DESIGN SCALABLE, COST-EFFECTIVE ELECTRIC VEHICLE LOAD SHIFT PROGRAMS

Leverage Energy Disaggregation for EVs

Bidgely | November 2021

OVERVIEW

Electric Vehicles (EVs) are here to stay. According to the International Energy Agency's (IEA) Global EV Outlook 2021, the total number of electric cars on the road surpassed 10 million worldwide, while electric car registrations increased by 41% in 2020. With aggressive climate and decarbonization goals, IEA estimates that more than 200 million EV's may hit the road by 2030. This dramatic growth presents both opportunities and challenges for electric utilities around the globe.

> *With change of this magnitude, utilities are faced with the challenge of integrating a massive and dynamic increase in EV charging loads, while maintaining grid stability and ensuring a positive customer experience.*

In today's nascent EV market, many utilities have begun to try to identify who has an electric vehicle and enroll them into TOU rates and EV charging programs to promote off-peak charging. However the majority of EV owners don't understand the role utilities play in managing their new increased electric load, and therefore opt-in remains low. As the number of EV owners scales exponentially, engaging them will become critical, and ensuring incentives are aligned to users who have the greatest grid impact becomes even more important.

A scalable EV program can:

- **Maximize load shift by engaging EV owners that habitually charge on-peak.**
- **Significantly increase the cost-effectiveness of EV charging programs by providing incentives relative to the grid value.**
- **Improve customer satisfaction and trust with targeted messaging and an optimal EV charging experience.**

EV INSIGHTS INCREASES PROGRAM PARTICIPATION

Advancements in meter-based analytics or energy load disaggregation allow Bidgely to accurately identify and estimate EV charging loads at residential homes. Identifying EV owners and their EV charging patterns allows utilities to estimate EV growth rates by location, and accurately forecast the anticipated impact on grid assets to achieve the load shift

PROVEN RESULT
Greater than **90%** EV charging detection & estimation accuracy validated against EV tracking hardware.

needed to accommodate the growth of EV charging. Electric load disaggregation can detect EV charging across the utility service territory without the need for expensive incentive-based opt-in hardware or telematics.

Bidgely's patented load disaggregation detects which customers have EV's, as well as when and how they charge their vehicles. This behind-the-meter intelligence equips the utility with critical information to position the utility as a trusted messenger to then engage EV owners. Bidgely's utility partners are now providing their EV customers with EV charging insights, which significantly improves participation in EV charging programs. EV users receive an itemized bill summary that outlines EV charging costs, new driver welcome emails, peak charge alerts, and EV charging monthly reports. By providing value via intelligence, utilities can reduce the need to pay for enrollment incentives to draw in new EV owners while also improving enrollment through engagement.
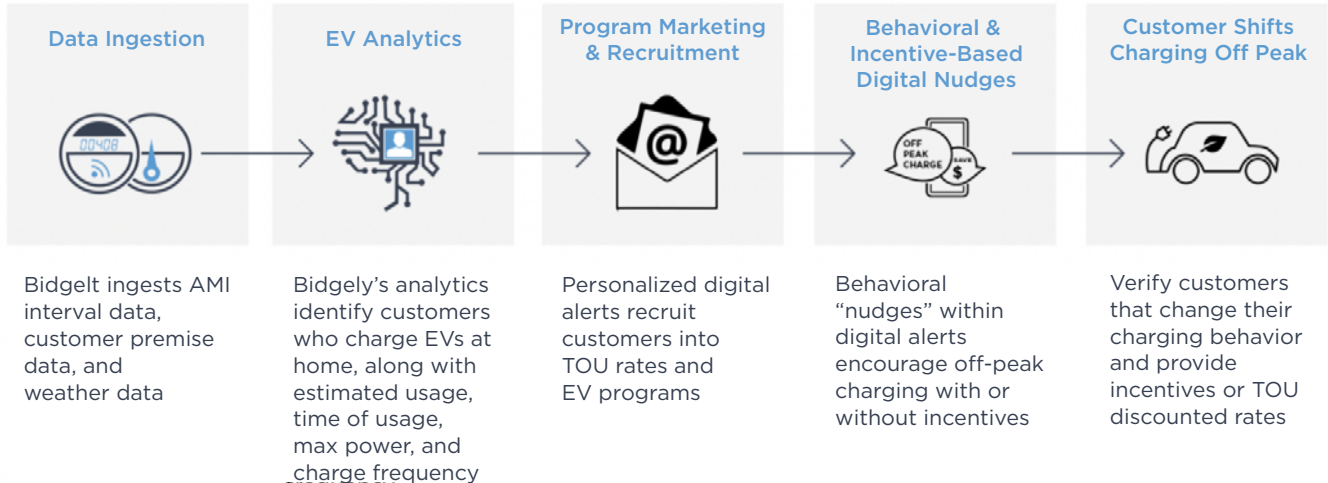
EV ENGAGEMENT IN
EV CHARGING PROGRAMS

Bidgely offers our Behavioral Load Shifting Program on an opt-out basis, meaning all customers with EVs and email addresses on file will receive personalized communications and behavioral nudges to encourage off-peak EV charging. This opt-out program design can be gamified as a "strike-based" program and configured with or without incentives to motivate customer participation in EV load shifting events.

Data Ingestion	EV Analytics	Program Marketing & Recruitment	Behavioral & Incentive-Based Digital Nudges	Customer Shifts Charging Off Peak
Bidgelt ingests AMI interval data, customer premise data, and weather data	Bidgely's analytics identify customers who charge EVs at home, along with estimated usage, time of usage, max power, and charge frequency	Personalized digital alerts recruit customers into TOU rates and EV programs	Behavioral "nudges" within digital alerts encourage off-peak charging with or without incentives	Verify customers that change their charging behavior and provide incentives or TOU discounted rates

Bidgely's utility-branded, mobile-optimized emails are designed to encourage customers to charge during off-peak times, by highlighting monthly charging trends and dynamically alerting customers when they have charged on-peak.

DETECT PEAK CHARGING

STRIKES-BASED ALERTS

EV CHARGING ACTIVITY
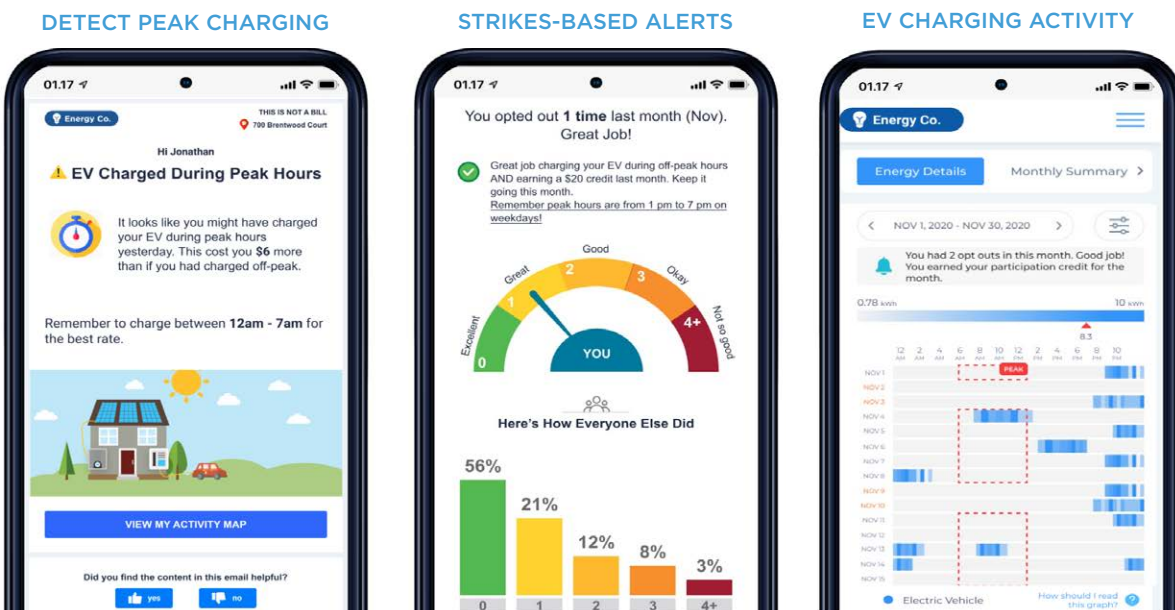
PROVEN RESULT

Bidgely's EV Solution has achieved email open rates of 77% and click through rates of 26%, while also achieving a 100% 'Thumbs-Up' rating from program participants.

Take your EV programs a step further to engage users that would benefit from an active managed charging program, where EV charging is automatically scheduled for off-peak hours. For customers who are willing to share their car access via API, managed charging provides a reliable option that can be added on top of the behavior-based program to simplify and ensure off-peak charging.

For customers looking to "set it and forget it" or for customers who don't respond to behavioral nudges, opt-in active managed charging provides a premier customer service on top of behavior-based charging. Active managed charging controls automate the off-peak charging but allow customers to override if needed. Our utility-first approach embraces existing EV or telematics partnerships in order to put the needs of the utility and EV-owning customers at the forefront of our solution design.

TARGETING PEAK EV USERS LEADS TO LOWER COST TO SERVE FOR UTILITIES

In today's budding EV landscape in which only a small percentage of customers have adopted EVs, utilities have the luxury of paying incentives to EV customers regardless of their charging behavior or grid value. However, as EV adoption proliferates, blanket incentives will become costly without driving the necessary results. Utilities want to build customer habits to maximize off-peak EV charging and minimize expensive on-peak charging loads. However, incentives are often paid to enroll customers who already charge during off-peak hours. Meanwhile on-peak charging may continue unaddressed.

Knowing who charges their EV during peak hours eliminates the need to run expensive broadcast marketing campaigns to recruit EV owners into programs and avoids incentivizing EV owners who already charge their EV during off-peak hours. Furthermore, not all EV charging occurs on a grid constrained asset. **Knowing when and where EV charging occurs allows EV programs to be designed with variable incentives relative to the value of the load shift** (ex. load shifted on a constrained substation). Bidgely's load disaggregation empowers utilities with the insights to design future-ready programs and tailor EV incentives to deliver maximum grid benefit.

> *Not all EV owners charge on-peak or on constrained grid assets,
> so why give all EV owners the same incentive?*

The ability to target on-peak EV users can deliver significant return-on-investment for the utility. The utility has a significantly higher cost to serve EV customers who charge during peak hours than EV users who charge during off-peak hours. Bidgely's EV disaggregation technology identifies different EV load patterns as is illustrated by the two users below. Let's assume on-peak wholesale power costs $50/MWh, while off-peak power costs only $25/MWh. In the example below, the EV owner on the left uses 3,200kWh, or 3.2MWh annually to charge their vehicle during on-peak hours, which may cost the utility as much as $150. Meanwhile, the EV owner on the right rarely charges during peak hours with only 450kWh, or 0.45MWh, at a wholesale cost to serve of only $25.

80% On-Peak Charging
4000 kWh annual EV charging
Charges 3+ times per week

15% On-Peak Charging
3000 kWh annual EV charging
Charges 1-2 times per week
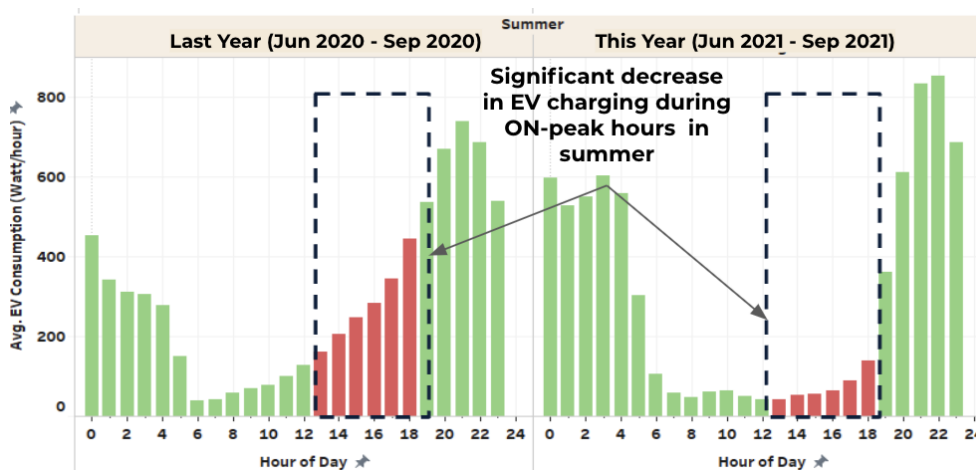
EV Usage Load Curve

EV Usage Load Curve
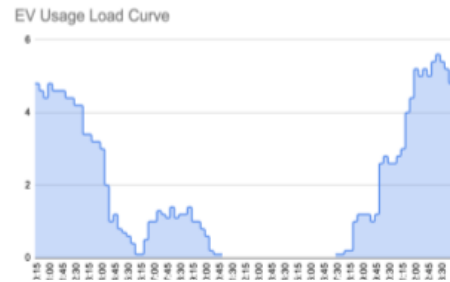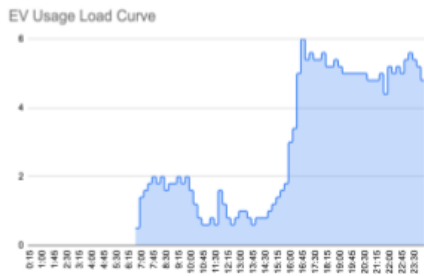
While both the left & right users have a high total EV charging - only the user on the left has significant on-peak charging disaggregated by Bidgely

By targeting users that have load patterns such as the customer illustrated on the left, the utility can make an informed decision to offer an incentive for more valuable EV load shift and avoid wasting incentives on users with EV load patterns like the one illustrated on the right.

CASE STUDY

Bidgely's EV Solution is deployed at a leading Southeast investor-owned utility with demonstrated program results across key performance indicators including: EV detection, customer engagement, and peak load shift.

During a trial period spanning 2020 and 2021, this Southeast utility sent EV owners behavioral alerts about when they were charging at peak times to encourage them to charge at off-peak times. Comparing the pilot period to the same summer time period in the previous year demonstrated a significant reduction in peak charging. Users who successfully minimized their peak charging were rewarded with paid incentives.

Summer
Last Year (Jun 2020 - Sep 2020)   **This Year (Jun 2021 - Sep 2021)**

Significant decrease in EV charging during ON-peak hours in summer

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PROVEN RESULT

A leading Southeast IOU realized an overall **73%** reduction in on-peak charging.

To kickstart your EV action plan, visit:
bidgely.com/ev and schedule a demo with us.

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