TOU PLAYBOOK

LEVERAGING AMI DATA FOR SUCCESSFUL TIME-OF-USE RATE IMPLEMENTATION

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Load shaping through rates is an important tool in establishing and maintaining system-wide flexibility and resiliency. That reality is one of the major factors driving utilities to increasingly shift from flat, volumetric rates to time-based residential rate structures. The goal is to incentivize consumers to align their energy use with times of greatest supply and lowest cost generation.

When executed well, the transition from flat rates to time-of-use (TOU) rates improves system utilization, reduces peak demand, and provides an opportunity for consumers to save money by empowering them to take charge of their energy costs. That ability to save money and have more control over when their energy is used translates into a much better customer experience (CX).

But at the same time, consumers have paid a flat rate per kilowatt hour for electricity for decades, and the transition to time-based rates is complicated. When implemented poorly, changing rate structures can inadvertently lead to confusion and bill increases — which undermine CX and consumer trust in the utility.

With so much at stake, household energy use data analytics makes it possible for utilities to avoid "getting it wrong" at every stage of the TOU rollout.

We developed this Leveraging AMI Data for Successful Time-Based Rate Implementation playbook to help utilities put energy intelligence to work to improve new rate structure development and implementation:

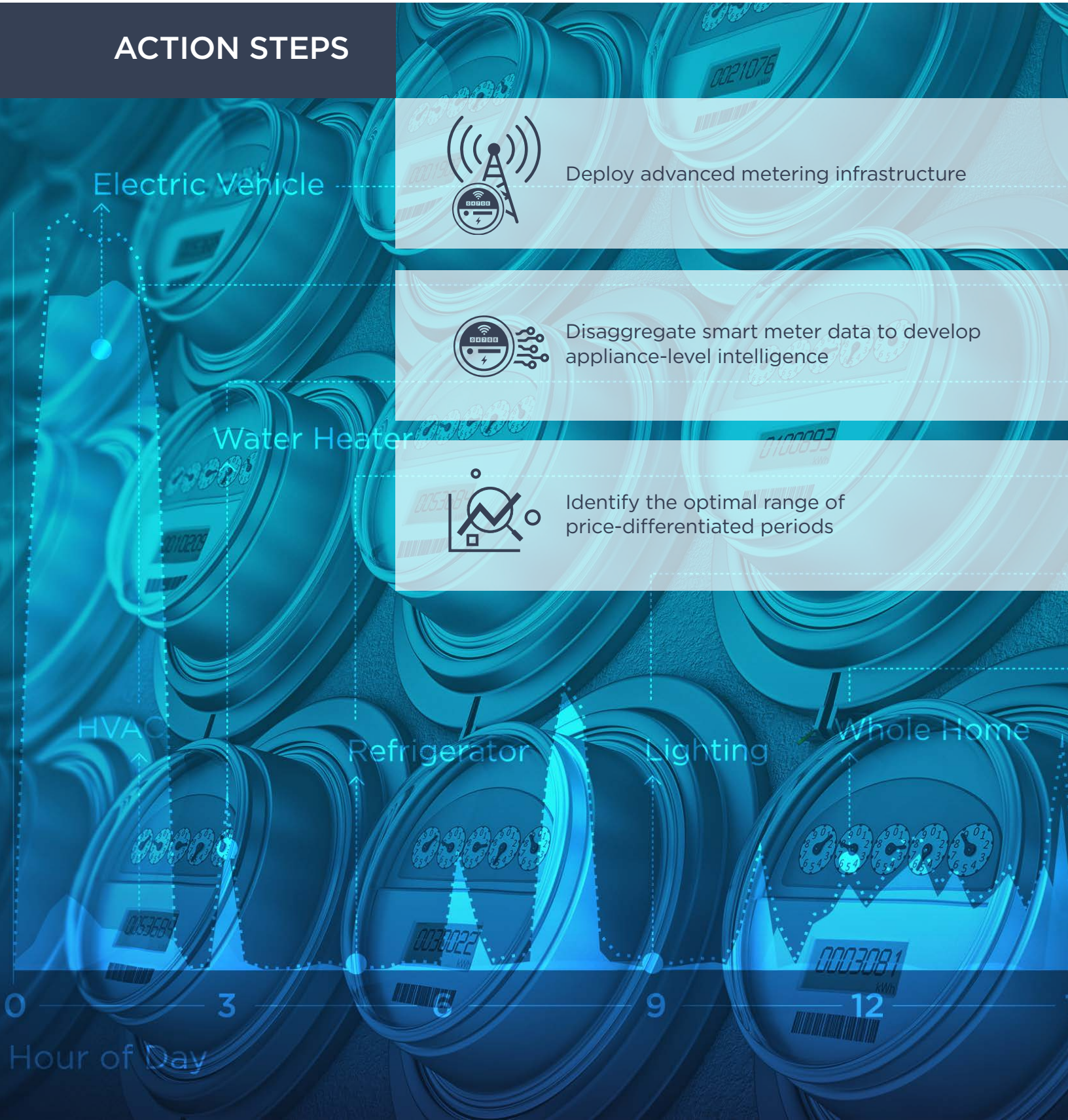
- **Phase 1:** Rate Design
- **Phase 2:** Recruiting and Onboarding
- **Phase 3:** Ongoing Personalized Coaching
- **Phase 4:** Program Evaluation and Optimization

In our final section, this playbook also explores electric vehicle TOU rates as one of the most compelling emerging time-based rate use cases in an era of increasing beneficial electrification.

PHASE 1: RATE DESIGN

Successful TOU rate design depends on the rates' ability to reflect real-time grid supply conditions and changes.

ACTION STEPS



Deploy advanced metering infrastructure

Disaggregate smart meter data to develop appliance-level intelligence

Identify the optimal range of price-differentiated periods

DEPLOY ADVANCED METERING INFRASTRUCTURE (IF YOU HAVEN'T DONE SO ALREADY)

Designing time-based rates requires advanced metering infrastructure (AMI) capable of recording consumption for granular time periods within a billing cycle.

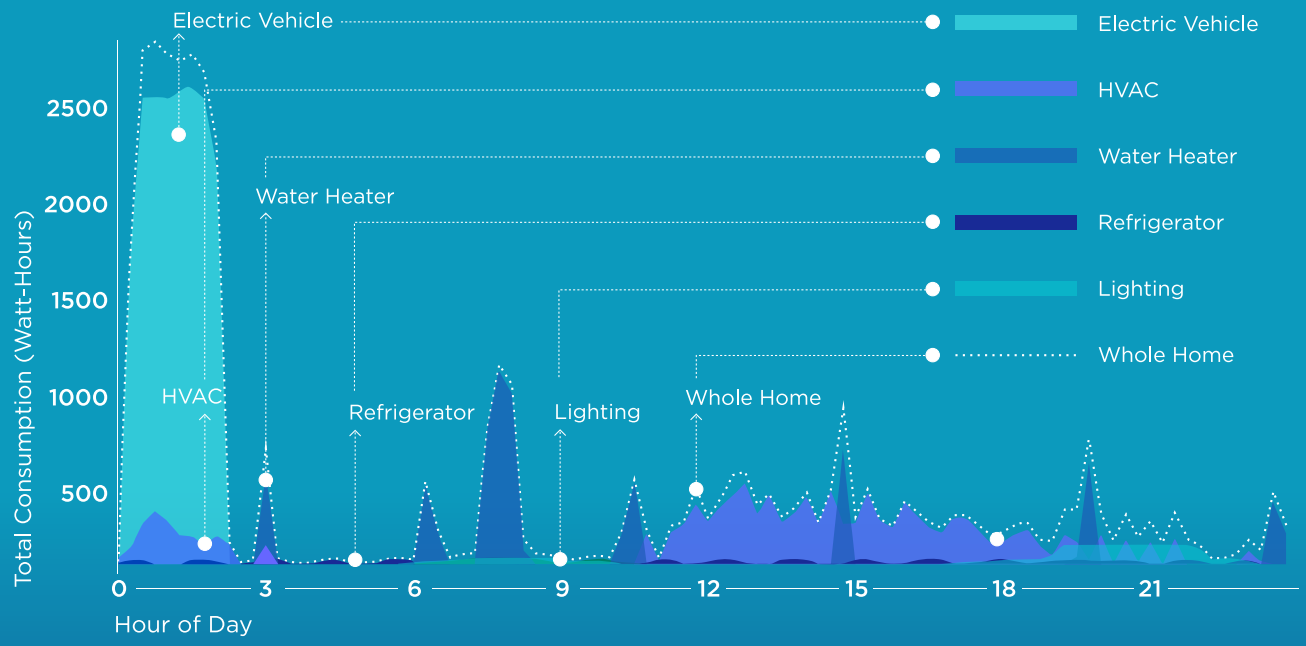
If you have already deployed AMI, skip ahead to learn more about how appliance-level consumption data inform more effective price signals.

For those utilities that have not yet invested in AMI infrastructure, consider a proof of concept rollout through which smart meters are installed on a limited number of homes – possibly 500 to 5000 – in order to demonstrate the efficacy of time-based rates to justify a broader AMI rollout.

DISAGGREGATE SMART METER DATA TO DEVELOP APPLIANCE-LEVEL INTELLIGENCE

Historic rate design has relied upon sampling fewer than 1 percent of a customer population together with extensive statistical modeling.

Sophisticated AI-powered load disaggregation empowers utilities to itemize 100 percent of residential member loads and achieve visibility into members' usage patterns at both whole-home and appliance levels, and eliminates the need for sampling and sampling-related errors.



AMI meter data coupled with supplemental utility-contributed consumer data informs up-to-date analyses of major appliance ownership, usage in kWh (including time of use), and additional attributes such as major appliance power draw in kW.

This advanced data science makes it possible to design rates that are both beneficial to the customer and to the utility.

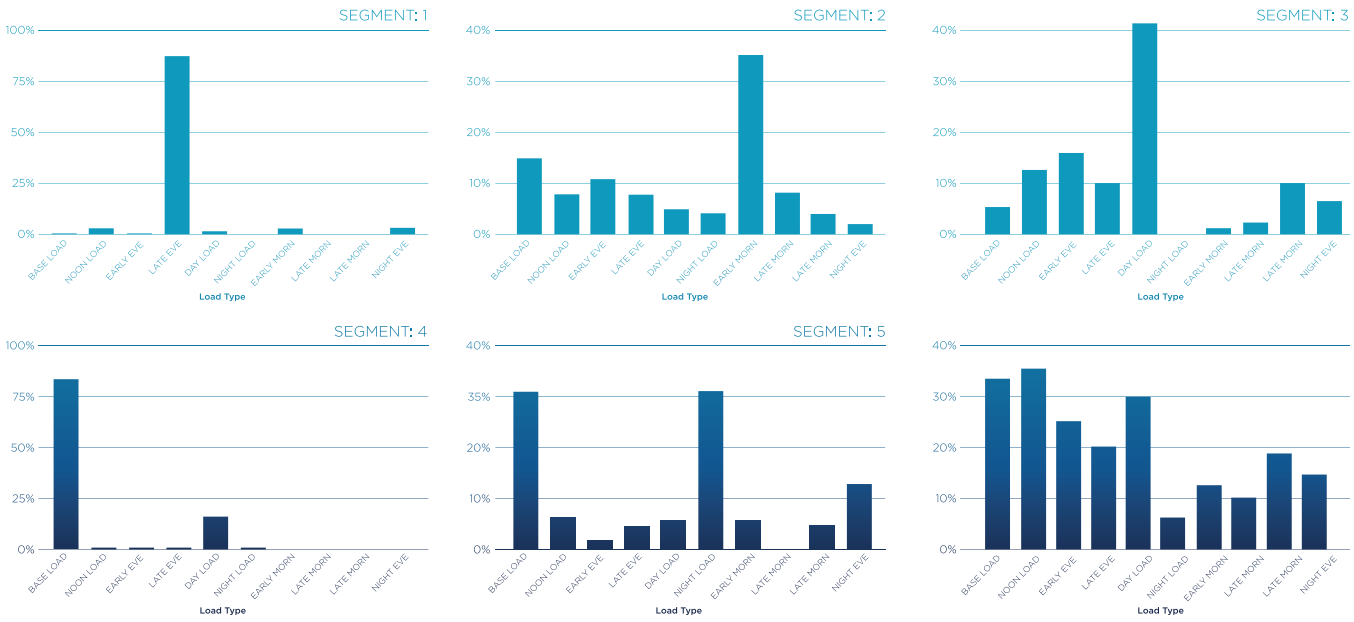
IDENTIFY THE OPTIMAL RANGE OF PRICE-DIFFERENTIATED PERIODS

The structure of a TOU program can include simple on-peak and off-peak pricing, seasonal TOU rates, or even hourly real-time pricing. Within each of those approaches, parameters such as the duration of each period and the seasonal windows can vary significantly.

Rates structured with long peak periods do little to reflect actual utility costs and have a marginal impact on customer bills. They can be particularly difficult for customers with inflexible daytime energy usage, such as those who work from home or retirees.

By providing more insight into customer usage patterns, an AMI-informed rate design process enables essential granularity of customer segmentation and price-differentiated periods, with rate structures tailored to a wider variety of customers with distinct demand profiles.

DAILY TOU BASED SEGMENTS



Appliance-level energy intelligence delivers a greater understanding of the unique segments that exist within a customer population, including their time of use, usage patterns, and the cost to serve. The most sophisticated and successful TOU programs provide a menu of rate options and price signals that allow individual customers to adopt price structures best suited to their unique and varied needs.

An AMI-data-driven process also allows utilities to determine the impacts of time-differentiated rates as part of the design phase, with intelligence that can be used to estimate billing outcomes if rate structures changed. This empowers utilities to ensure their rate design will yield the desired outcomes and that no customers will be unfairly impacted or receive a significant increase in their monthly bill, long before rolling out the new rates out to customers,

Getting TOU rates right leads to economic alignment of customer incentives with costs to serve and improved customer engagement and satisfaction.

The continuous analysis of AMI data enables TOU programs to evolve as customers change their energy behaviors, ensuring that rate alternatives are always best aligned with customers' current energy consumption. (More on this topic in Phase 4.)

PHASE 2: RECRUITING AND ONBOARDING

The key to successfully implementing TOU rates is aligning rates with customer price signals while avoiding bad customer experiences. Getting TOU rate rollouts wrong can lead to a customer backlash when they receive higher-than-expected bills that are difficult to explain — which can be particularly damaging in today's economically uncertain environment.

There continues to be a lot of discussion in the industry about whether opt-in or opt-out time-varying rate structures are the preferred approach. No matter which choice structure you implement, energy intelligence maximizes TOU rate participation, advancing the utility rate evolution to the benefit of everyone involved.

With advanced AI technology, AMI analytics provide utilities with the customer-specific insights they need to personalize each consumer's TOU rate journey, making it a positive experience from initial enrollment through long-term participation.

Customers are more likely to opt into a time-varying rate plan when the advantages of doing so are explained in specific and relevant terms -- such as with a personalized estimate of the savings they are expected to realize based on their unique energy usage and appliance ownership.

Similarly, customers are less likely to opt out when they receive personalized coaching about how to realize the greatest benefit from their new rate plan and avoid any potential pitfalls.

ACTION STEPS

Identify customers most likely to achieve TOU rate savings (opt-in programs)

Recruit TOU rate subscribers (opt-in programs)

Onboard new rate participants with personalized guidance (opt-in and opt-out programs)

IDENTIFY CUSTOMERS MOST LIKELY TO ACHIEVE TOU RATE SAVINGS (OPT-IN PROGRAMS)

Not all consumers have the same potential to shift their time of use. Their ability to do so depends on a wide range of factors, such as what electric appliances they have in use and whether they live in a single-family or multi-unit dwelling, drive an electric vehicle or have solar installed. TOU rates can have an adverse impact on consumers who have less ability to shift their usage.

Successful opt-in TOU rate recruitment strategies should target those customers who have the greatest load-shifting potential. AI-powered data analytics can identify not only homes that are using larger loads during defined peak hour periods but also their appliance-specific energy consumption and times and duration of use to determine what percentage of their loads are shiftable.

Beyond load profiling, customers who have made beneficial electrification progress by adopting electric vehicles, heat pumps, and smart electric appliances are good TOU rate targets because they are in a better position to respond to time-varying prices. In addition, for those customers who have installed solar or energy storage, time-based rates can boost their return on investment.

The best-fit TOU rate participants can be identified based on how energy is used in the home and when consumers are able to shift their demand to align with grid needs.

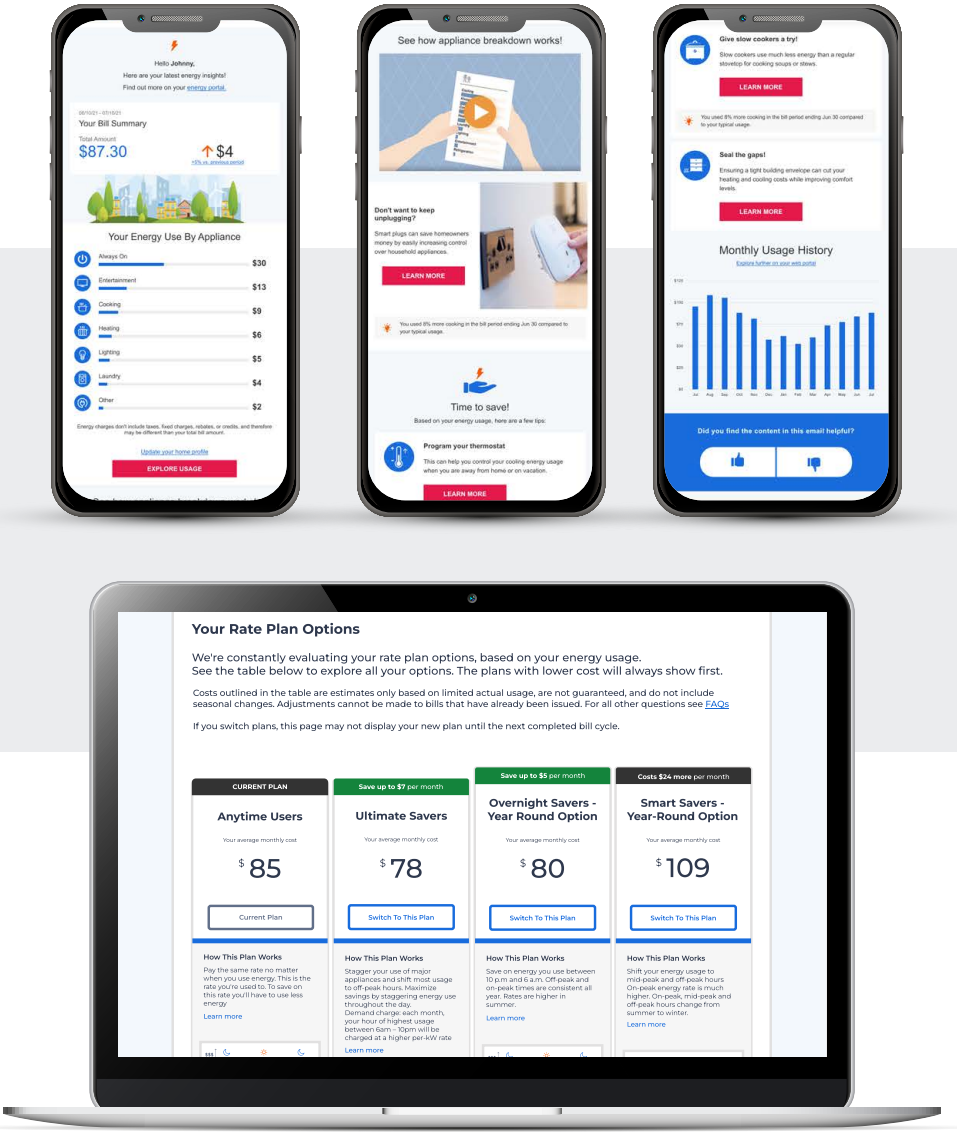
RECRUIT TOU RATE SUBSCRIBERS (OPT-IN PROGRAMS)

Inviting residential customers to opt-in to time-variant price options has historically realized a relatively low adoption rate when compared to opt-out plans in which all customers are auto-enrolled. However, customers who affirmatively opt-in are likely to contribute more significant peak-time reductions than those who are enrolled passively.

AMI-data-driven opt-in programs can realize much greater opt-in rates by making it possible to target customers with personalized targeting rather than mass marketing.

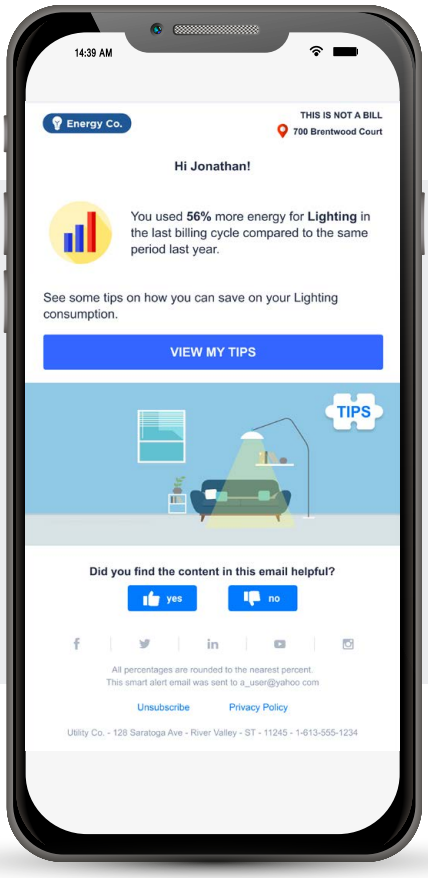
Promoting and recommending the adoption of TOU rates requires that customers 1) understand the mechanics of a TOU rate and how it works; 2) understand how, based on their unique historical load and consumption habits, the customer could save money compared with their current rate; and 3) understand whether achieving the promised savings will require changes in current home or single appliance energy consumption.

To equitably meet customers “where they are” via the communication channel of their choice, it’s also important to provide multi-channel rate education tools that both “push” personalized recommendations via email or SMS as well as self-service rate comparison research via the web.



ONBOARD NEW RATE PARTICIPANTS WITH PERSONALIZED GUIDANCE (OPT-IN AND OPT-OUT PROGRAMS)

Create an ongoing behavioral journey for customers who have moved to a TOU rate that helps them learn how to minimize usage during peak hours. By personalizing TOU rate education and recommendations, utilities can help customers successfully adjust to time-based rate structures and realize positive outcomes immediately and over time.



PHASE 3: ONGOING PERSONALIZED COACHING

The more customers embrace time-varying rates, the greater the gains in grid management, costs to serve, customer savings, and customer experience. But as with any new experience, customers need coaching to make sure they are using their rate effectively to achieve maximum TOU load shifting and savings. One-on-one engagement makes that coaching more effective.

For example, explaining to a consumer how much energy they are using between 5 p.m. to 9 p.m. and which of their appliances are consuming that energy provides very precise information they can act upon to avoid high bills.

The capability to provide specific advice about what ongoing energy use behaviors to change or which of their home appliances they can adjust fosters a continual rate optimization collaboration that yields a better customer experience and greater trust in the utility as an advisor.

Personalized communications based on AMI data help eliminate high bill surprises at every stage and keep customers moving forward toward achieving maximum savings.

ACTION STEPS

SHARE RECURRING MONTHLY FEEDBACK

Successful TOU implementations require more frequent customer touchpoints than a once-a-month bill. By expanding the number of standard customer communications and diversifying the insights and recommendations they contain, utilities are able to provide ongoing and recurring feedback. Regularly scheduled TOU customer touchpoints can include:

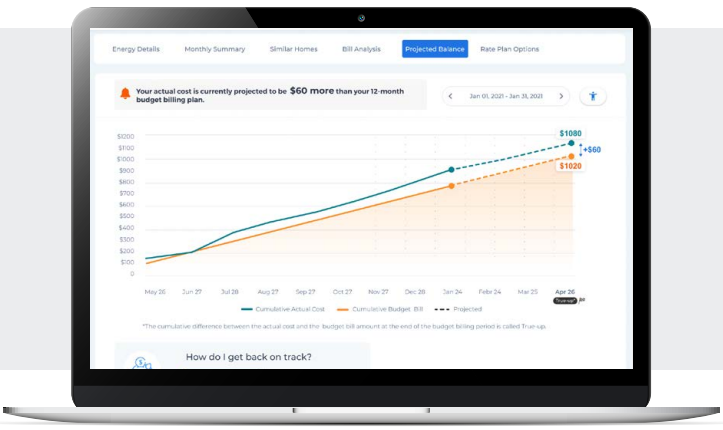
Monthly Bill Summary: Empowers customers with an appliance-level view of energy spending, a breakdown of peak vs. off-peak hours, and identification of the appliances that are used most during peak hours. This consumer-centric approach to billing better motivates customers to save through insights and recommendations specific to the appliance categories with the highest spending.

Budget Alerts: Advises customers when they're approaching the budget they've set to reduce bill shock and presents opportunities to reduce their bill before the end of the billing cycle.

Weekly Reports: Enable consumers to track their weekly usage trends, including such features as a peak hours analysis and week-over-week comparison.

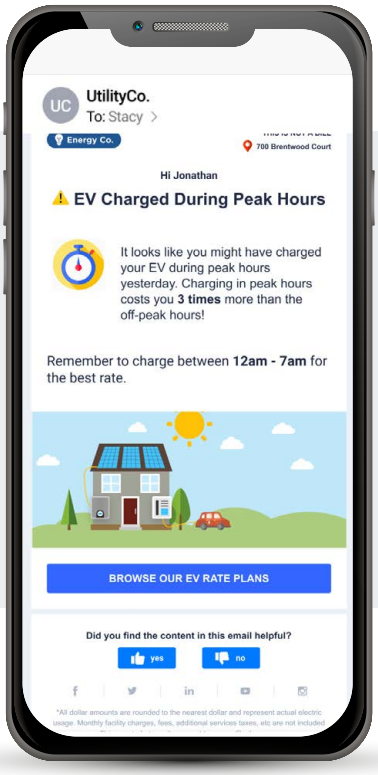
Similar Home Comparison: Highlights energy usage during peak and off-peak hours in comparison to similar homes (in terms of size, type, location, and appliance profile) and motivates customers to save with recommendations specific to their appliance categories with the highest spending.

Bill Projection: Proactively predicts end-of-cycle billing based on energy used so far in peak and off-peak hours, reducing bill shock and highlighting the opportunity to lower their bill.



SEND PEAK USAGE ALERTS

In addition to regularly scheduled rate feedback and recommendations, peak alerts should be dynamically triggered to provide immediate feedback whenever a customer uses specific appliances during peak hours. These "in the moment" reminders are particularly helpful in encouraging and empowering consumers to correct their peak usage behaviors.



PROVIDE SELF-SERVICE ENERGY ACTIVITY MAPPING TOOLS

Self-service rate research tools are an important part of helping customers better understand how to optimize their energy usage. Energy activity maps provide easy-to-interpret graphs that track energy usage during peak and off-peak hours by time of use and duration. This visual representation of energy usage is a powerful way to build customer understanding as to how their habits equate to energy costs, and what steps they can take to achieve the greatest TOU benefit.

PHASE 4: PROGRAM EVALUATION AND OPTIMIZATION

New rate designs can sometimes have unintended outcomes, highlighting the importance of real-time monitoring of their impact.

Conducting AMI-data-based analyses of existing rate plan outcomes can serve as an essential tool to understand how customers are responding to the new prices and to evaluate the need to change or modify rate designs.

Understanding how user behavior is changing compared to a control group, or even compared to a customer's baseline can build a powerful understanding of what strategies are working, and even what appliances they are affecting.

Analyzing appliance usage patterns on an ongoing basis enables utilities to responsively refine rate design to maximize energy savings for both the utility and the customer.

SHARE RECURRING MONTHLY FEEDBACK

For many electric vehicle drivers, the fuel cost savings compared with traditional gas-powered vehicles played a significant role in their decision to buy an EV. EV time-of-use rates provide EV owners with a way to amplify their fuel savings further by charging their vehicles during off-peak hours when TOU rates are at their lowest.

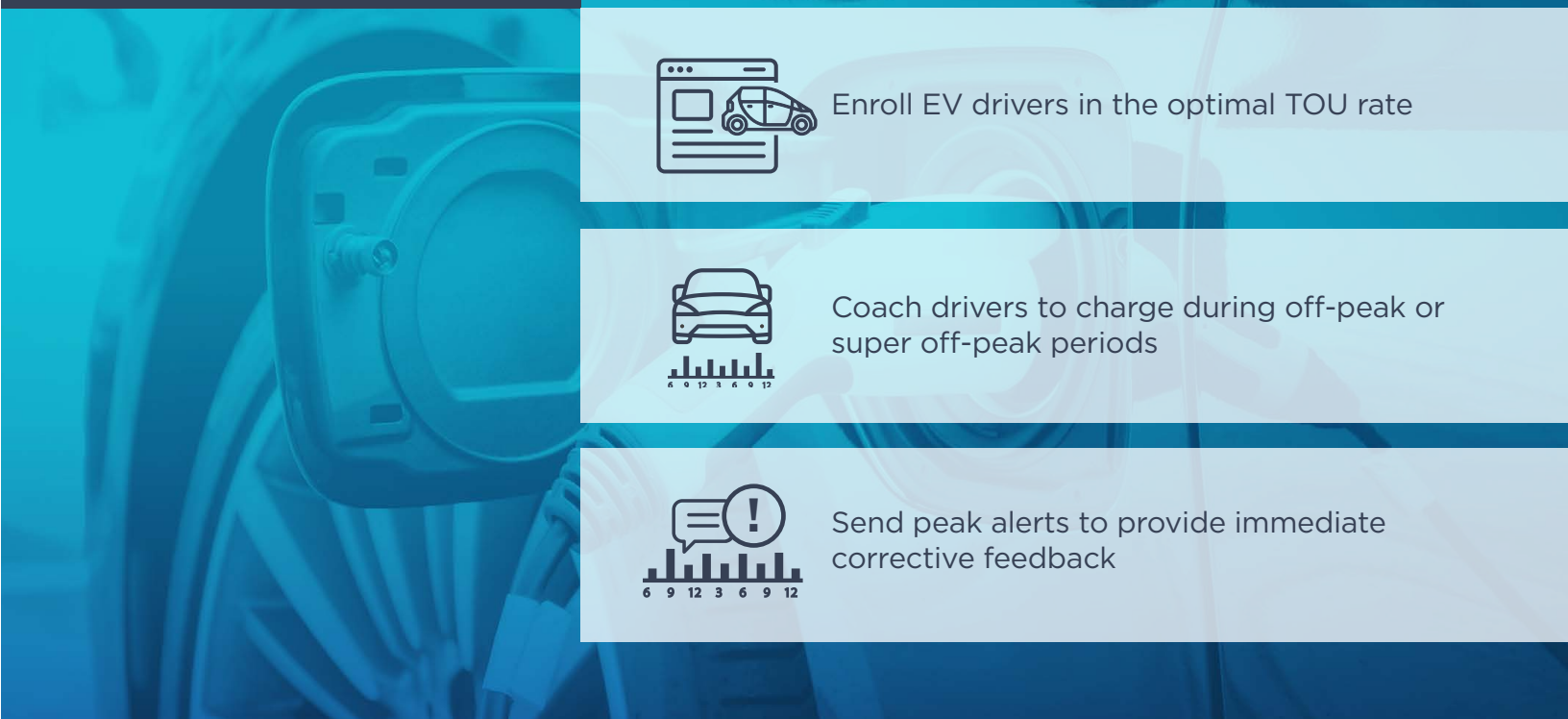
In this way, utilities are in a position to offer their customers greater fuel-savings ROI than they anticipated when they bought their vehicle, which can deliver a big boost to customer satisfaction.

As with any TOU rate, AI-powered disaggregation detection and insights should be the foundation for this approach.

In the case of EV drivers, smart meter energy intelligence reveals which customers have purchased an EV, when they are charging their vehicle, and what equipment they're using to do so.

With that information, utilities can personalize their EV TOU charging engagement with each driver.

ACTION STEPS



- Enroll EV drivers in the optimal TOU rate
- Coach drivers to charge during off-peak or super off-peak periods
- Send peak alerts to provide immediate corrective feedback

ENROLL EV CUSTOMERS IN THE OPTIMAL TOU RATE

Each month customers should receive a “monthly tracker” email summary of their EV charging and monthly spending on EV charging, including specific tips to optimize charging.

This email outreach serves as an ideal time to promote TOU rate plans to those EV users who are not already enrolled with a call to action that is personalized with specific customer savings potential based on their vehicle, charging equipment, and charging requirements.

COACH DRIVERS TO CHARGE DURING OFF-PEAK OR SUPER OFF-PEAK PERIODS

Once EV drivers are on a TOU rate, ongoing coaching should highlight how much their EV current charging behaviors cost on the TOU rate structure. This personalized analysis fosters improved clarity about the cost of vehicle charging.

SEND PEAK ALERTS TO PROVIDE IMMEDIATE CORRECTIVE FEEDBACK

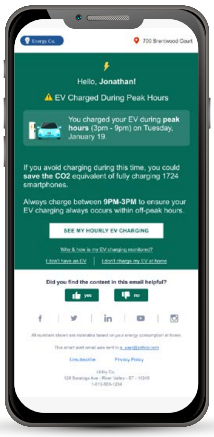
Peak alert communications should provide EV drivers with immediate feedback on negative charging behavior, reminding customers how much more they paid for that charge versus an off-peak charge. This specific dollar figure is useful in both preventing high bill surprises as well as encouraging the customer to shift charging in the future.

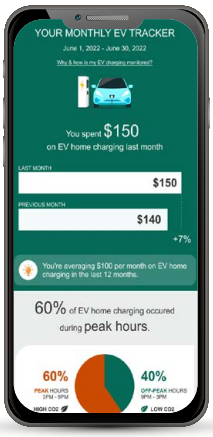
This type of engagement's precision, accuracy, and timeliness empower drivers to optimize their TOU plan fully and derive the most benefit.

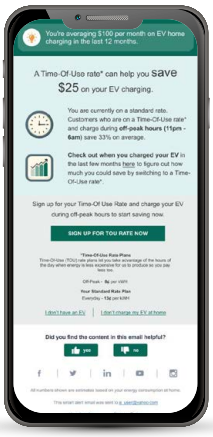
LOOKING FORWARD

The promise of TOU rates to improve system utilization, reduce peak demand and lower consumer costs is significant, but the transition necessary to achieve that promise is complex and requires a solid data foundation.

The appliance-level grid insights and personalized customer engagement that AMI energy intelligence enables improve the likelihood of successful TOU rate rollouts at every stage: rate design, recruiting and onboarding, ongoing coaching, and program evaluation and optimization.







For more information about how Bidgely’s Analytics Workbench can inform TOU programs, download our **Analytics Workbench Solution Brief**.

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