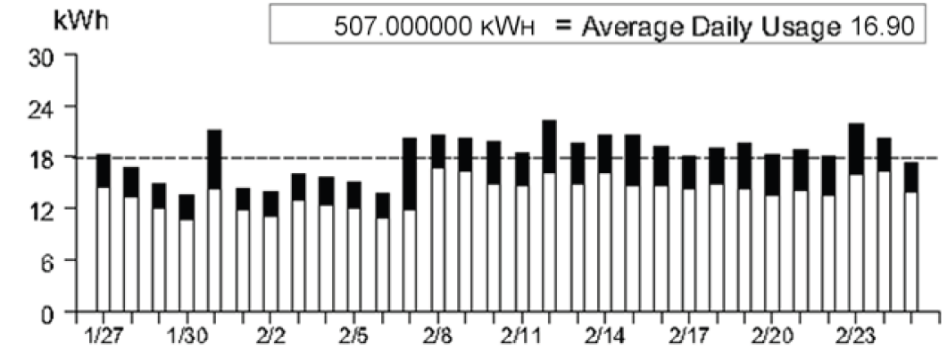
# 4. Robust customer education & tools are essential

- Especially for vulnerable customers
- Examples:
  - Visuals on customer bills
  - Simplified rate comparison
  - Online calculators to help customers select their best rate based on historical usage patterns
  - Tips on how to be successful on a chosen rate plan
  - Online videos
  - FAQs
  - Shadow bills

# Examples

## Helpful bill information (PG&E)

**Electric Usage This Period: 507.000000 kWh, 30 billing days**




| | Usage | Energy Charges |
|---|---|---|
| Peak[1] | 21% | $31.23 |
| Off Peak[2] | 79% | $118.50 |

[1]**Peak:** 4:00pm-9:00pm, Every Day;
[2]**Off Peak:** All Other Hours

- Shows daily on-peak vs. off-peak usage
- Reminds customers of on-peak hours

# Examples

## Less helpful bill information (Xcel Colorado)

| DESCRIPTION | CURRENT READING |
|---|---|
| Mid Pk Energy | 9 Actual |
| On-Peak Energy | 43 Actual |
| Off-Peak Energy | 158 Actual |
| Total Energy | 210 Actual |

- What are the on-peak vs. off-peak hours???

**Time-of-Use Rates:** electricity use charges for customers on our time-differentiated pricing plan. Electricity pricing varies depending on when you use it. The On-Peak period is 3–7 p.m., weekdays except holidays; Mid-Peak is 1–3 p.m., weekdays except holidays; Off-Peak is all other hours.

**IMPORTANT PHONE NUMBERS** (Available 24 hours, 7 days a week)

Electric Emergencies: **800-895-1999** Natural Gas Emergencies: **800-895-2999** Call Before You Dig: **811** Telecommunications Relay Service (TRS): **711**

**CONVENIENT WAYS TO PAY YOUR BILL**

Standard Payment Options (no fees apply):

- **My Account:** View and pay your bill using our mobile app, see your energy use and access your account information.
- **Auto Pay:** Automatically pay your bill directly from your bank account.
- **Pay Online:** View and pay your bill online using MyCheckFree.
- **Pay by Phone:** Make your payment from your checking or savings account with a phone call to **800-895-4999**.

- **Pay by Mail:** Return the enclosed pre-addressed envelope to **Xcel Energy, PO Box 660553, Dallas, TX 75266-0553**. Include the attached bill stub for faster processing along with your payment. Apply proper postage.

**Electronic Check Conversion:** When you provide a check as payment, you authorize us either to use information from your check to make a one-time electronic fund transfer from your account or to process the payment as a check transaction.

**Other Payment Options**
Third-Party processing fees will apply. Xcel Energy does not collect or benefit from these fees:

- **Credit/Debit Card Payment:** To pay with your card, use **MyAccount** or **eBill** or call **833-660-1365**.
- **Pay Stations:** Visit **xcelenergy.com** to find an in-person location near you.

**GLOSSARY**

**Colorado Energy Plan Adjustment (Colo Energy Plan Adj):** funds voluntary early retirement for Xcel Energy's coal-fired power plants as part of our plan to cut carbon emissions by 2030 and provide net-zero energy by 2050.

**Demand Charge:** recovers costs to produce and deliver power to you, including the costs of poles and wires, transmission and distribution facilities in the power grid.

**Demand Peak Day Quantity (Demand PDQ):** this charge is for large commercial and industrial customers only. It's a measurement of their highest daily use of electricity during a monthly billing cycle.

**Demand-Side Management Cost Adjustment (Demand Side Mgmt):** recovers costs of energy efficiency and conservation programs that encourage customers to reduce their energy use. If you receive electricity and natural gas from us you will see two charges.

**Gas Cost Adjustment (Gas Cost Adj or Natural Gas):** recovers the cost of natural gas purchased and delivered to you, including natural gas fuel, upstream transportation and storage services. We pass on the wholesale cost to customers without a markup. Costs are adjusted on a quarterly basis to reflect market conditions.

**General Rates:** your base rate charge, which includes the Service and Facility Charge, metering charges, a Demand Charge (if applicable), plus either an Energy Charge for electric service or the Usage Charge for gas service, as applicable.

**General Rate Schedule Adjustments (GRSA):** a percentage amount of your bill calculated for base rate charges, excluding the Service and Facility Charge for gas customers, the Energy or Usage Charge and the Demand or Capacity Charge. The adjustment can be positive or negative and is [illegible] electric

**[illegible]pline:** reflects Xcel Energy's payments [illegible] interstate pipelines and storage facility operators to deliver natural gas into Xcel Energy's gas system. The Federal Energy Regulatory Commission regulates these upstream services and the rates charged to Xcel Energy.

**Kilowatt Hour (kWh):** Measures the amount of electricity you use.

**Late Payment Charge:** we assess a late payment charge on any unpaid balance exceeding $50.00. For residential customers, a late payment charge of 1% per month is applied. For commercial customers, a 1.5% late payment charge will be assessed.

**Load Meter Charge:** a flat monthly charge for those with customer-owned generation in parallel with Xcel Energy's system. This fee is for the cost of the meter needed for these accounts.

**Natural Gas:** reflects our cost to purchase natural gas fuel at market prices as approved by the Colorado Public Utilities Commission.

**Production Meter Charge:** a flat monthly charge for customers who have on-site power generation, like rooftop solar, and are connected to Xcel Energy's system. This fee is for the cost of the meter needed for these accounts.

**Purchased Capacity Cost Adjustment (Purchased Cap Cost Adj):** the cost to purchase [illegible]

**[illegible]stance [illegible]tomers. If you receive [illegible] natural gas from us you will see [illegible]o charges. If you're struggling to pay your utility bills, you might qualify for exemption from a monthly charge related to energy assistance and be eligible for utility bill payment assistance. Please call 1-866-HEAT-HELP to see if you qualify. You may request to opt out of this charge by calling 800-895-4999.**

**Si tiene dificultades para pagar sus facturas de energía , es possible que reuna los requisitos para recibir asistencia para pagar sus facturas y que sea eligible para la excencion del cargo por asistencia energetica Llame al 1-866-HEAT-HELP (1-866-432-8435) para ver si califica para recibir asistencia.**

**Electric Commodity Adjustment (ECA):** recovers the cost of fuel used to generate the electricity you use. We pass on the wholesale cost to customers without a markup. Costs are adjusted on a quarterly basis to reflect market conditions.

**Energy Charge:** the variable costs of producing energy not collected through quarterly commodity adjustments.

**Franchise Fee:** this surcharge pays cities and counties for the right to use public streets to provide utility

**Renewable Energy Standard Adjustment (Renew Energy Std Adj):** a base rate charge which represents 1% of an electric bill and funds renewable energy programs as required by Colorado law under which utilities must generate or purchase increasing portions of their electricity from sun, wind or biomass.

**Revenue Decoupling Adjustment:** supports a program designed to encourage conservation without penalizing the energy provider for the reduction of electricity use. Adjusted quarterly, customers will either see a bill credit or a surcharge not to exceed 3% of your overall bill.

**Service & Facility Charge:** a flat monthly charge for the meter on your home, having the meter read, billing support and customer service needs.

**Time-of-Use Rates:** electricity use charges for customers on our time-differentiated pricing plan. Electricity pricing varies depending on when you use it. The On-Peak period is 3–7 p.m., weekdays except holidays; Mid-Peak is 1–3 p.m., weekdays except holidays; Off-Peak is all other hours.

**Therm:** Measures your natural gas use. One therm is equal to 100 cubic feet of natural gas. A dekatherm is 10 therms.

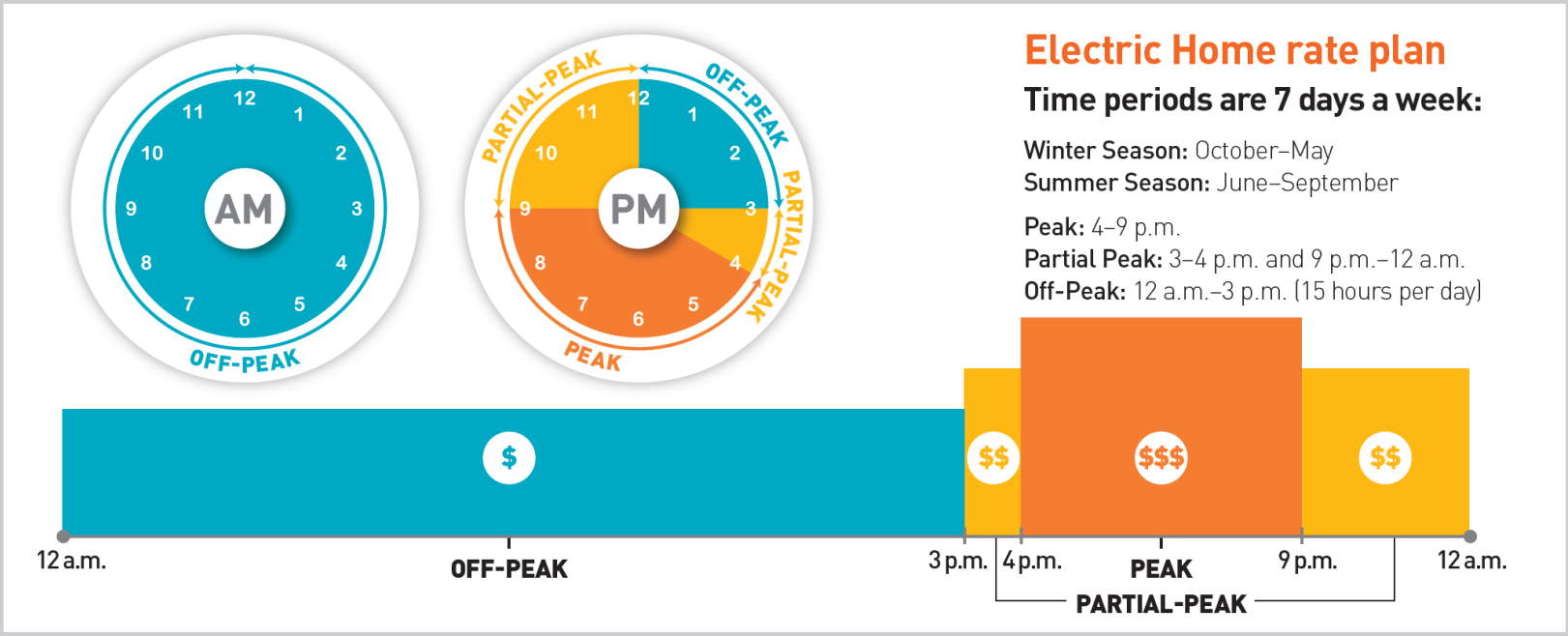
**Therm Multiplier:** natural gas usage is measured in therms. This is the conversion from the volume of natural gas (cubic feet) to energy use (therms).

**Transmission Cost Adjustment (Trans Cost Adj):** recovers transmission investments for infrastructure to carry electricity from a power plant to your home and business that results in a net increase in transmission capacity or are part of an approved Wildfire Mitigation Plan. Also recovers distribution costs pursuant to Colorado Senate Bill 24-218.

**Transportation Electrification Plan Adjustment (Trans Elec Plan):** funds programs to help customers unlock the benefits of electric transportation.

**Usage Charge:** this charge covers the costs for providing natural gas service, including moving natural gas through pipelines and storage to your home or business, that are not recovered through other charges.

# PG&E Educational Materials




## Ways to save with Electric Home

Households can maximize savings when renewables are more plentiful by **using energy during lower-priced times/off-peak hours**.

**Try these no cost saving tips:**

- Charge electric vehicles (EVs) overnight after 12 a.m.
- When possible, shift energy usage, such as running large household appliances, to off-peak time periods
- If applicable, utilize stored energy from your residential battery during peak hours from 4 to 9 p.m.

# PG&E Educational Tools

## Tools for choosing rate plans

### Online rate analysis

- See what's available and how the different rate plans work
- View your custom rate analysis
- Decide what rate plan would be the best rate plan for you

Use our rate analysis tool →

### Low-cost and no-cost energy-saving tips

Find ways to save with very little out-of-pocket expense.

View the energy-saving tips →

### Energy glossary

Better understand your energy statement. Learn the definitions of common energy-related terms.

Go to the energy glossary →

# Contact

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California Public Utilities Commission

# Reflections on California's TOU Transition

*Current and Future Pricing Strategies for Electrification, Decarbonization, and Affordability*

**Paul S. Phillips** | Energy Division, CPUC

# Introduction: California Rates and Affordability: *"A Tale of Two States"*

## ❖ Coastal, cooler-to-moderate climate zones

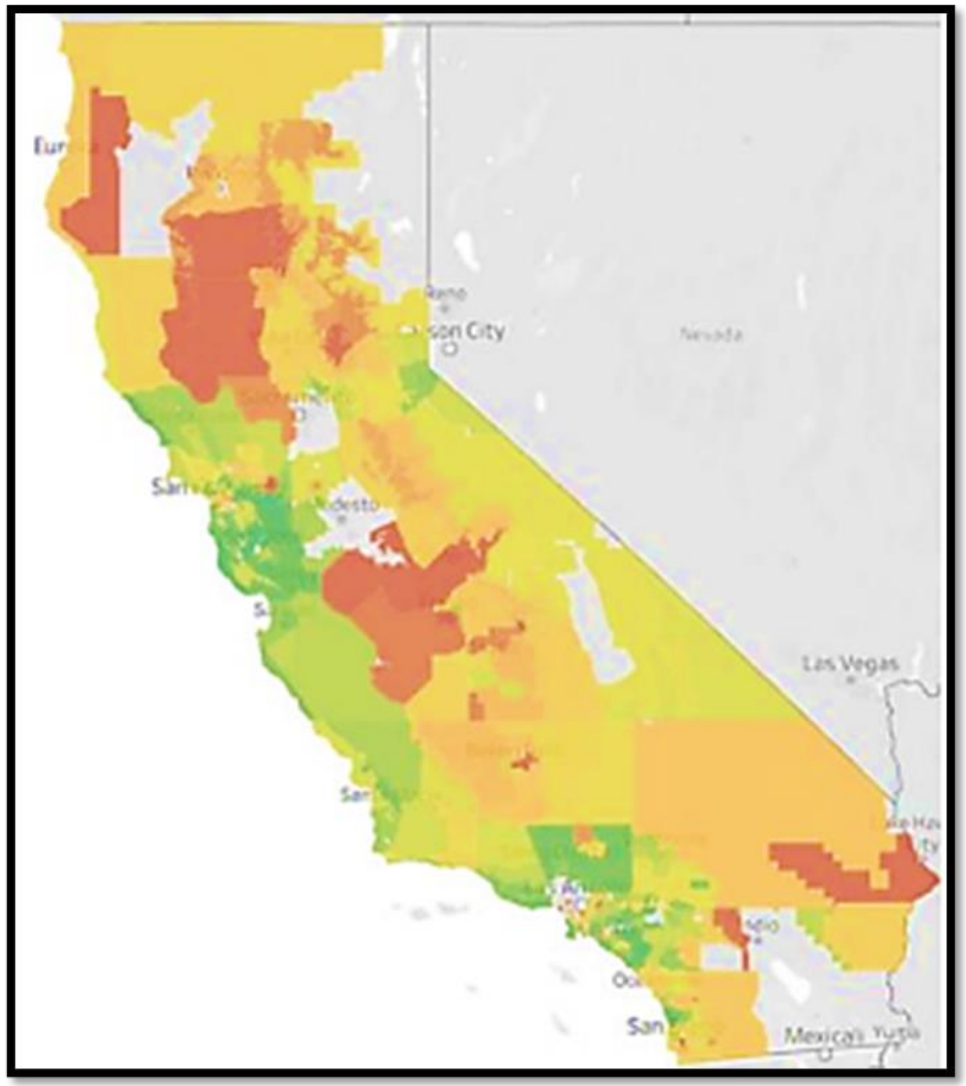
- Wealthier homeowners, more moderate weather
- Higher Net Energy Metering (NEM) i.e., rooftop solar + storage adoption rates to offset monthly bill
- Higher Electric Vehicle (EV) adoption rates and more rate choices such as electrification rates to reduce bill impacts

## ❖ Inland, hotter climate zones

- More acute affordability issues
- Greater air conditioning needs resulting in greater average kilowatt-hour usage per month
- Fewer resources to invest in solar / storage / EVs, yet more likely to pay more for service due to cost shifts.

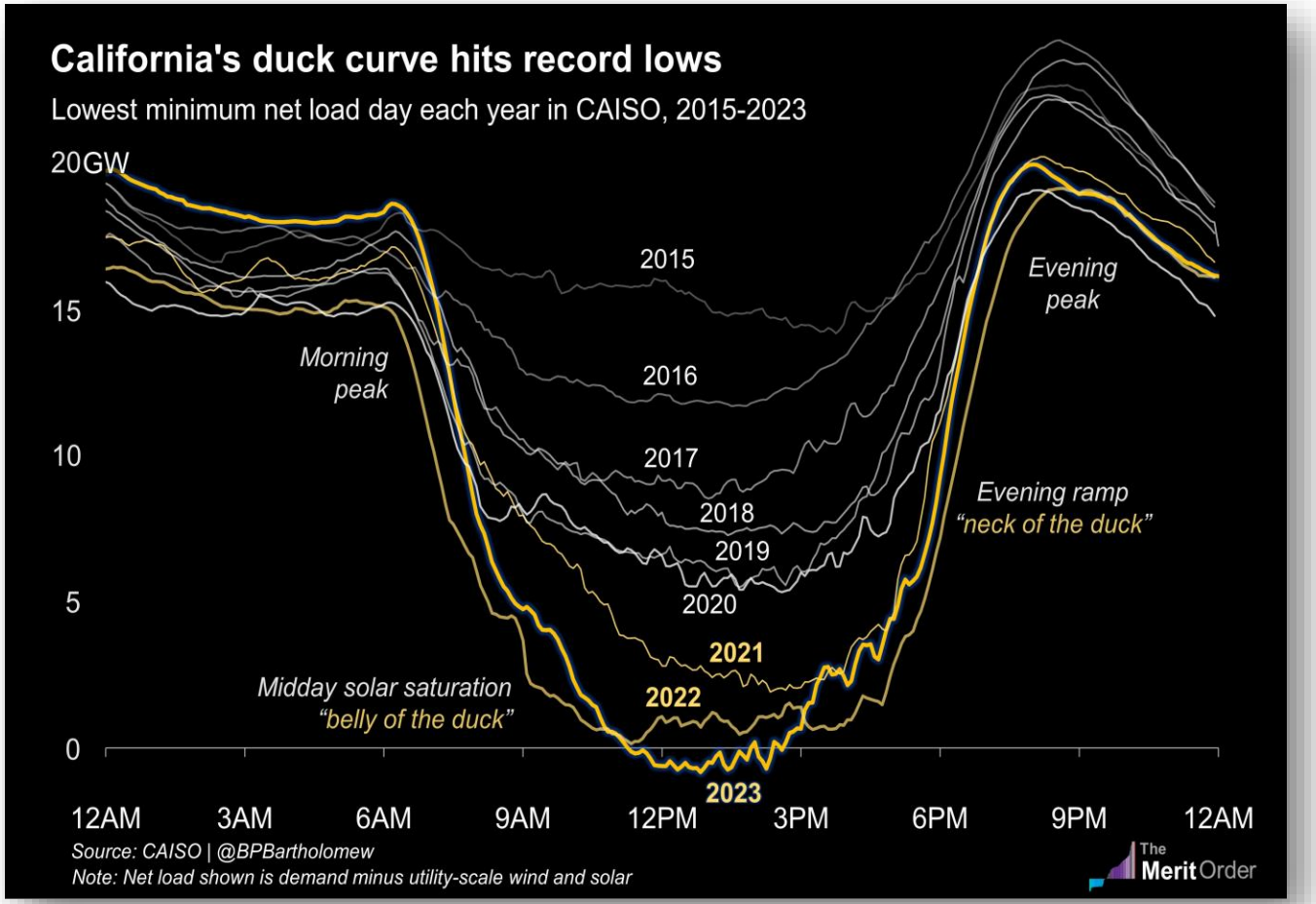
## ❖ *Narrative for the next several years?*

- EV sales momentum + greater electrification + ongoing rate reforms should lead to lower household energy costs for all.




*Source*: 2022 CPUC Annual Affordability Report

# California's "Duck Curve" and Evening Ramp Trends Require Greater Precision in TOU + Widespread Dynamic Pricing




## Problematic System Trends Ahead (by 2030)

- Forecasted 60% increase in evening ramp, up to **15-20x increase in inefficient renewable energy curtailment.**
- Demand Response programs have limited impact on shifting load to off-peak times and must be paired with off-peak load growth incentives.
- **Distribution Price Tag for Electrification:** Up to $50 to $100 billion in infrastructure upgrades to ready the grid for mass EV adoption and building electrification.
- **Cause & Effect:** Reliability issues are exacerbated by cost distortions and pricing inefficiency.
- Widespread storage, rapid Vehicle to Grid ("V2G") growth and better pricing strategy are the keys to the future.

# SNAPSHOT OF CALIFORNIA'S TOU JOURNEY

- Non-residential mandatory TOU rates have been in place going back to the early 2000s, with small commercial in place just before 2010.
- The response to the California energy crisis of 2000-2001 (wholesale market failure) led to a decade of unintended residential rate design consequences.
  - *Legislation (AB 1X) froze lower two tiers in an inclining block structure, which led to tier expansion and retail rate distortion at the upper tiers as RPS driven revenues skyrocketed through 2009.*

- **Assembly Bill 327** (Padilla, 2013) piggy-backed on a major CPUC rulemaking that would institute sweeping reforms: consolidation of tiered rates, transition to default residential TOU.
- **2015 Decision (D.) 15-07-001** was a mammoth blueprint for a multi-year tiered rate compression, TOU and dynamic rate pilots, marketing, and a transition glidepath to TOU implementation.
  - *Optional and default pilots over 2-3 years enrolling 700K customers were very successful.*
  - ***Multichannel Marketing, Education & Outreach campaign (ME&O):*** *focus group research, statewide air cover (mass market contract), customized IOU campaigns (mass media, digital, print, mail, etc.).*

# An Evolving California Residential TOU Customer Protections Package

# TOU Customer Protections: CA Public Utilities Code Section 745

## Exemptions from Default TOU (PU Code 745(c)(2))

- The CPUC excluded California Alternate Rates for Energy (CARE) and Family Electric Rate Assistance (FERA) customers in hot climate zones from being defaulted to TOU rates.
- The exclusion prevents disproportionate bill increases for economically vulnerable households, especially where cooling needs are high.
- These customers can still opt-in voluntarily to TOU if its benefits their usage profile.

## Customer Choice Elements

- TOU rates are *voluntary and opt-outable*.
- IOUs were required to offer a menu of rate options including tiered and EV-specific TOU rates.
- The design reflects core rate reform principles: consumer choice, affordability, and grid-friendly behavior.

# Bill Protection and Shadow Billing for Default Residential TOU

## One-Year of Bill Protection Post-Enrollment

- Applies automatically to customers defaulted onto TOU rates.
- If a customer's total annual cost on TOU exceeds what they would have paid on their prior rate, they receive a credit to make up the difference.
- Bill protection gives customers a "risk-free trial" period to test TOU without financial downside.
  - For example, SDG&E issued $6.24M in protection credits, averaging $28.08 per eligible customer.
  - Note: Some Community Choice Aggregators (CCAs) were not required to provide protection on the generation portion, complicating the full bill comparison.

## Shadow Billing Tools

- Utilities provided ongoing "shadow billing" via online portals or printed comparisons, showing what a customer would have paid under their prior rate.
- Tools allows customers to monitor monthly impacts and adjust usage or opt out.
- Utilities used these tools to improve transparency, build trust, and reduce complaints or confusion.

# Opt-Out and Rate Education Provisions

## Opt-Out Channels

- Multiple accessible methods were offered: online tools, call centers (live agents or automated), reply cards, and proactive outbound calls to customers forecasted to be **"significant non-benefiters"** (> $100/year increase).
- Most customers who have opted out used the business reply card (BRC); however, postal delays sometimes caused confusion or missed transitions.
- **Opt-out rates:** SDG&E (16%), SCE (22%), PG&E (21%) as of 2023.

## Onboarding New Customers

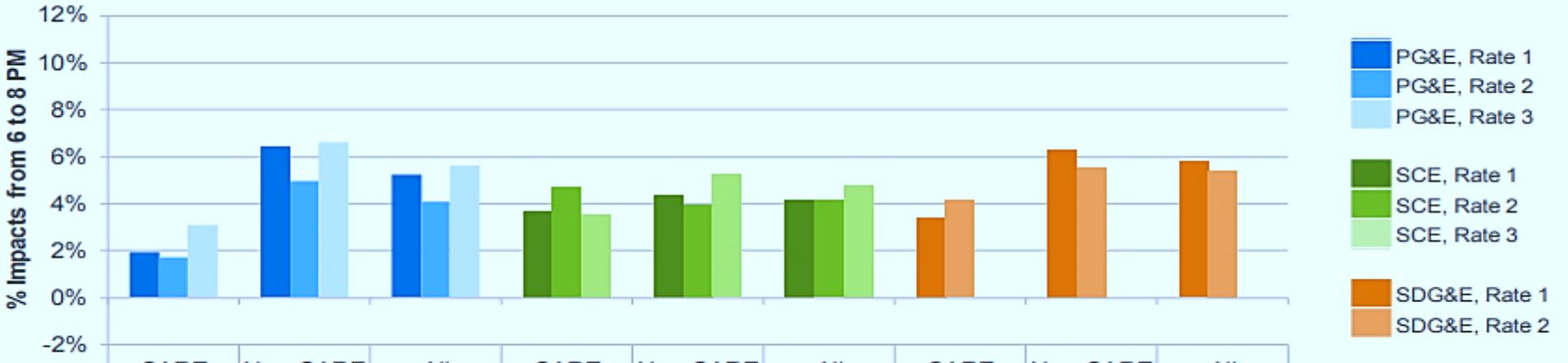
- ***Since October 2022, TOU is the default rate for all new customers at service turn-on or transfer.***
- Despite defaulting, customers can choose a different rate during enrollment or switch at any time after.
- Utilities must provide rate comparisons and engage in "rate conversations" at turn-on to help customers select the best fit.
- However, < 50% of new customers chose TOU, indicating a need for improved education, scripting, and personalized messaging about TOU benefits (e.g., lower midday prices, support for clean energy).

# Residential TOU Load Impact Measurements Point to Success

# Results of "Mild" TOU Rates Boost Confidence in Prospective "Spicy" TOU and Demand Flexible (Dynamic) Rates

➢ ***2022-23 Load Impact Studies:*** *Residential and EV TOU rates yield promising load shift and bill impacts.*

- **Residential TOU**: 2% – 7% interior peak (6-8 pm) load shift, but 1.2% to 7.7% from 4-9 pm.
- **EV TOU Rates**: 14-20% for SCE, 14.7% for SDG&E, and 10-16% for PG&E.




| | | CARE | Non-CARE | All | CARE | Non-CARE | All | CARE | Non-CARE | All |
|---|---|---|---|---|---|---|---|---|---|---|
| | | PG&E | | | SCE | | | SDG&E | | |
| Rate 1 | % Impact | 2.0% | 6.5% | 5.2% | 3.7% | 4.4% | 4.2% | 3.4% | 6.3% | 5.8% |
| | kW Impact | 0.02 | 0.07 | 0.06 | 0.04 | 0.06 | 0.05 | 0.02 | 0.05 | 0.05 |
| Rate 2 | % Impact | 1.7% | 5.0% | 4.1% | 4.7% | 4.0% | 4.2% | 4.1% | 5.6% | 5.4% |
| | kW Impact | 0.02 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 | 0.05 | 0.04 |
| Rate 3 | % Impact | 3.1% | 6.6% | 5.6% | 3.5% | 5.2% | 4.8% | | | |
| | kW Impact | 0.03 | 0.07 | 0.06 | 0.04 | 0.07 | 0.06 | | | |

# New Customer Protection: Income Graduated Fixed Charge

- **Purpose:** *Lower volumetric rates, reduce NEM (solar) cost shift to Non-NEM customers, create more equity and increase electrification incentives across all residential rate structures.*

- **Three income tiers:**
  - Tier 1 – CARE (California Alternative Rates for Energy) -eligible customers
  - Tier 2 – FERA (Family Electric Rate Assistance) -eligible customers plus customers who live in deed-restricted affordable housing
  - Tier 3 - Non-CARE/FERA-eligible customers

- **Recover marginal customer access costs + specific line item charges – leads to discounted fixed charges for CARE and FERA customers:**
  - Tier 1 - $6/month
  - Tier 2 - $12.08/month
  - Tier 3 - $24.15/month

- **Volumetric rate reductions across all TOU periods.**
  - Summer peak reduction of 8-10% (based on 2023 revenue requirements)

❖Optional rates are required to have the same fixed charge structure.

# IGFC Bill Impacts – Default TOU Rates

*Estimated based on average usage. Savings for low-income customers and hotter climate zones.*

### PG&E Average Monthly Bill Impacts

| Climate Zone | CARE | FERA | Non-CARE/FERA |
|---|---|---|---|
| P | $ (8.53) | $(18.09) | $ (4.21) |
| Q | $ (6.24) | $(13.61) | $ (2.24) |
| R | $ (6.76) | $(14.28) | $ (3.45) |
| S | $ (5.74) | $(12.63) | $ (1.47) |
| T | $ (0.60) | $ (2.90) | $ 9.11 |
| V | $ (2.62) | $ (6.75) | $ 1.64 |
| W | $ (6.34) | $(13.48) | $ (1.47) |
| X | $ (2.61) | $ (6.70) | $ 3.40 |
| Y | $ (7.06) | $(15.43) | $ 2.49 |
| Z | $ (4.09) | $ (9.96) | $ 11.50 |

### SCE Average Monthly Bill Impacts

| Climate Zone | CARE | FERA | Non-CARE/FERA |
|---|---|---|---|
| 5 | N/A | N/A | $ 0.82 |
| 6 | $ (1.62) | $ (2.40) | $ 6.41 |
| 8 | $ (2.66) | $ (4.02) | $ 5.13 |
| 9 | $ (4.39) | $ (6.80) | $ 0.43 |
| 10 | $ (7.08) | $(10.86) | $ (0.28) |
| 13 | $ (8.19) | $(12.25) | $ (2.96) |
| 14 | $ (8.36) | $(12.73) | $ (2.12) |
| 15 | $ (9.77) | $(14.94) | $ (6.72) |
| 16 | $ (5.88) | $ (9.25) | $ 4.15 |

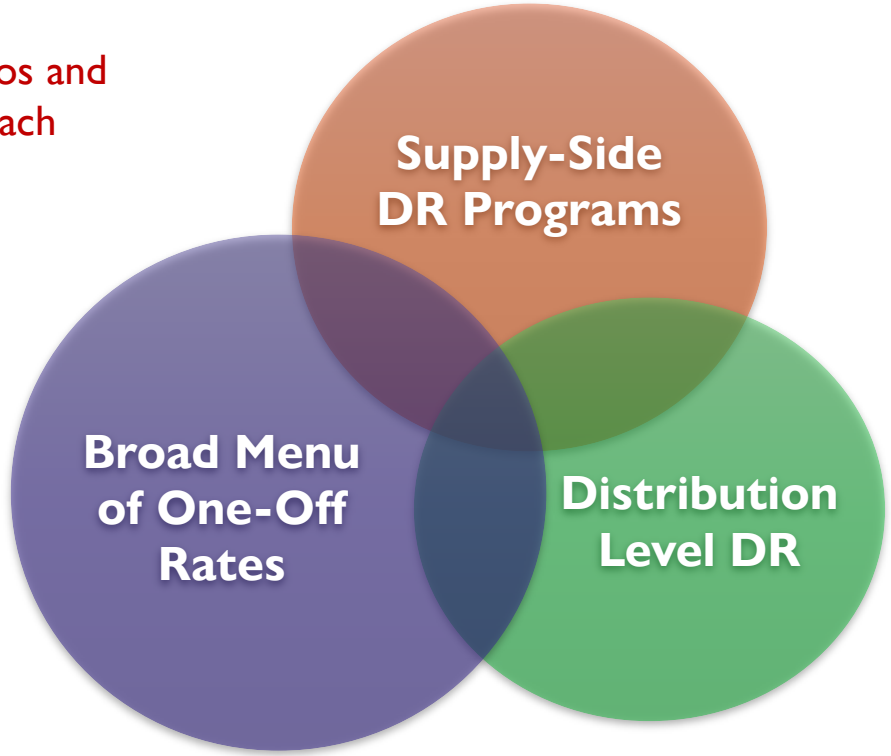
### SDG&E Average Monthly Bill Impacts

| Climate Zone | CARE | FERA | Non-CARE/FERA |
|---|---|---|---|
| Inland | $ (6.63) | $(10.31) | $ 0.74 |
| Coastal | $ (3.78) | $ (5.94) | $ 2.39 |
| Desert | $(17.97) | $(27.50) | $ 0.33 |
| Mountain | $(19.79) | $(30.89) | $ (6.79) |

# TOU Results and Learnings Inform the Transition to the CalFUSE Framework, Advanced TOU and Dynamic Pricing

# The California Flexible Signal for Energy (CalFUSE): Optimizing DER Value, Maximizing Economics of Electrification, and Improving Grid Resource Management

**Status Quo:** Silos and Piecemeal Approach



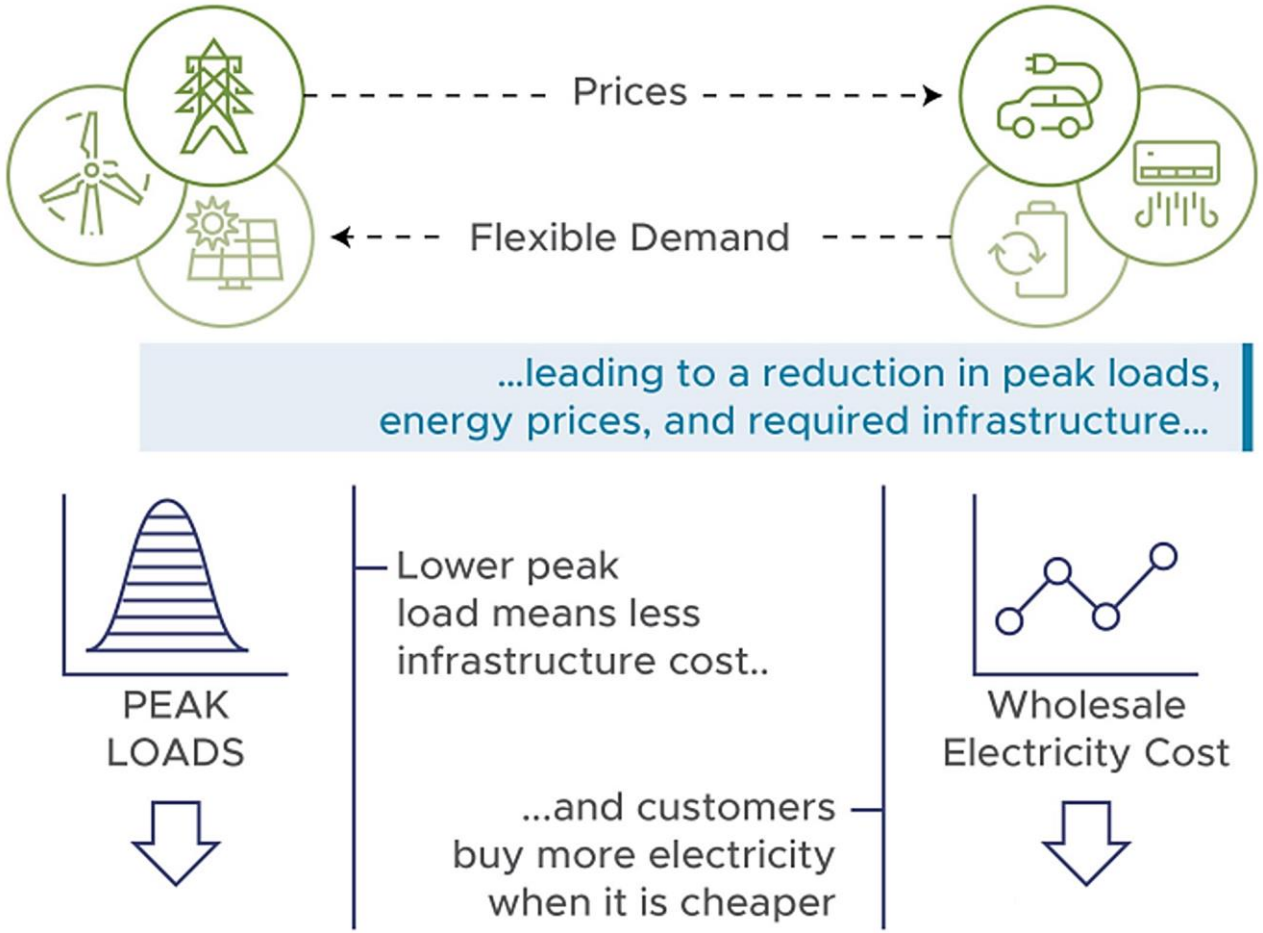

**Innovation:** Integrated Price Signal to Incentivize Electrification, Optimize DERs and Virtual Power Plants, Reduce Cost of Service, Meet LMS Standards

**California Flexible Unified Signal for Energy (CalFUSE)**

- Complex, inefficient, expensive, confusing
- Difficult to scale, limited adoption, obsolescence
- High cost of controls and automation
- Experimental one-off tariff and program designs

➔ Reduced complexity, single point of focus
➔ Highly scalable integrated program + tech growth
➔ Lower cost of controls, automation, infrastructure
➔ Widespread advanced TOU and dynamic pricing

# Increased Demand Flexibility Means Higher Capacity Utilization and Downward Pressure on Cost




- ➔ Better alignment of wholesale and retail costs.
- ➔ Reduced peak loads, energy prices, and infrastructure needs (deferred investment).
- ➔ Improved utilization of existing capacity (higher load factors).
- ➔ Reduced cost of service.
- ➔ More ***"prosumer" surplus*** for participating customers.

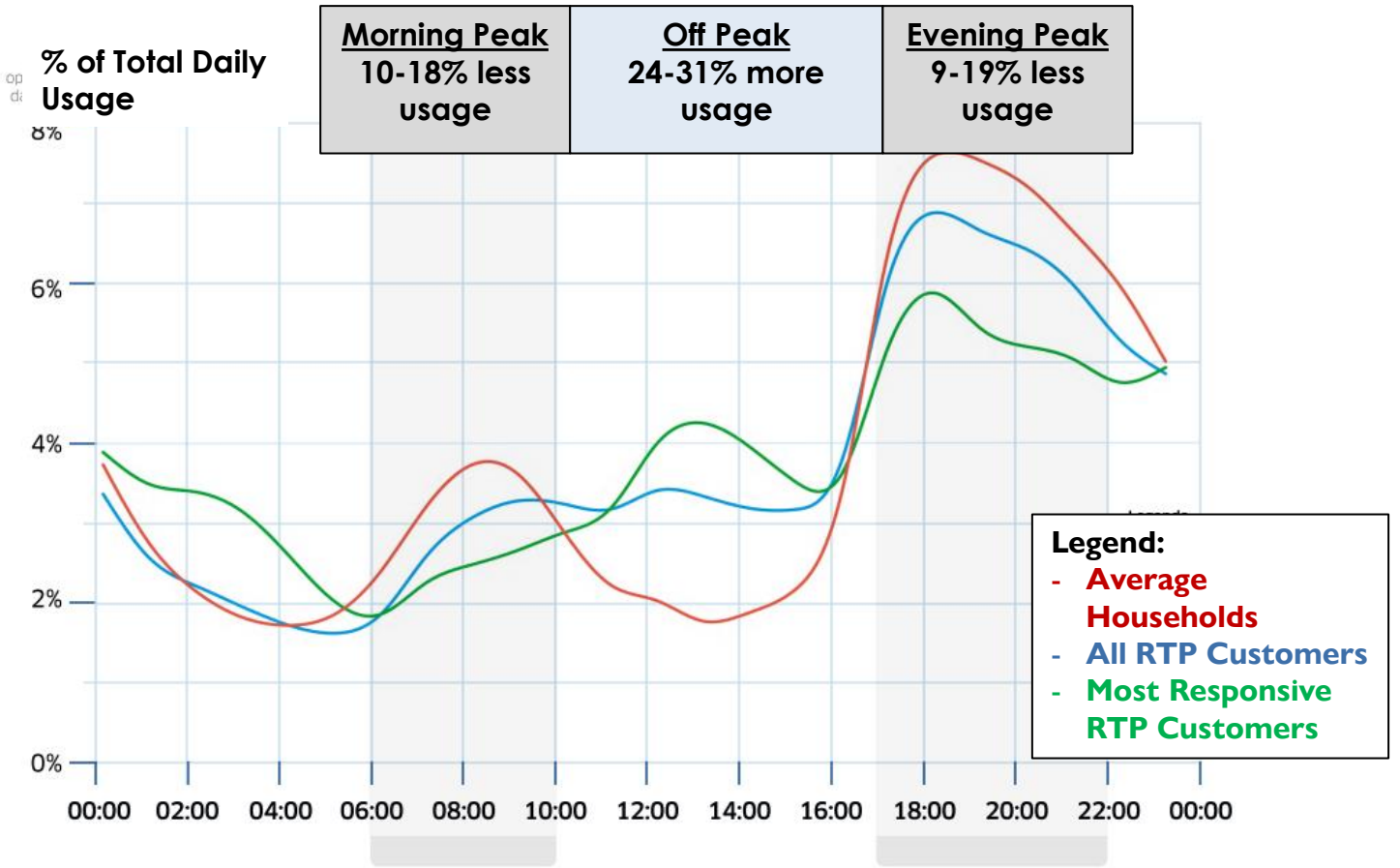


Image Source: PNNL DSO+T Study January 2022

# Residential Dynamic / Real Time Pricing Successes in Other Jurisdictions

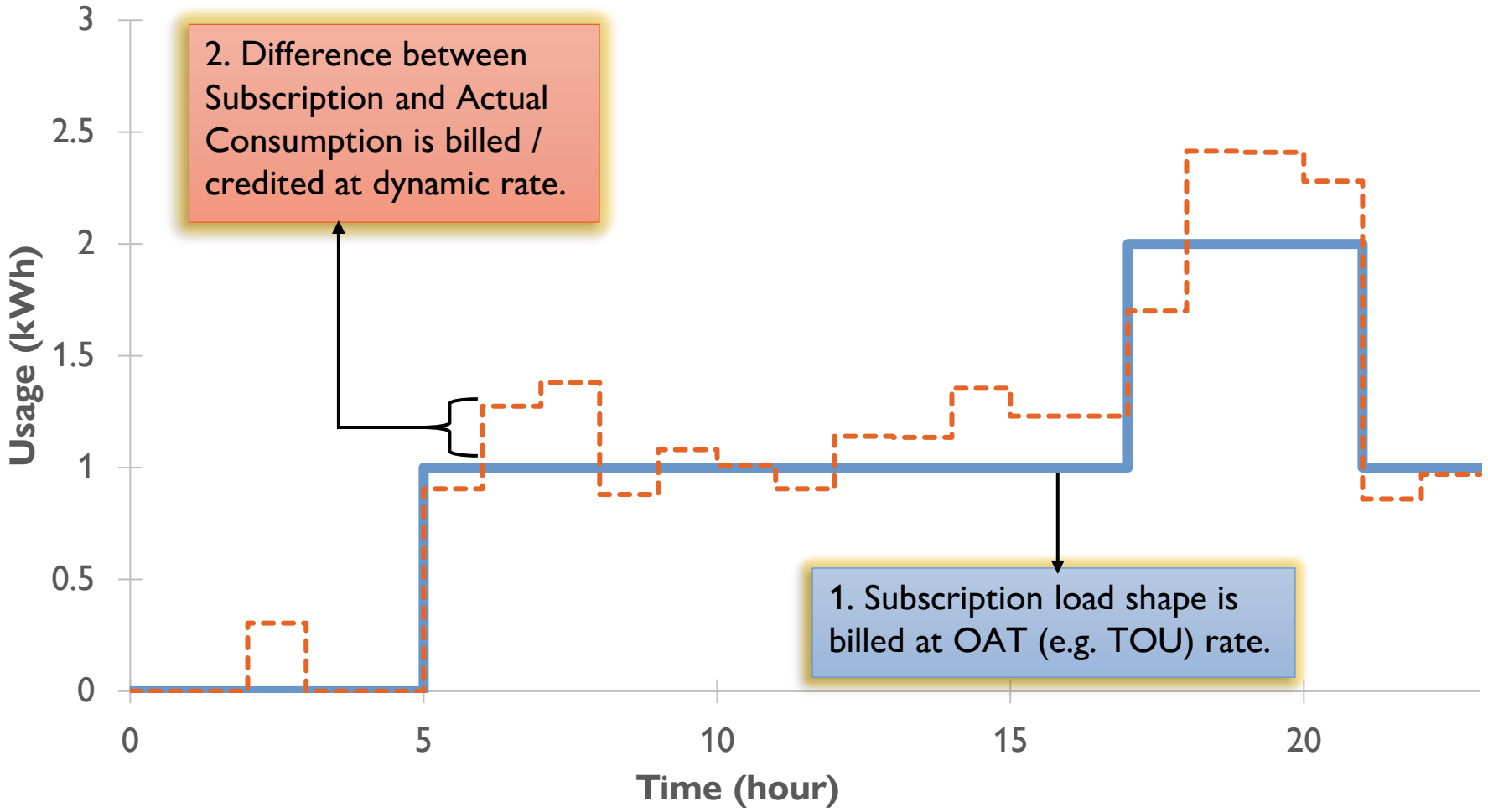
- **Domestic and International**
  - **Oklahoma Gas & Electric and Georgia Power:** RTP + baseline subscriptions.
  - **Illinois:** Ameren and ComEd (Illinois) – 13% average residential bill reduction on RTP.
  - **Denmark, Netherlands, Spain:** success with optional to default dynamic / RTP tariffs.
    - ***Netherlands**: 19% peak load shift on average in 2023*
    - *Increased daytime usage up to 31%*
    - *Based on 100,000+ users on ANWB Energie's dynamic rate.*
- Growing need to expose customers to dynamic / RTP signals to maximize demand flexibility.
- Higher risk and reward, third party EMS options.

## *Netherlands Hourly Load Shift on Dynamic Pricing Contracts*



# Customer Protection: Baseline Subscriptions

*Historic Load Shape & Energy Quantity at Otherwise Applicable Tariff (OAT) Price*




- Stabilizing element (hedge) for customers and utilities.
- Ongoing shadow bill with the ability to improve "billing position" at hourly price over OAT.
- A form of "paying for your load shape" in advance based on usage history.
- Georgia Power has long used customer baseline subscriptions with RTP.

# Broad Conceptual Elements of the CalFUSE Framework

**Price Presentation**

- **Universal Standardized Pricing Access** (TOU to RTP)
- **Interconnection with MIDAS** backbone + "price machine" systems
- **Digitization** of other open source grid systems to promote pricing ubiquity

**System Wide Rate Reform**

- **Real Time Energy Prices** (marginal energy cost)
- **Real Time Capacity Prices** (scarcity price functions)
- **Location-based Distribution Pricing** (nodal / p-node)
- **Bidirectionality of Pricing** (fair compensation for DER exports)
- **Rate Case Reform** (capacity efficiency adjustments, rate design evolution, equity)

**Hedging Options and Protections**

- **Subscription Options** → "Pay for Your Load Shape"
- **Transactive Energy Options** (week ahead, "buy / sell" contracts)
- **Third Party Energy Management Services** (EMS + ASP marketplace)

# California Public Utilities Commission

*Paul Phillips oversees the Electric Rates section of the CPUC Energy Division, developing statewide pricing strategies for an evolving grid. Earlier in his career, Paul focused on climate strategies, utility cost modeling, mergers & acquisitions, and academic consulting on electric market restructuring and the energy crisis. He later served as an energy advisor in renewable procurement, net energy metering, and gas and electric rates. Paul holds an MPA from the Harvard Kennedy School and a BA in English Literature and Economics from UCLA.*

San Francisco | Sacramento | Los Angeles

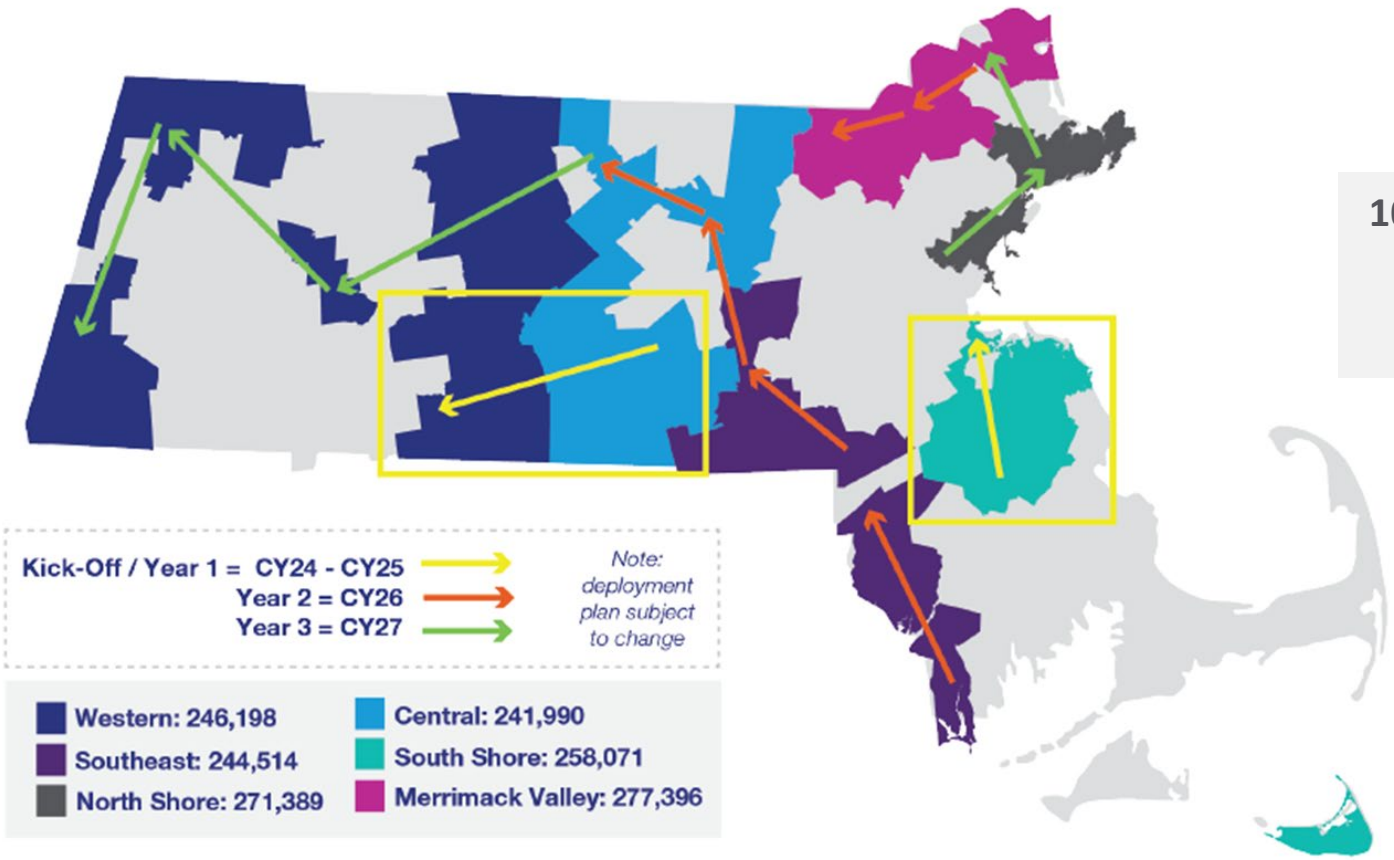
www.cpuc.ca.gov

# TVR Implementation Considerations

- July 21, 2025

nationalgrid

# National Grid AMI Deployment Update (as of 7/08/2025)




**1017** Field Area Network (FAN) Devices

**101,158** AMI Meters

**200,740 Unique Customers Have Received AMI Install Communications**

Brockton

Easton

North Easton

Randolph

South Easton

Worcester

**90-day Communications Tactics:**

- Connected TV
- Interactive Video
- Rich Media
- Standard Display
- Spotify Audio
- Paid Social
- Digital Billboards

nationalgrid

# National Grid AMI Deployment Update

| CY 2025 | CY 2026 | CY 2027 |
|---|---|---|

**Establish and maintain a stable end-to-end meter-to-cash process**

| CY 2025 | CY 2026 | CY 2027 |
|---|---|---|
| Continue to deploy customer insights on National Grid's MyAccount portal | Operationalize remote meter investigation | Complete deployment of FAN devices |
| Continue to deliver AMI-enabled proactive alerts to customers | Progress remote meter connect/disconnect capability | Complete deployment of AMI meters |
| Advance outage management improvements | Deploy BulkAPI data sharing solution (if directed) | Operationalize remainder of AMI-enabled functionalities (outage mgmt., remote connect/disconnect, events and alarms, opt-outs) |
| Develop and implement Green Button Connect | Commence rollout of customer load disaggregation application (Sense App) | |
| Commence design/development of BulkAPI data sharing solution | | |
| Launch customer load disaggregation pilot (Sense App) | | |

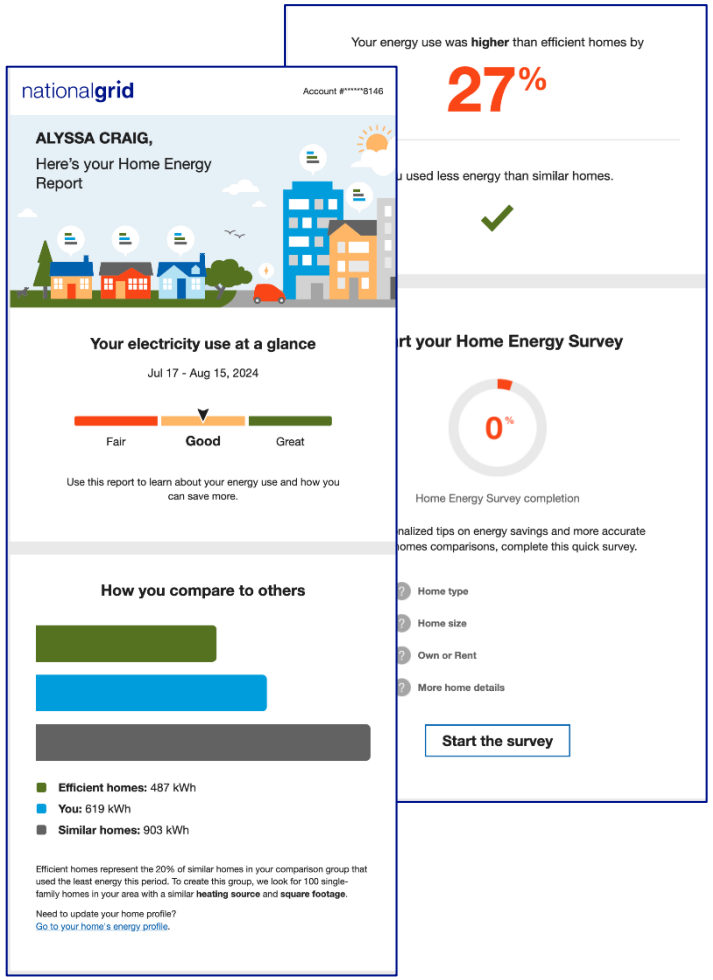
nationalgrid

# AMI Benefits and Capabilities

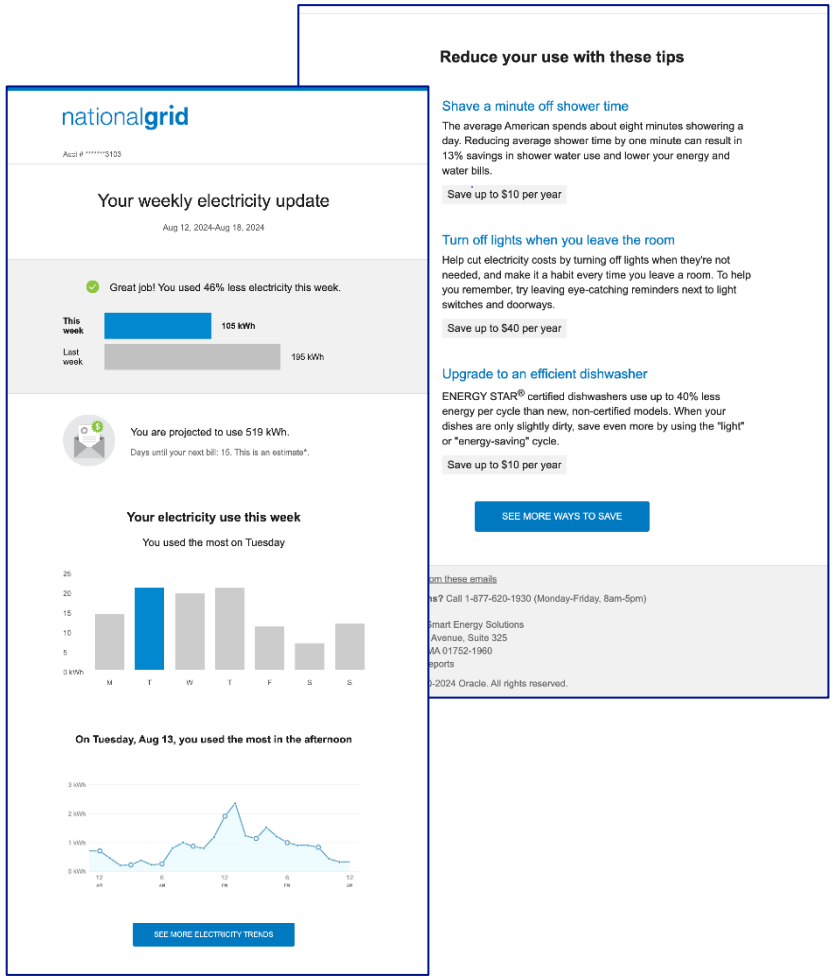
- Outage Reporting:  AMI outage reporting data will be improved to provide near real time outage reporting to our outage management system (OMS) which will provide dispatch, and operations staff the information in required to efficiently and effectively manage outage events.
- Interval Metering: Interval metering provides the data necessary for more accurate customer billing, enhanced customer insights, and enables advanced demand management programs, and other customized customer programs focused on controlling or reducing energy consumption. Once deployed AMI meters can provide 15-minute interval data that uploaded to our back-end system daily and is considered VEE Quality data within 24-48 hours.
- Innovative Rate Designs: Granular and timely interval metering data will enable innovative rate designs to evolve and enable customers to more effectively manage their energy needs.
- Data Sharing: Data sharing is a foundational tool that will allow customers and third- parties the ability to use data to inform behaviors, products, and programs leading to a reduction in energy consumption. National Grid has updated the Green Button Connect (GBC) SOW to include AMI interval data. We are in the process of setting up API bulk data sharing capabilities through Utility API with expected implementation Q2 of CY 2026, Each EDC is building their own API repository that will be able leveraged for the central data repository legislative requirement. Requirements for the Central data repository are still awaiting guidance from the D.P.U.
- System Monitoring & Advanced Planning:  AMI loading and voltage data will facilitate advanced planning, load forecasting, and management of distributed energy resources.

# Opower Products Enabled/Enhanced by AMI – Customer Reports

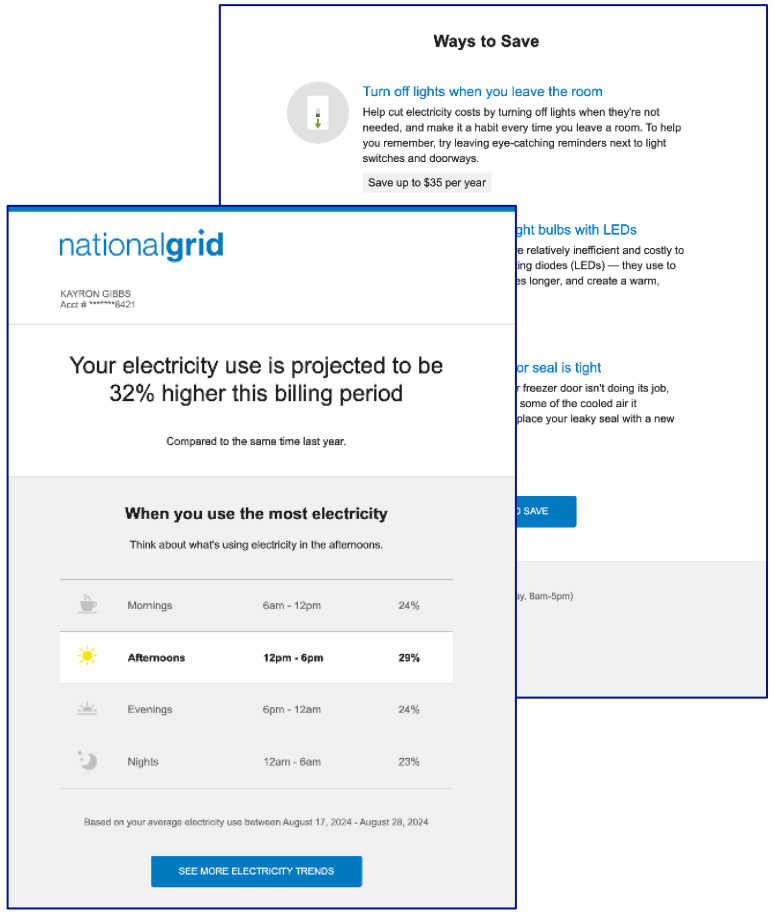
## Home Energy Report (HER)




## Weekly Energy Update (WEU)

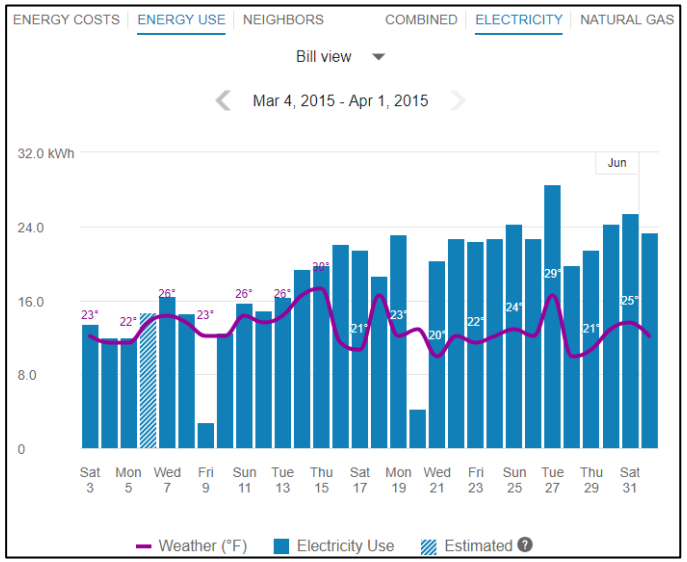



## High Usage Alert (HUA)

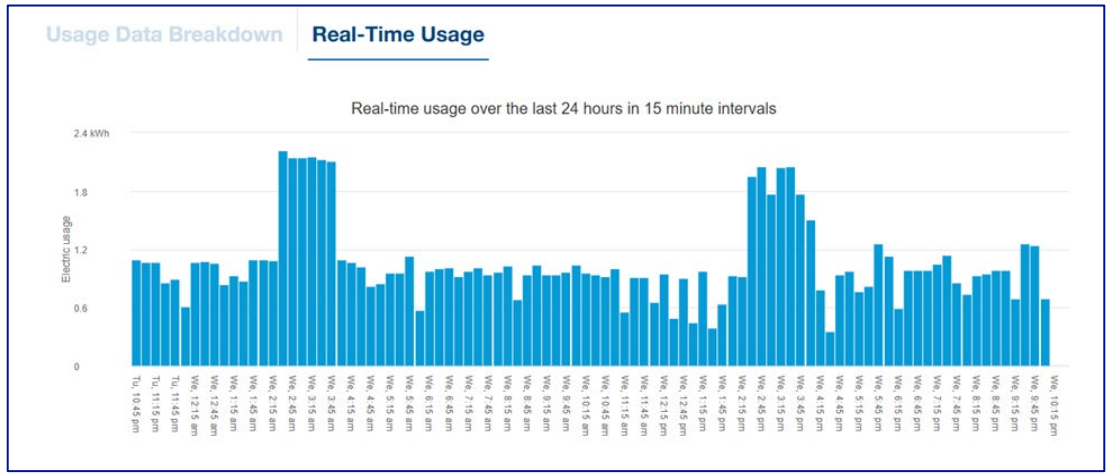


# Opower Products Enabled/Enhanced by AMI – MyAccount Widgets

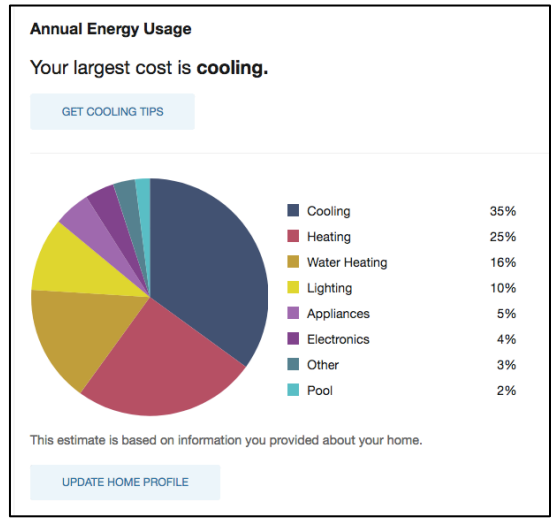
## Data Browser

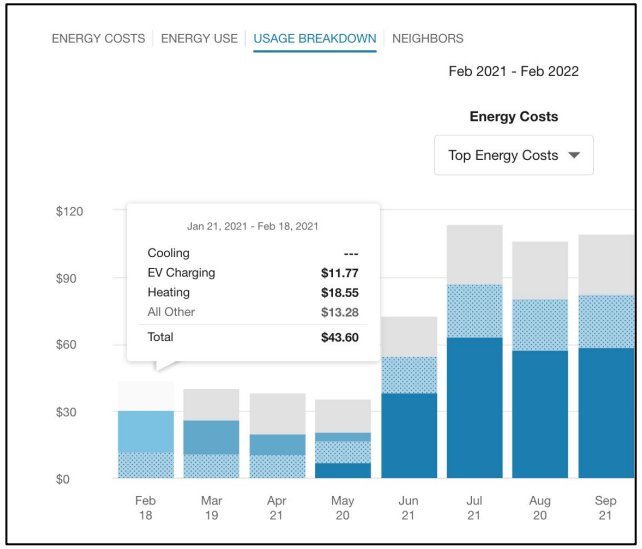



## Near Real-Time Usage



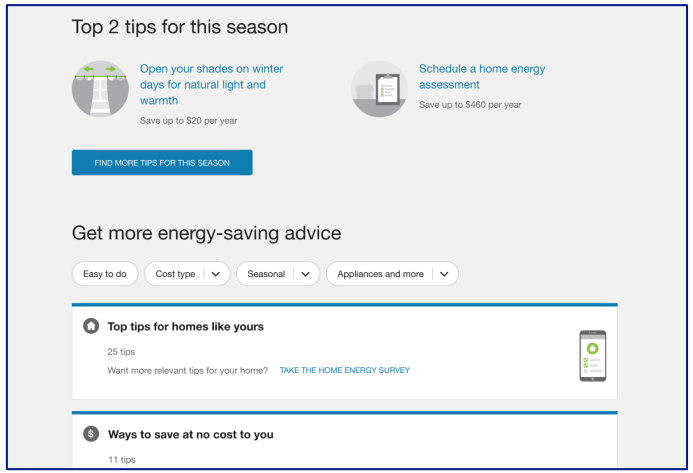

## Home Energy Analysis




## Highest Energy Use Days


## Energy Saving Tips



# Opower Products Enabled/Enhanced by AMI – MyAccount Widgets

## Data Browser/ Usage Data Breakdown

- Visual breakdown of energy usage through different filters
- Tracks trends and costs daily, monthly, yearly
- Compares trends in customer's usage with weather and similar homes
- Electric and Gas

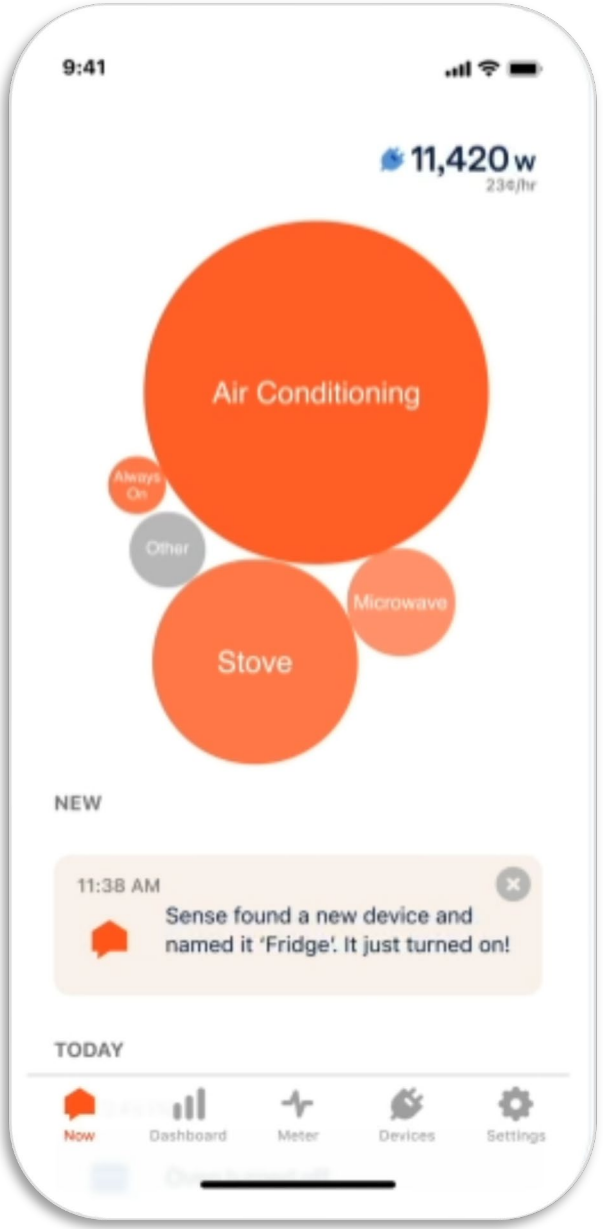
## Near Real-Time Usage/ Highest Energy Use Days

- Total household electricity use in 15-minute increments
- Highlights the highest energy use days of the month
- Helps customers identify patterns in their energy usage
- Electric only

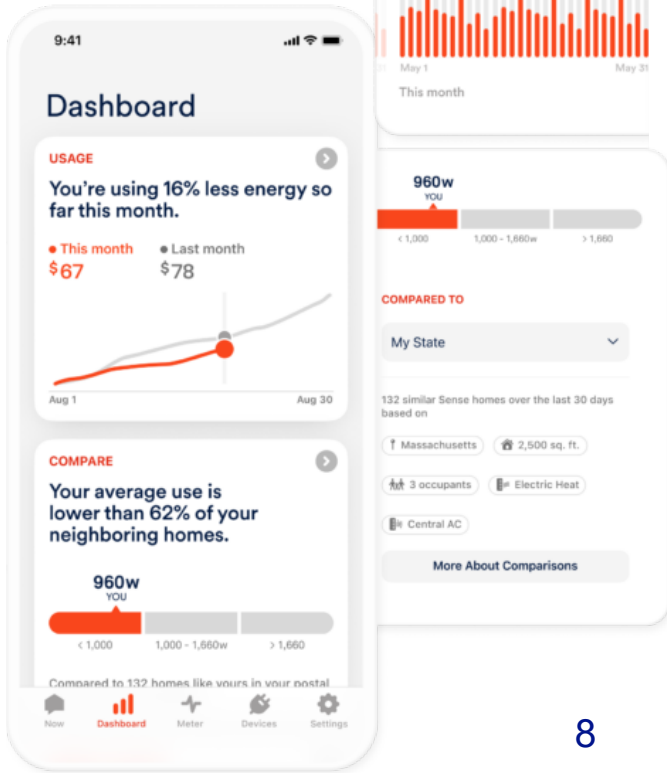
## Home Energy Analysis/ Energy Saving Tips

- Survey is prompted through MyAccount to customers to self-identify their household profile and energy habits
- Customers receive personalized energy saving tips
- Customers can save and track completion of tips

# Sense App Overview




- **Customer data is processed by Sense and stored on the meter, NG will not have access to the data**
- Offered in addition to Opower near real-time usage widgets on MyAccount portal at no additional cost to customers
- Shows energy usage down to appliance-level
- Customers opt-in to create account and consent to share energy usage data from their L+G Revelo smart meter
- Meter must be within range of customer's home wifi router
- Sense must collect approx. 2 weeks of customer's data before effective use
- Sense is downloaded on the Edge Intelligence Card (EIC) on the meter, kept separate from metrology



# TVR Implementation Capabilities

- National Grid can accommodate Default Time of Use Rates for Supply, Transmission, and Distribution
- Currently offer voluntary TOU (VTOU) rate in NY for delivery and supply for residential customers
- For any new rate offerings, customer information system (CIS) design, development, and testing will begin when requirements are known
  - Requires development/testing of multiple and complex company systems to implement, including the AMI Meter Data Management System (MDMS)
  - Anticipate a timeline of ~12 months once requirements are defined (i.e., following design and approval of rates).
- System development process includes many steps including: design of rates, system coding, report development, bill print, establishing workflows, and robust testing to ensure elimination of downstream impacts on other systems

- Customer Protections – multiple options from an implementation perspective but cost and timelines depend on complexity and must also be weighed with policy considerations and objectives.
- In NY, after 1 year, Company compares customer VTOU bills to what customer would have paid under standard rate and issues a one-time bill credit if costs higher under VTOU.

# Supply TVR Considerations

- **Basic Service TOU rates**
  - Can be implemented but requires updates to CIS.
  - ~12 months post approval of a rate structure

- **TVR Considerations for Third Party Suppliers**
  - Utilization of same Time Periods as EDC – requires updates to Electronic Data Interchange (EDI) Implementation Guide and CIS
  - Timeframe depends upon effort for EDI and scope of CIS development, which is informed by rate complexity.
    - More complex development implies a longer implementation timeline
- **Billing on Interval Data**
  - Development is required to accommodate EDI transactions, as well as other system changes (CIS and MDMS)
  - Requires a deep understanding of requirements prior to beginning development, to include:
    - Process related to establishing time periods for supply and updating price groups to accommodate
    - Process for the estimation of intervals

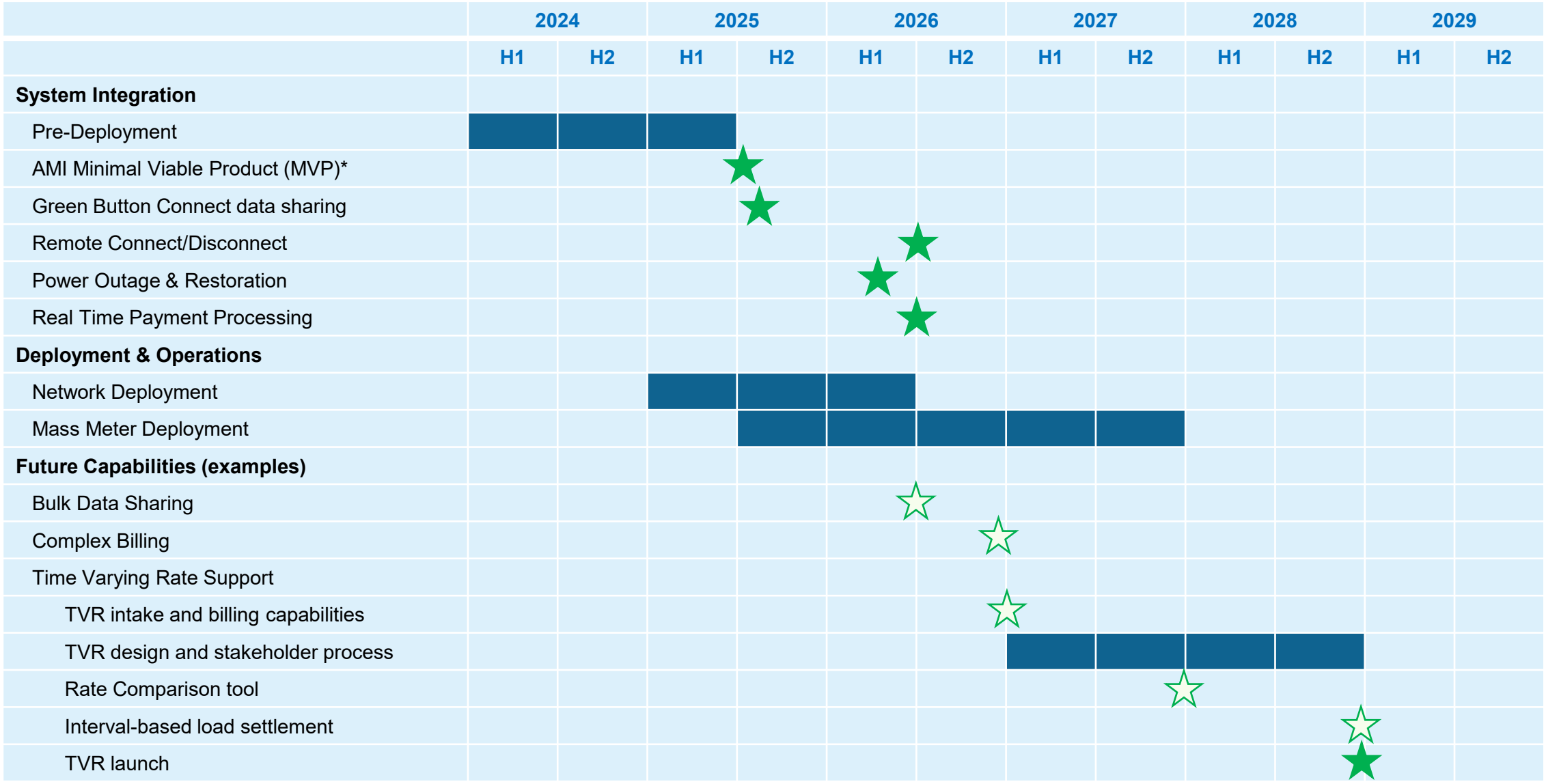
# Eversource MA AMI Implementation

July 2025

# Agenda

- MA AMI Implementation Timeline
- Progress To Date and Next Steps
- Assisting customers with TVR
- AMI customer experience and engagement

# MA AMI Implementation Timeline




EVERSOURCE | AMI Program

★ Target date set

☆ Target date tentative

*Inclusive of Asset Management, Mass Meter deployment, Meter-to-Cash, Opt-Out, Meter Events, Customer Portal & Green Button Connect, and Data Analytics

# AMI Program Progress to Date

## System Integration

- End-to-End, User Acceptance, and Performance Testing for July 21st system Go-Live is complete
- Customer Communications (90-60-30-day letters) processes deployed to production and letters are being sent to customers based on the meter deployment schedule.

## Network/ Meter Deployment

- Completed 75% of Network Construction for Western Massachusetts. On-track for early August completion.
- Building up AMI electric meter inventory ahead of Western Massachusetts meter deployment which is set to start at the end of July

## Change Management

- All end-user training needed prior to system go-live has been completed.
- Additional end-user training scheduled to expand business engagement as mass deployment ramps up.

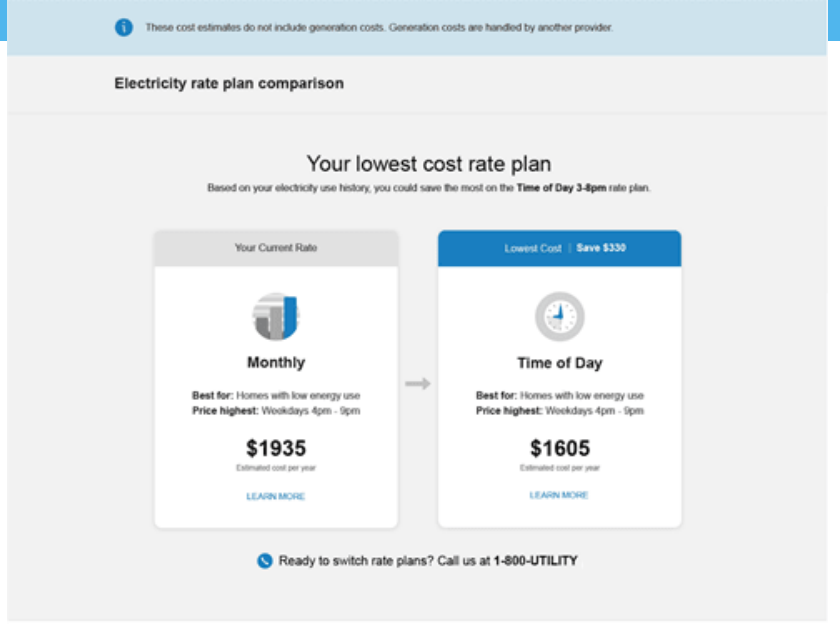
## Next Steps

- Technical Release of AMI MVP functionally planned for July 21st
- Mass Meter Deployment for Western Massachusetts expected to start in late September after a post MVP Go-Live ramp up period of two months
- Network Construction for Eastern Massachusetts expected to start in late July

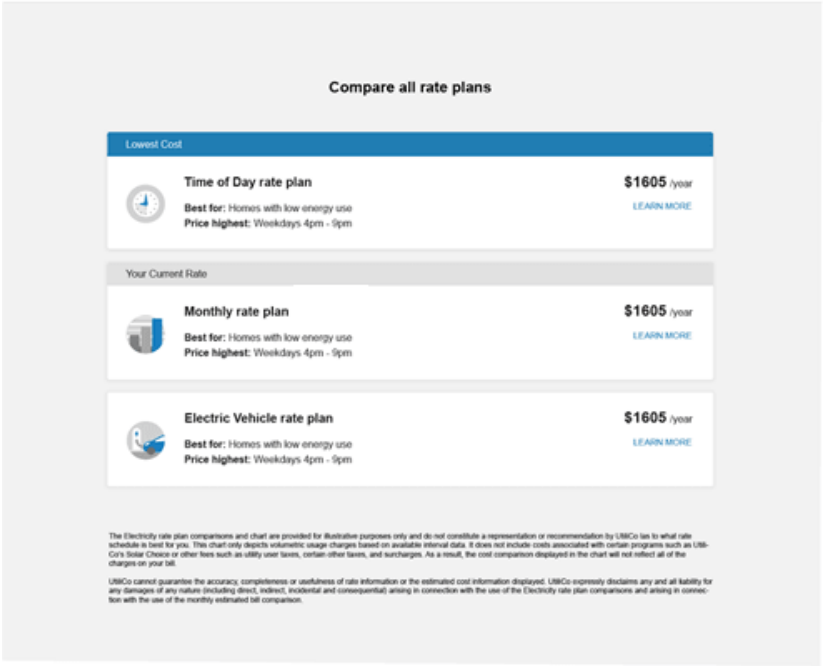
# Assisting customers with TVR

**Rate comparison tool** to be launched in customer engagement portal before TVR launch

- Ability to model basic service and competitive supply options (that meet CIS parameters for rate-ready billing)
- Requires at least 9 months of billing history
- Potential to push periodic recommendations to customers (with sufficient usage history)
- Benefits of rate comparison tool approach
  - Leverages AMI customer engagement channels (app and web)
  - Gives customers maximum control of their billing options
    - Customers can react to periodic recommendations and/or proactively analyze their options
    - Allows customers to monitor multiple options based on eligibility before committing to enrollment
    - CSRs can assist customers uncomfortable with digital self-service
  - Allows customers to adjust simulation based on expected changes in behavior, household composition, home attributes and equipment
  - Rate comparisons can be paired with other AMI insights, recommendations and alerts
  - Customers can select among a broad list of rate options for comparison
    - Not limited to a pre-selected narrow set of options
  - Ensures that analysis is performed on sufficient historical data
  - Will be performed outside the CIS using extracted data
    - Avoids costs and complexity of producing multiple bill scenarios in parallel for a single customer within the CIS
  - Minimizes expectations for cancel/rebills



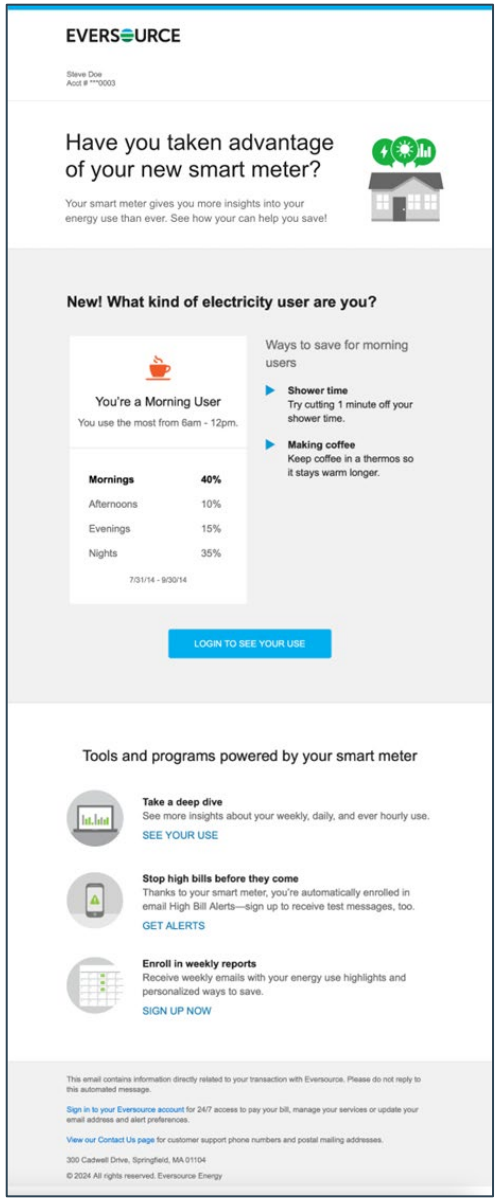




# Customer Experience Timeline

| When | What |
|---|---|
| Day 0 minus 90 days | 90 day installation notification via print and email (if available) |
| Day 0 minus 60 days | 60 day installation notification via print and email (if available) |
| Day 0 minus 30 days | 30 day installation notification via print and email (if applicable)<br>Banner on eversource.com Account Details page |
| Day 0 minus 1-3 days | 1-3 day installation notification via email, text, voice (based on customer channel of choice) |
| **Day 0** | **Meter Installation** |
| Day 0 + 1 week | Banner on eversource.com confirming meter installation |
| Day 0 + 2 weeks | 1st Customer Education Report email from OPower (automatically enrolled) |
| Day 0 + 3 weeks | First weekly energy update email from Opower (and every week going forward – automatically enrolled) |
| Day 0 + 30 days (first bill post installation) | Daily usage is available on eversource.com Usage Details |
| Day 0 + 2 months | Bill forecast available on eversource.com Account Details page |
| Day 0 + 3 months | 2nd Customer Education Report email from Opower (automatically enrolled) |
| Day 0 + 4 months | Disaggregation available on eversource.com (Account Details Bill Comparison, Usage Details, Home Energy Analyzer) |
| Ad hoc, based on default 30% usage threshold | High Bill Alert via email or text |

# Customer Education Report #1 (2 weeks)



EVERSOURCE

Steve Doe
Acct # ***0003

Have you taken advantage of your new smart meter?

Your smart meter gives you more insights into your energy use than ever. See how your can help you save!

**New! What kind of electricity user are you?**

You're a Morning User

You use the most from 6am - 12pm.

| | |
|---|---|
| **Mornings** | **40%** |
| Afternoons | 10% |
| Evenings | 15% |
| Nights | 35% |

7/31/14 - 9/30/14

Ways to save for morning users

- **Shower time**
  Try cutting 1 minute off your shower time.
- **Making coffee**
  Keep coffee in a thermos so it stays warm longer.

LOGIN TO SEE YOUR USE

Tools and programs powered by your smart meter

**Take a deep dive**
See more insights about your weekly, daily, and ever hourly use.
SEE YOUR USE

**Stop high bills before they come**
Thanks to your smart meter, you're automatically enrolled in email High Bill Alerts—sign up to receive test messages, too.
GET ALERTS

**Enroll in weekly reports**
Receive weekly emails with your energy use highlights and personalized ways to save.
SIGN UP NOW

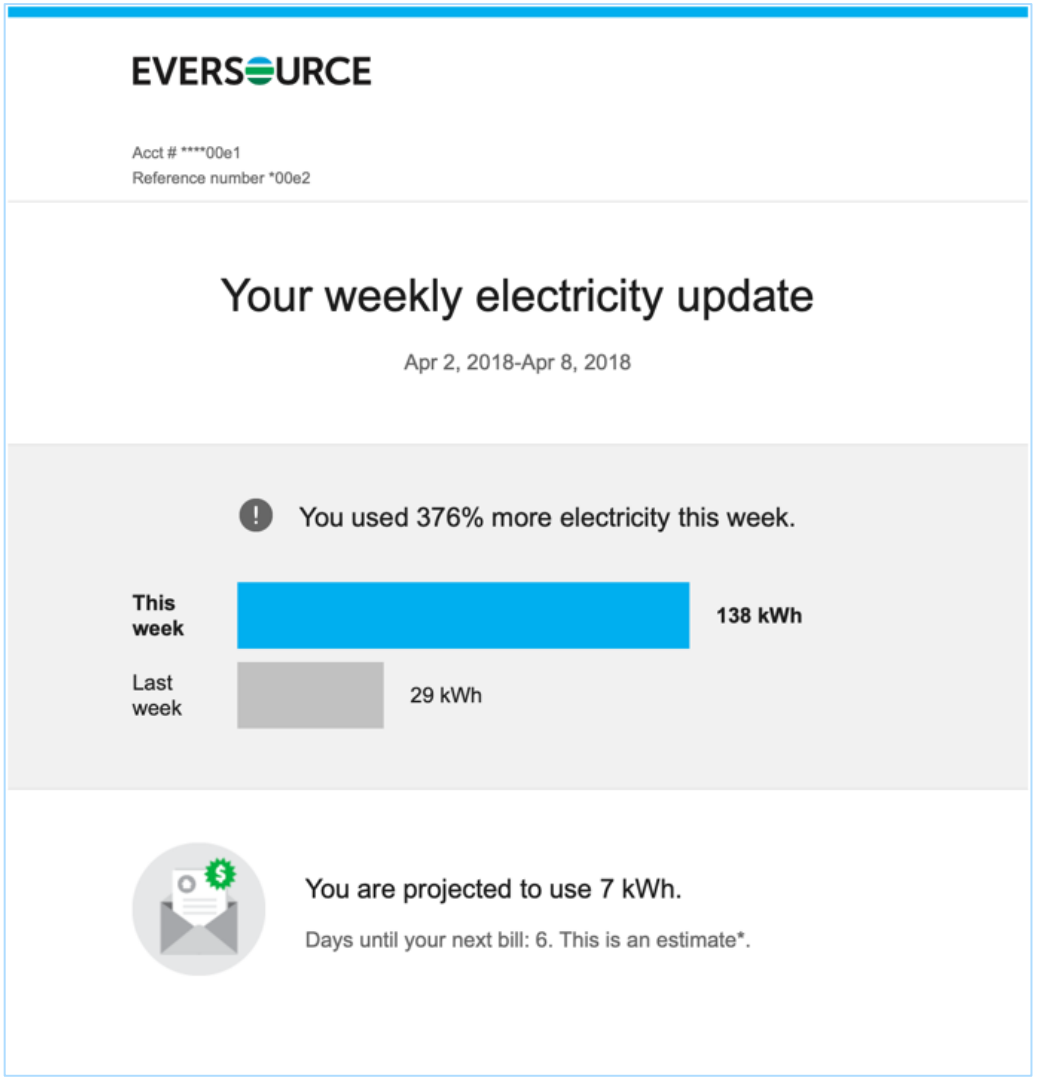
This email contains information directly related to your transaction with Eversource. Please do not reply to this automated message.

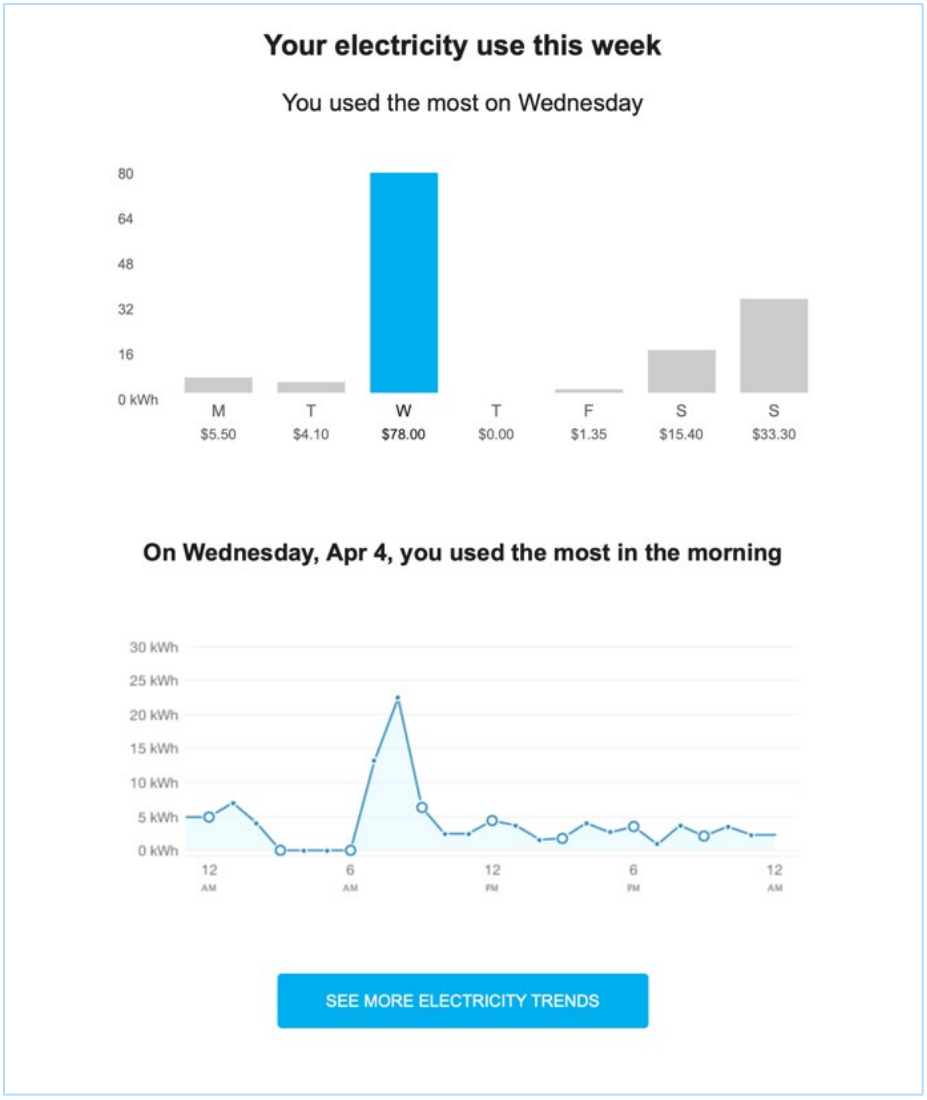
Sign in to your Eversource account for 24/7 access to pay your bill, manage your services or update your email address and alert preferences.

View our Contact Us page for customer support phone numbers and postal mailing addresses.

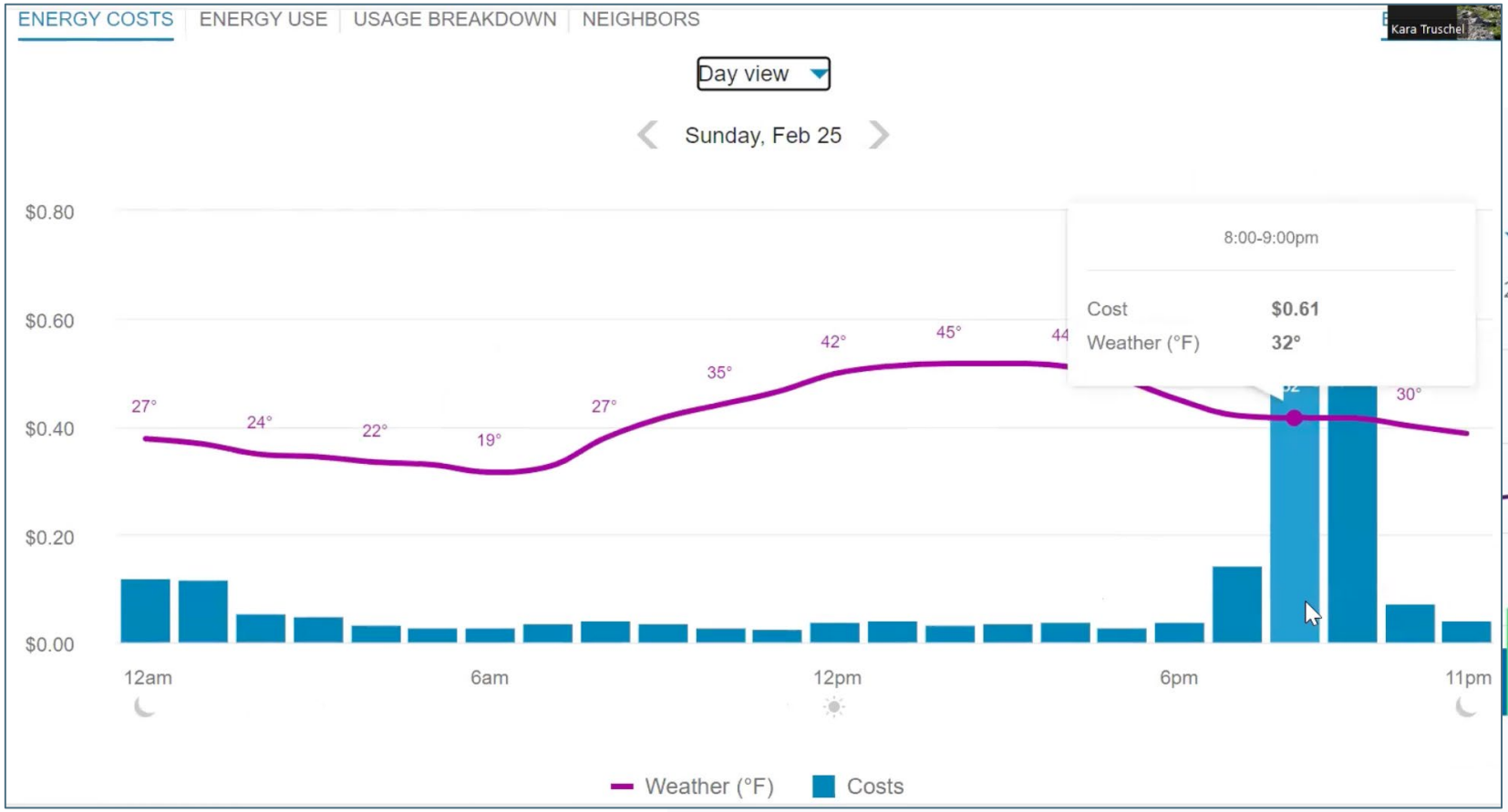
300 Cadwell Drive, Springfield, MA 01104

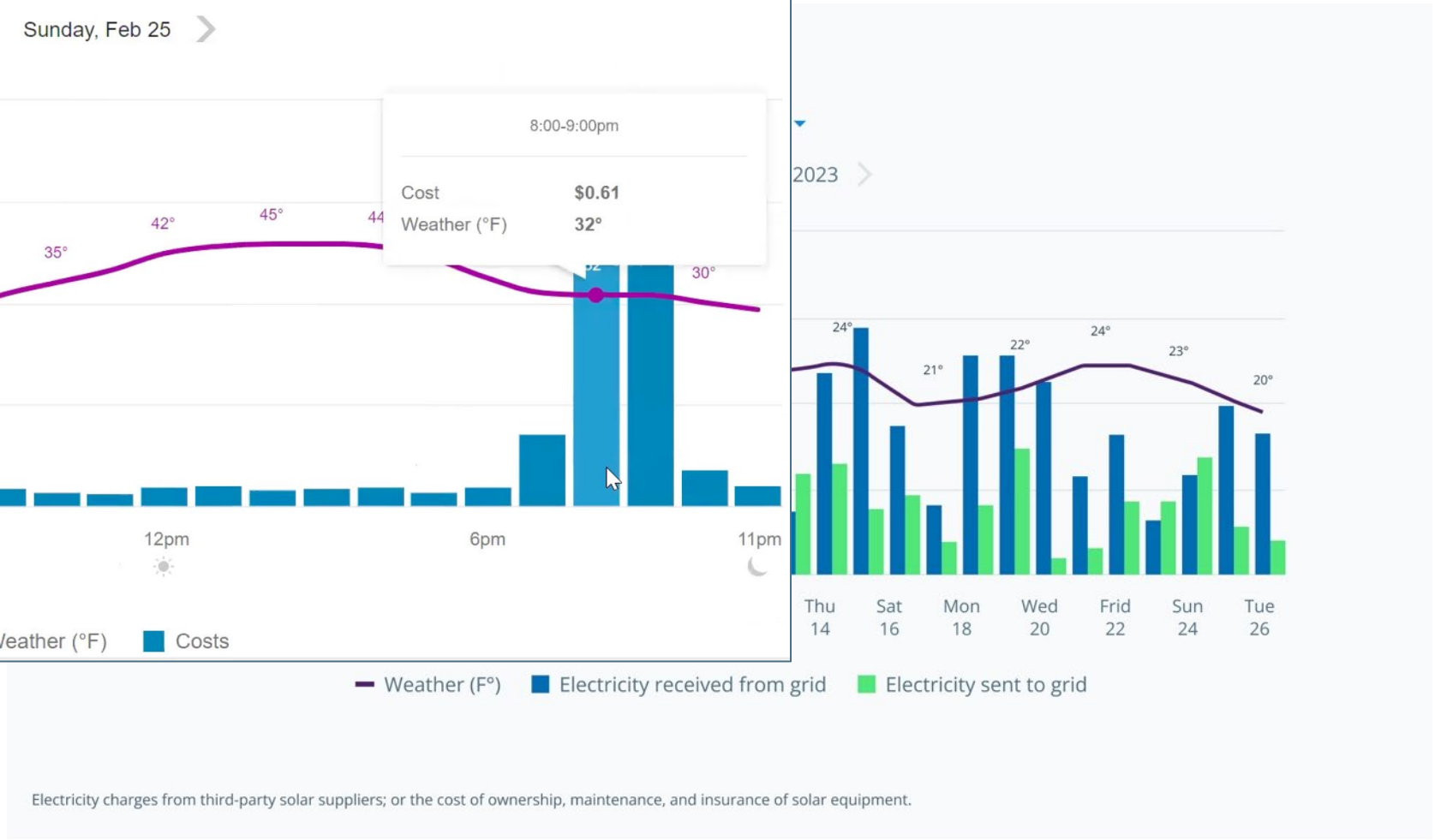
# First Weekly Energy Update (3 weeks)



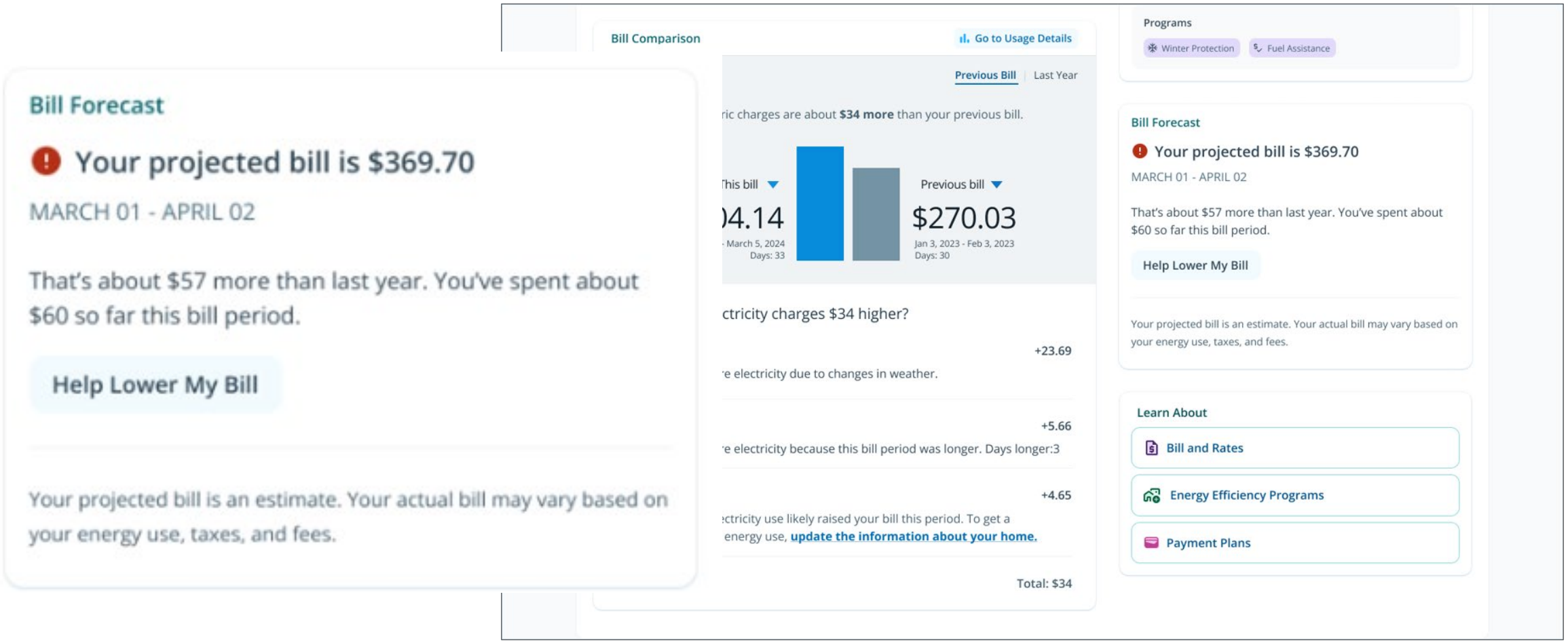



# Daily Usage on eversource.com (30 days)

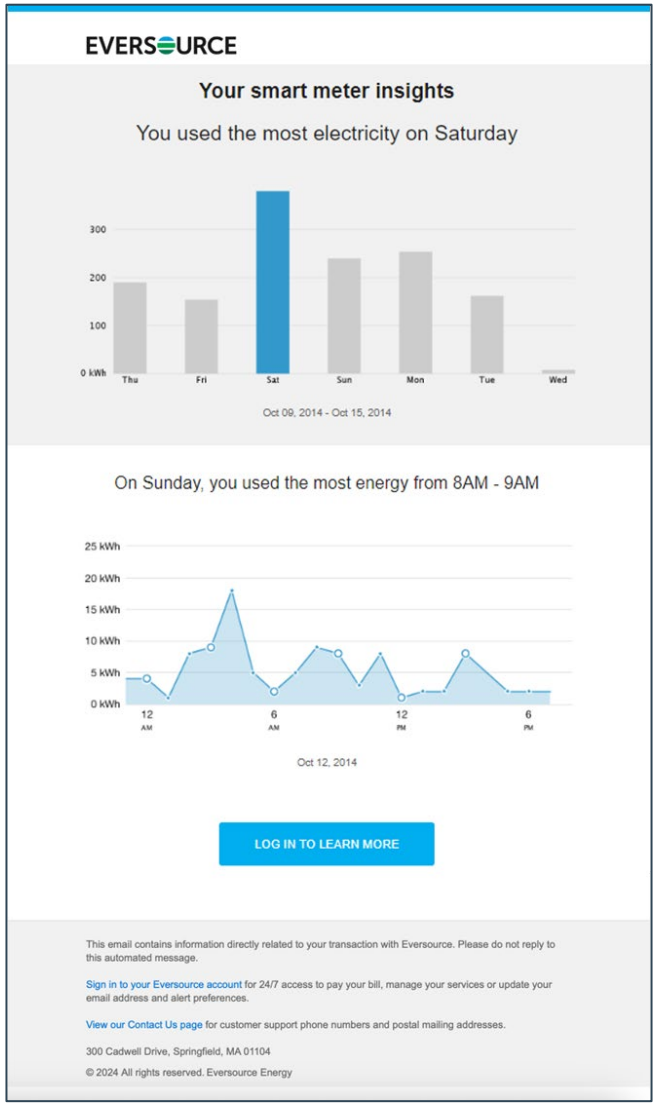


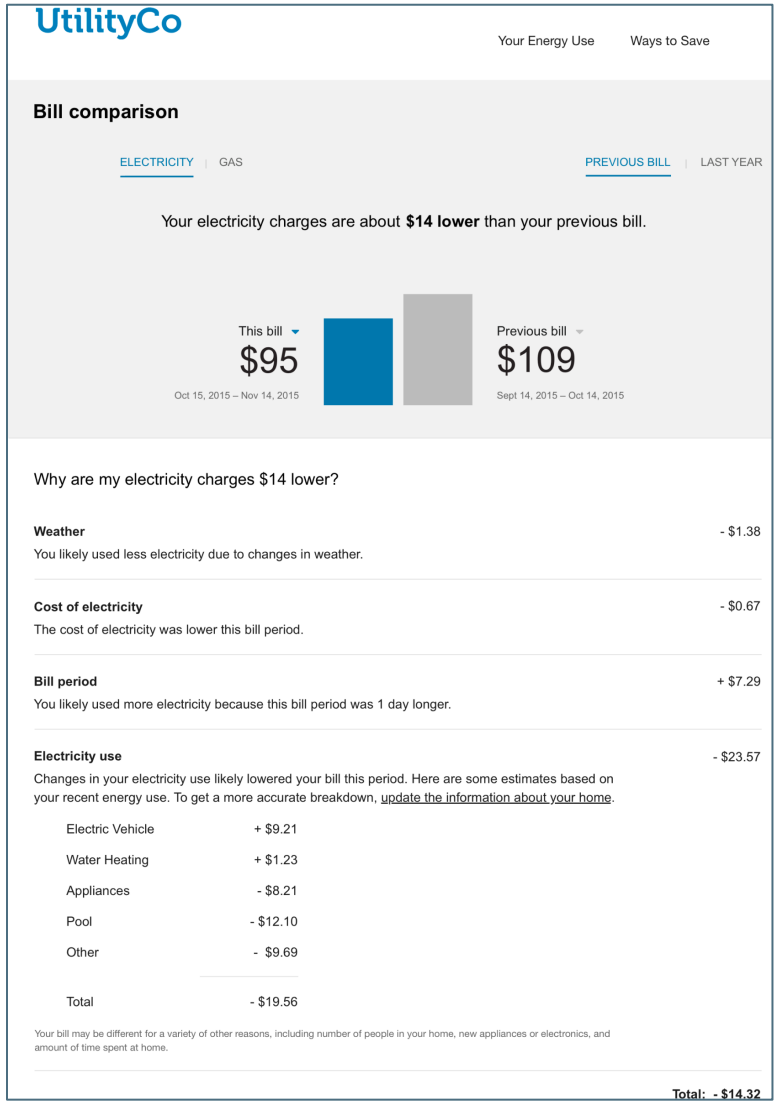
# Bill Forecast on eversource.com (2 months)

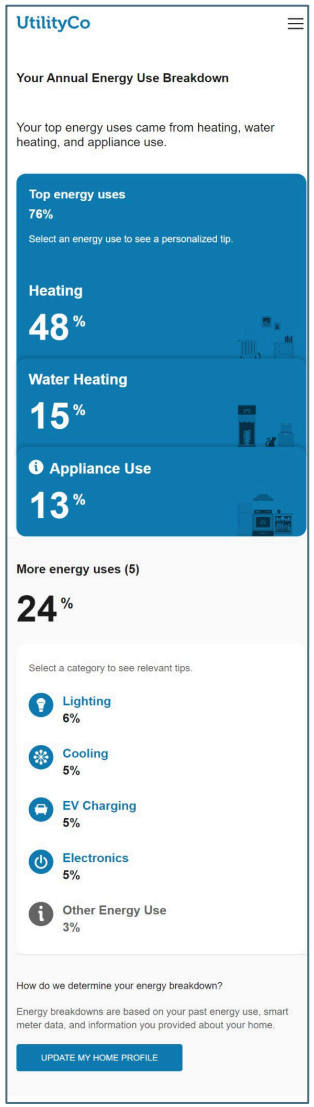


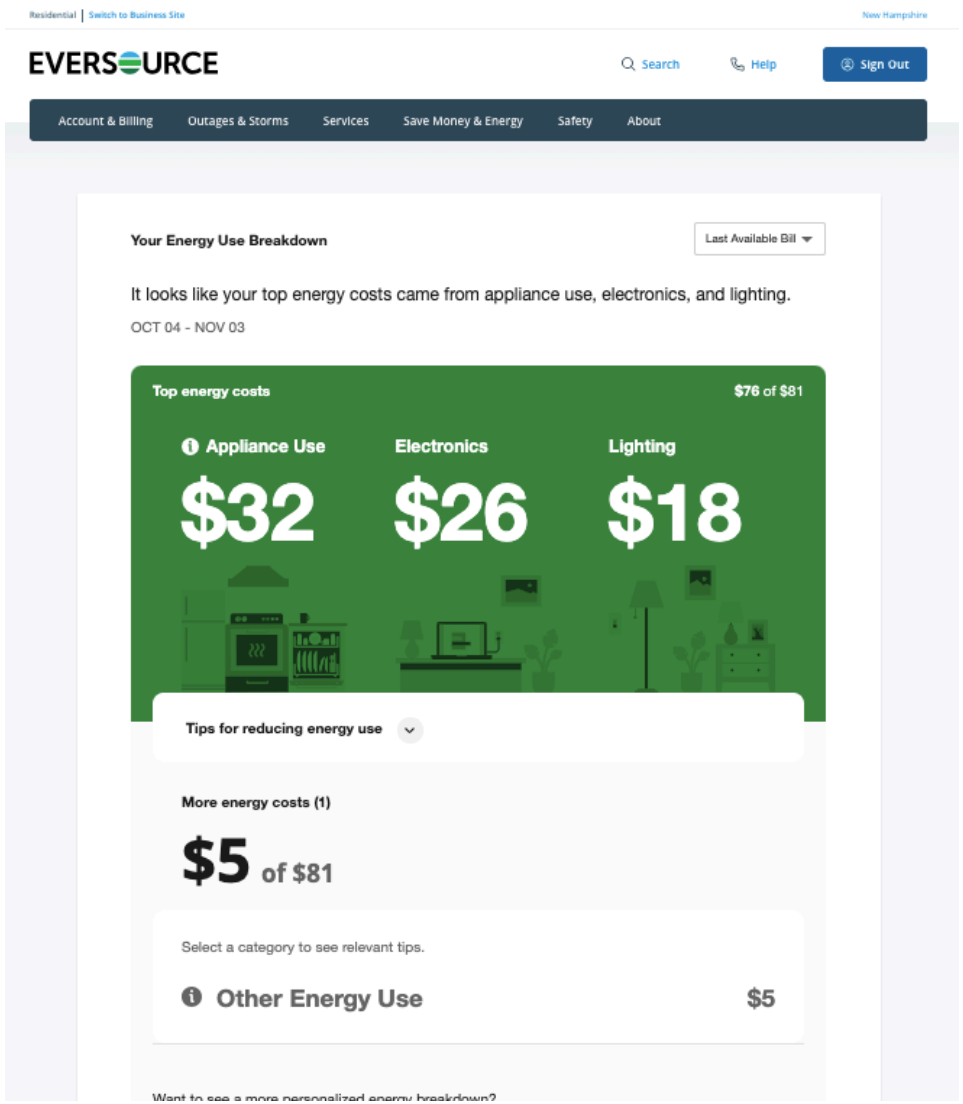
# Customer Education Report #2 (3 months)



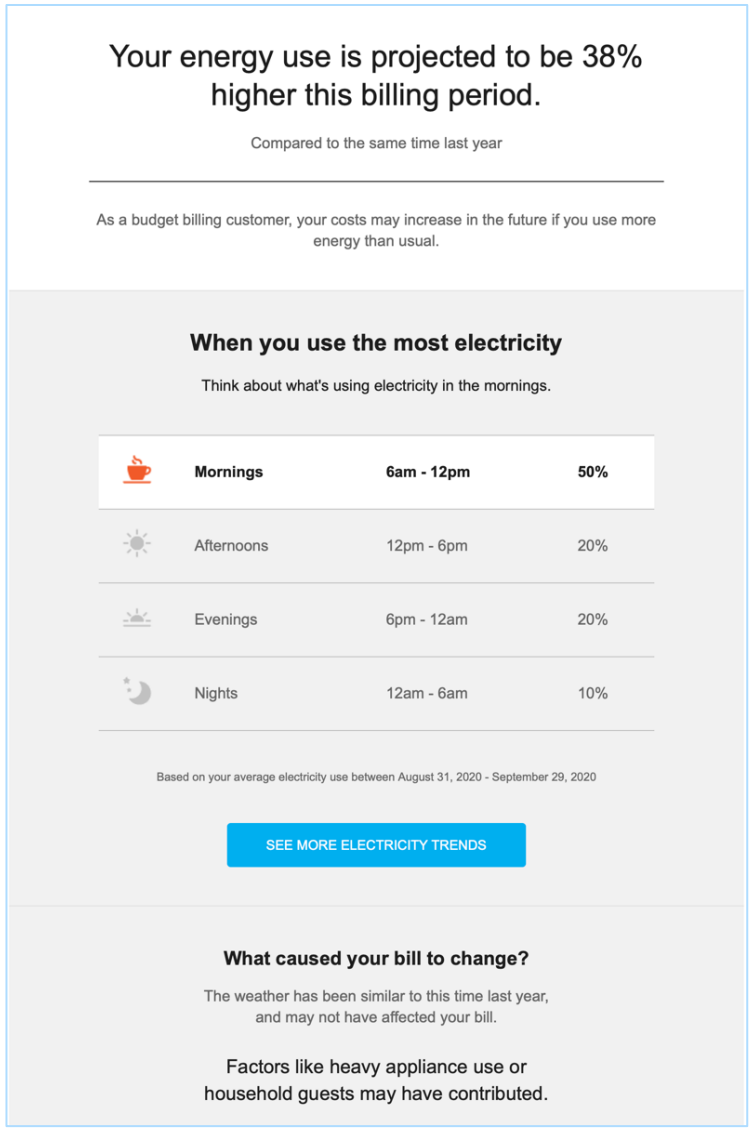
# Disaggregation on eversource.com (4 months)



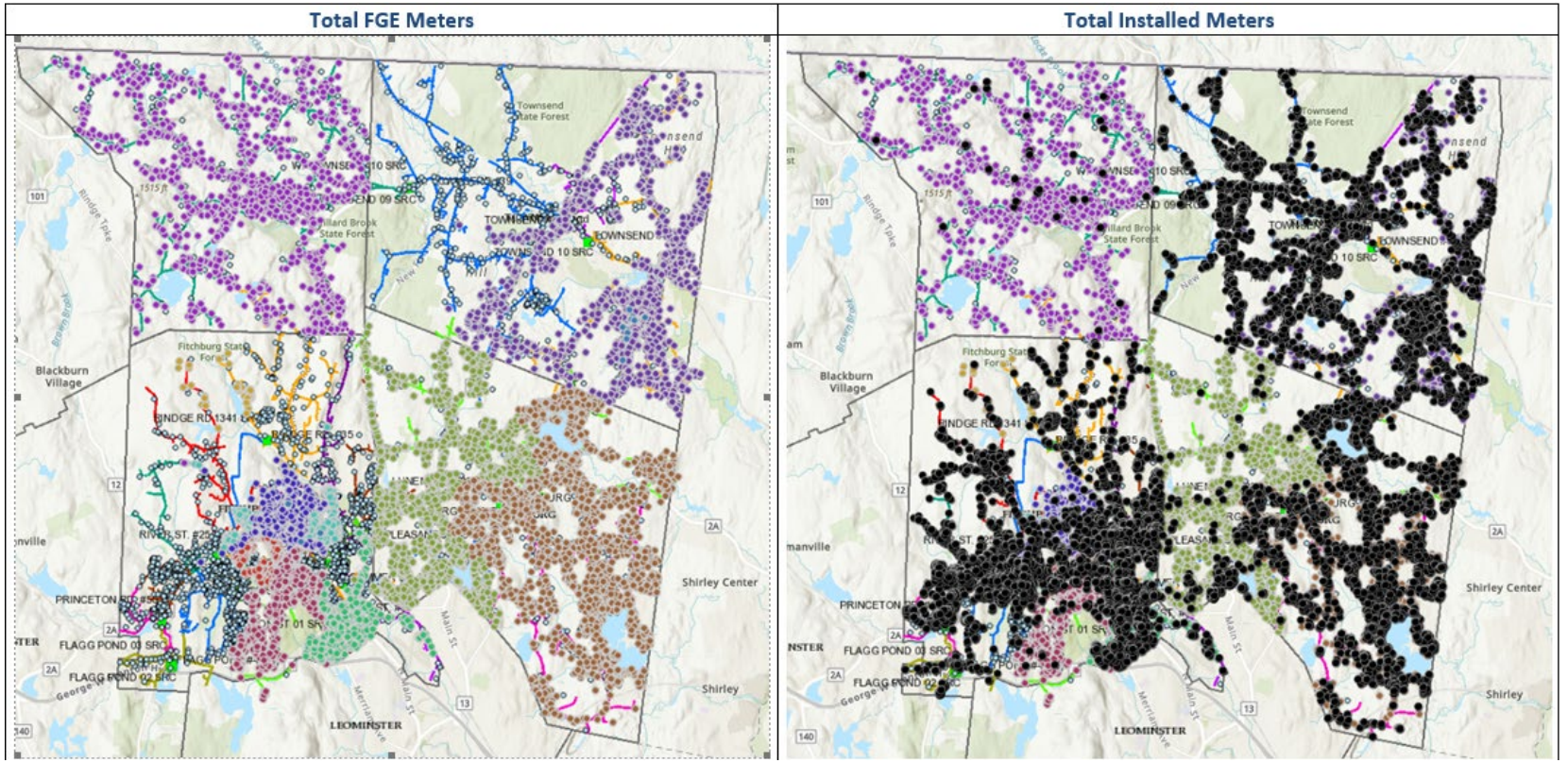



# Timeline – High Bill Alert (ad hoc, 30% default usage threshold)



# Unitil AMI Deployment Update- 7/10/2025




Above is a visual progress update of the AMI Meter Replacement in Unitil's Massachusetts service territory. The dark colored meters on the right have been replaced.

| AMI Meter Report | |
|---|---|
| **Total Meters in FGE Inventory** | 31,006 |
| **Exchanged** | 19,129 |
| **Percent installed** | 62% |

Unitil

# Unitil- AMI Benefits/Capabilities

- Interval Metering: Interval metering provides the data necessary for demand management programs, TOU/TVR rates, and other customized programs focused on controlling or reducing energy consumption.

- Innovative Rate Designs: Granular and timely interval metering data will enable innovative rate designs to evolve and enable customers to more effectively manage their energy needs.

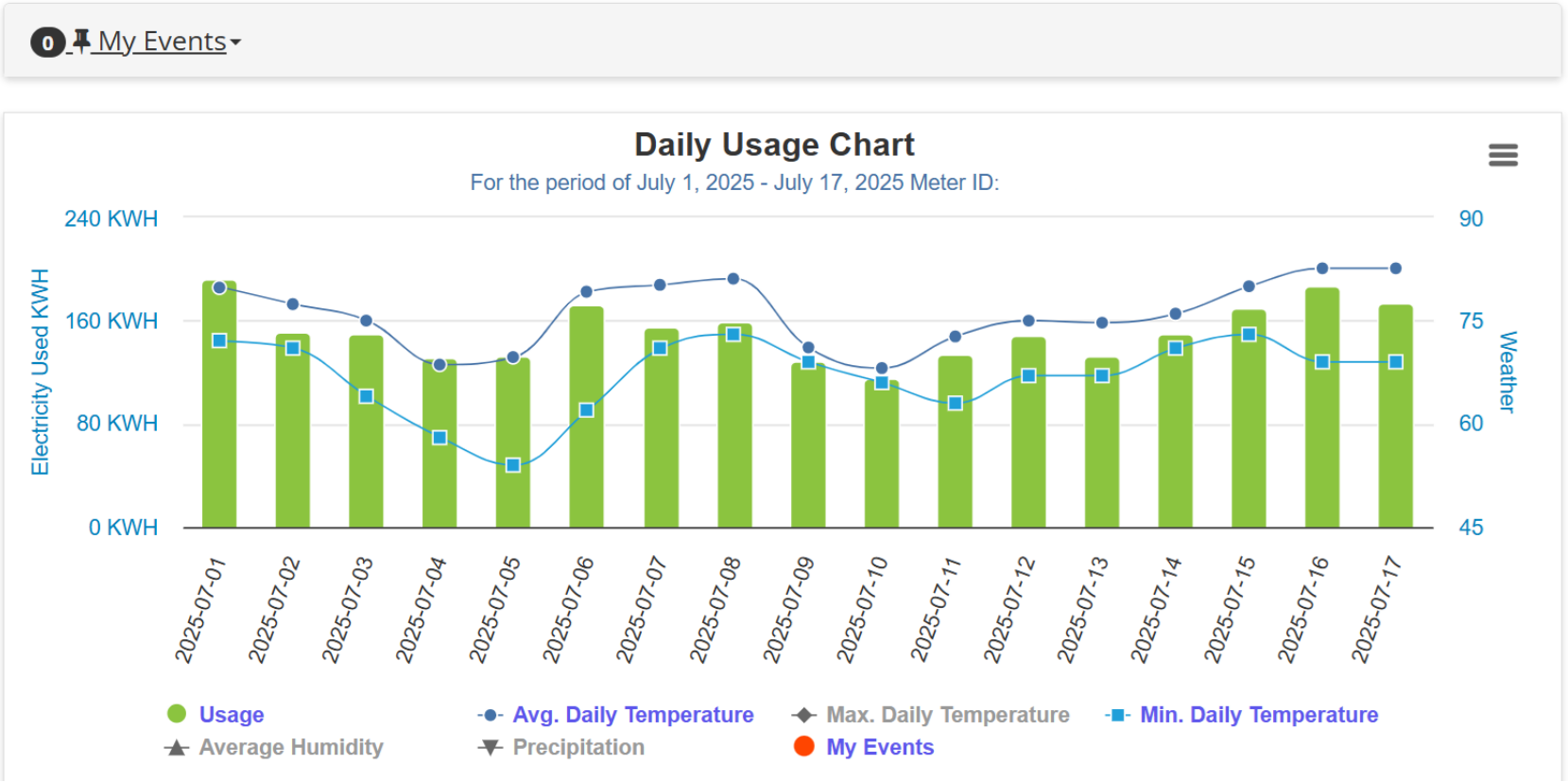
- Data Sharing: Data sharing is a foundational tool that will allow customers and third- parties the ability to use data to inform behaviors, products, and programs leading to a reduction in energy consumption.

- System Monitoring & Advance Planning: AMI loading and voltage data will facilitate advanced planning, load forecasting, and management of distributed energy resources.

- Outage Reporting: AMI outage reporting data will improve restoration times and provide dispatch and operations staff the information required to efficiently and effectively manage outage events.

Unitil

# Unitil- AMI Customer Experience Items




- Current Daily Usage Chart
  - Weather Overlay
  - “My Events”
- Looking to Launch GBC by end of year
- Opt-In High Usage Alert offering in 2026

# Unitil- Time of Use Rates- Capabilities

- Unitil can accommodate TOU Rates for Distribution, Transmission, and Basic Service Supply
  - Currently providing 3-Part Whole House TOU Rate in NH and 3-Part Residential EV Rates in MA and NH
- For additional offerings, CIS design, development, and testing to begin when rate structures are approved
  - Requires development/testing of multiple company systems to implement
- System development process includes many steps including: design of rates, system codes, report development, bill print, establishing workflows, and testing
- Opt-In vs. Opt-Out have different implementation impacts and timelines
  - Opt-out will require code and robust communications plan
- Estimated timeline for Opt-In: ~12 months once a final rate structures are approved
- Customer Protections
  - In the short term, Unitil can provide a bill comparison tool of TOU vs. Non-TOU rates to support "Opt-In" process (currently provided in NH)
  - Shadow Billing is a longer term item that Unitil would need to explore

# Unitil- Time of Use Rates- Supply

- Delivery of Basic Service TOU rates prior to 3rd Party Offerings?
  - Yes, as there needs to be updates to both EDI and CIS prior to providing 3rd Party TVR Rates
  - ~12 months post approval of a rate structure (opt-in)
- TVR Considerations for External Supply
  - Simple TVR: Utilizes the existing Company Time Periods for Distribution, Transmission, and Basic Service
    - Requires updates to EDI Implementation Guide and CIS
    - Timing Dependent upon effort for EDI and scope of CIS Development
  - Complex TVR: Differing Time Periods for Supply
    - Requires Billing on Interval Data
    - More Complex Development, longest implementation timeline
- Billing on Interval Data
  - Development is required to accommodate EDI transactions, as well as other system changes (CIS and MDM)
  - Requires a deep understanding of requirements prior to beginning development, to include:
    - Process related to establishing time periods for supply
    - Process for the estimation of intervals
- Other Development Items/Decisions: Opt-Out & Shadow Billing & Changes to Load Settlement

Unitil

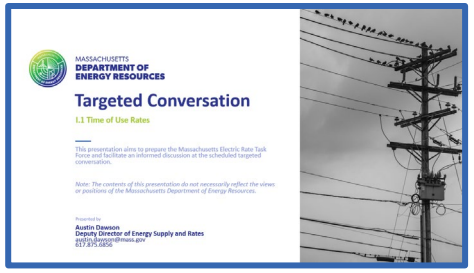
# Next Steps

## Targeted Conversation

**July 30, 2025, 2-4pm**

- Will serve as a deliberative space following related expert presentations to prompt informed discussion on policy questions and priorities

Illustrative Presentation




## Optional Office Hours

**July 28, 2025, 2-4pm**

- Optional office hours for further conversation, serving as a structured opportunity to work towards common understandings and positions. We also encourage participants to have discussions amongst each other beside formal Task Force sessions
- Please reach out to **chris.connolly2@mass.gov** to request an invitation.