PHASE 01
Accelerating
Customer
Awareness,
Education
and Adoption

PHASE 02
EV Detection
and Forecasting

PHASE 03
Behavioral Load
Shifting

PHASE 04
Active Managed
Charging

bidgely

BIDGELY'S AI-POWERED
EV SOLUTION

The pace of EV adoption continues to gather momentum as range anxiety is waning, vehicle performance is improving and prices are falling—translating into a tremendous opportunity for utilities. More than 10 million electric cars are on the road today, accounting for 26 terawatt-hours (TWh) of charging. By 2030, in excess of 200 million chargers will be installed, accounting for 550 TWh of charging.

If current projections hold, Boston Consulting Group estimates that electric vehicles could create between $3 and $10 billion in new value through 2030 for an average energy business with 2 million to 3 million customers.

This massive increase represents the most significant opportunity in a generation to increase base demand and margins while simultaneously introducing new utility services like home and public charging infrastructure and bolstering grid reliability and resiliency.

With so much at stake, Bidgely designed its EV Solution as an easy-to-navigate roadmap that equips energy providers with essential data insights and practical operational strategies to maximize EV upside. Not every energy provider—let alone every consumer—is at the same point on the EV adoption curve. Bidgely's EV solution meets consumers and energy providers where they are today and plots an implementation course based on where they aspire to be.

The EV Solution roadmap is comprised of four phases that can be activated sequentially or in parallel:
1. Accelerating customer awareness, education and adoption
2. Analyzing the EVs on the road today and forecasting where EVs will be tomorrow
3. Shifting EV load using behavioral mechanisms
4. Implementing managed charging

# PHASE 1: ACCELERATING CUSTOMER AWARENESS, EDUCATION AND ADOPTION

The earliest step in the EV transformation begins while consumer adoption in a territory remains low. Now is the time to begin the ongoing process of driving EV education and awareness to increase the pace of adoption.

Bidgely's EV Solution empowers energy providers to lean into **pre-purchase customer engagement** with education and awareness to alleviate consumer anxieties, inform customers about vehicle offerings and share community trends.

Engagement starts by identifying customer attributes that contribute to higher propensity to buy an EV—such as solar ownership or participation in an environmental rate plan—to enable hyper-targeted planning and marketing.

Applying Bidgely's patented disaggregation and machine learning technology to residence metadata, appliance-level energy use, lifestyle, neighborhood trends, tax credit availability and more, Bidgely helps energy providers target personalized EV education to the highest propensity buyers to optimize marketing and engagement success and ROI. Smart meter data then further allows each prospective EV buyer touchpoint to be hyper-personalized based on their unique energy use profile and customer persona.
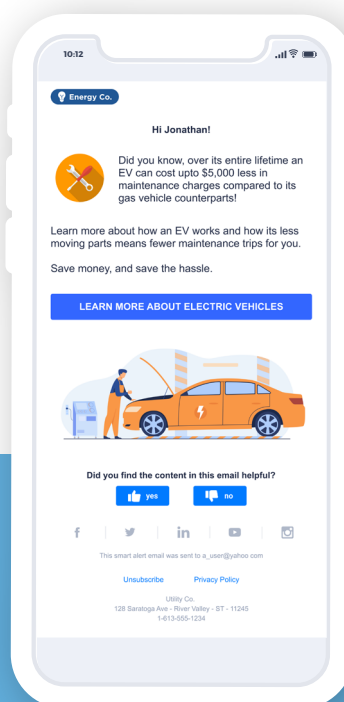
Bidgely's approach to pre-purchase customer engagement is designed to pique customers' interests with the EV ownership value proposition that resonates most. "Personalized nudges" delivered on a regular cadence encourage their purchase and nurtures them throughout their buying journey.
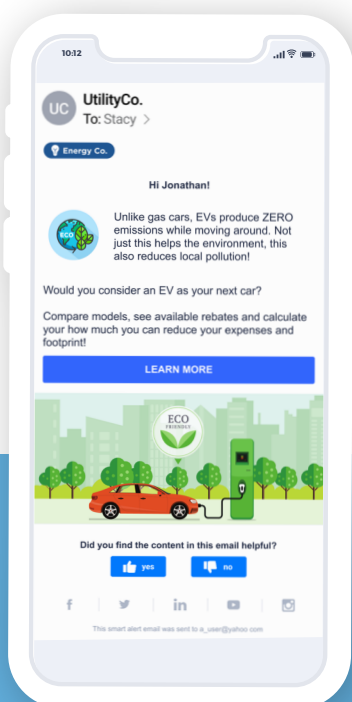
HELP THE PLANET
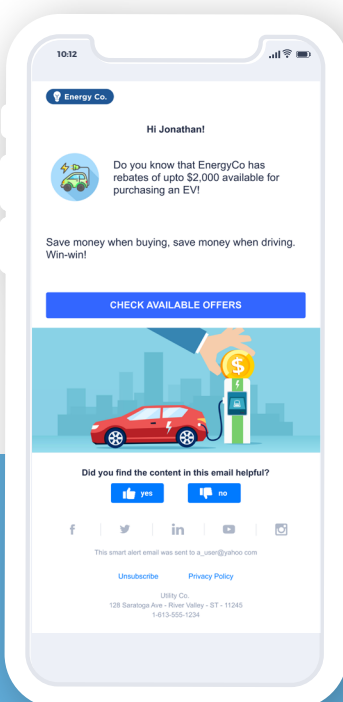
SAVE MONEY

SAVE TIME

PHASE 2: EV DETECTION AND FORECASTING

As EV ownership begins to accelerate, data-informed preparation for the coming adoption wave becomes a necessity. Energy providers can rely upon Bidgely's patented EV detection technology to pinpoint with high accuracy which customers charge an EV at their residence.

EV Estimates from Raw Energy Consumption

Bidgely's disaggregation science identifies appliance-level patterns in raw meter data across all homes in a service territory in real time. Our EV disaggregation is the most accurate in the industry—able to identify charger types, charger amplitude, typical hours when EV charging happens, if charging is occurring on a schedule, and monthly EV consumption.
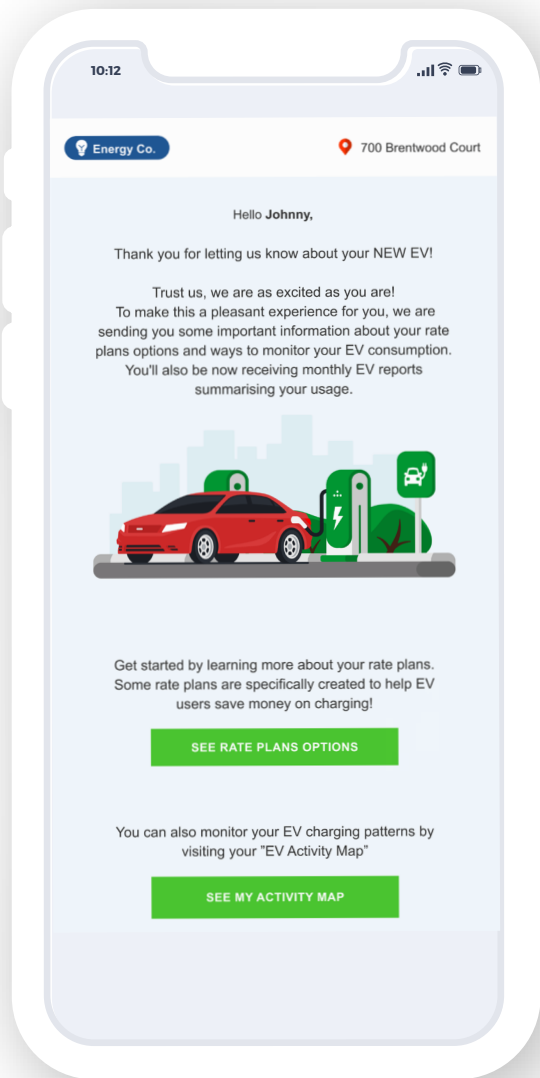
Load Profile and Flexibility Analysis

Charger Type	L2
Amplitude	11,900 W
# runs peak hours (winter)	3
Consumption Peak Hours (winter)	64.437 kWh
# runs peak hours (summer)	10
Consumption Peak Hours (summer)	425.814 kWh
Interval start-end time (avg)	8pm - 4am
Charging frequency (avg)	4 times / week
Location of Charge	Home

Load profile and flexibility analysis
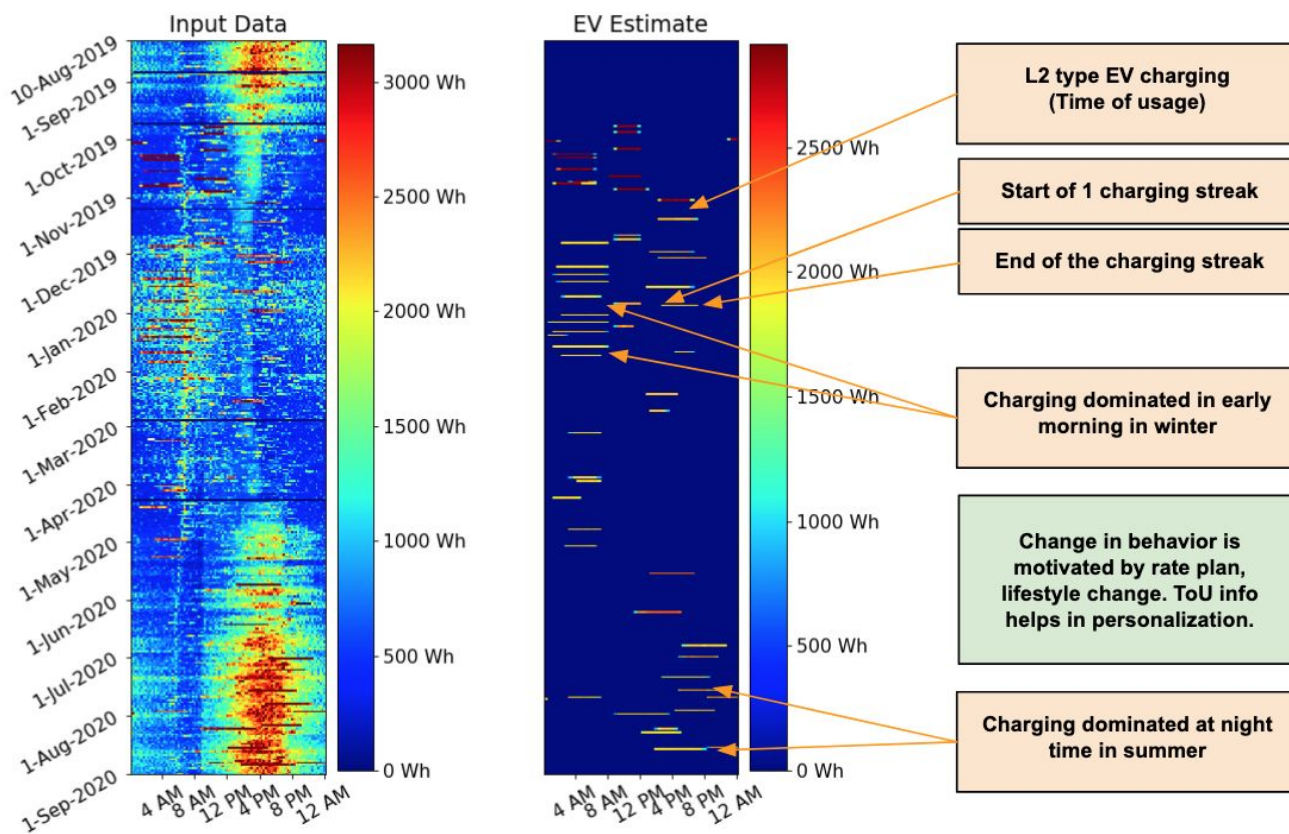
Customer Charging Attributes Identified by Bidgely

More accurate than motor vehicle registration records and more complete than telematics, Bidgely's **Analytics Workbench** provides granular EV analytics for every EV owner in a service territory to enable energy providers to proactively welcome and engage with all new drivers as a trusted advisor and set them up from the start to manage their EV charging and optimize their ownership experience. Moving forward, EV owners receive regular summaries of their charging activity and cost of ownership.

Bidgely's detection insights also optimize EV program development and serve as powerful inputs for both real-time **grid operations and infrastructure planning**. Utilities are able to see the total charging consumption and EV load by region, zip code, substation or feeder; the percentage of Level 1 vs. Level 2 chargers; EV load forecasts; percentage of on- vs. off-peak charging; specific geographies with the highest charging; and more.

Grid Charging Attributes Identified by Bidgely	
Percentage of Chargers Types	80% L2
Total Charging Consumption (by region, zip, substation, feeder)	11,700,000 W
Substation EV Load	48,000 W
Feeder EV Load	10,000 W
Transformer EV Load	5,000 W
EV Load Forecast (on-demand, monthly)	50,000,000 W
Percentage of Customers Charging On Peak (by season)	78%
Geographies with High Charging	79237, 44383, 00001

Analytics Workbench visualizes EV loads over time to determine where constraints may exist or develop. Energy providers are able to leverage Bidgely's patented AI to identify high growth EV pockets and locate prime locations for public **charging infrastructure** based on existing and future EV adoption, disadvantaged areas, high traffic regions, and grid-friendly locations.
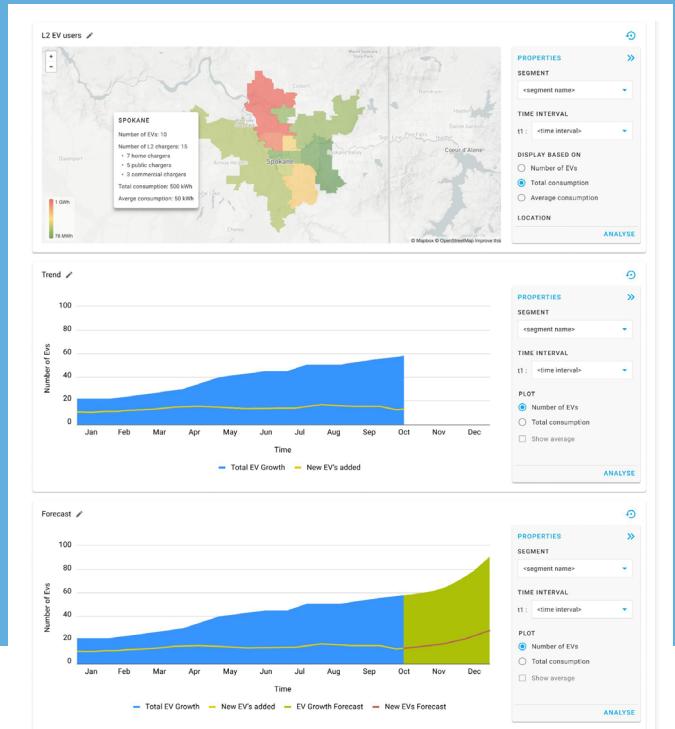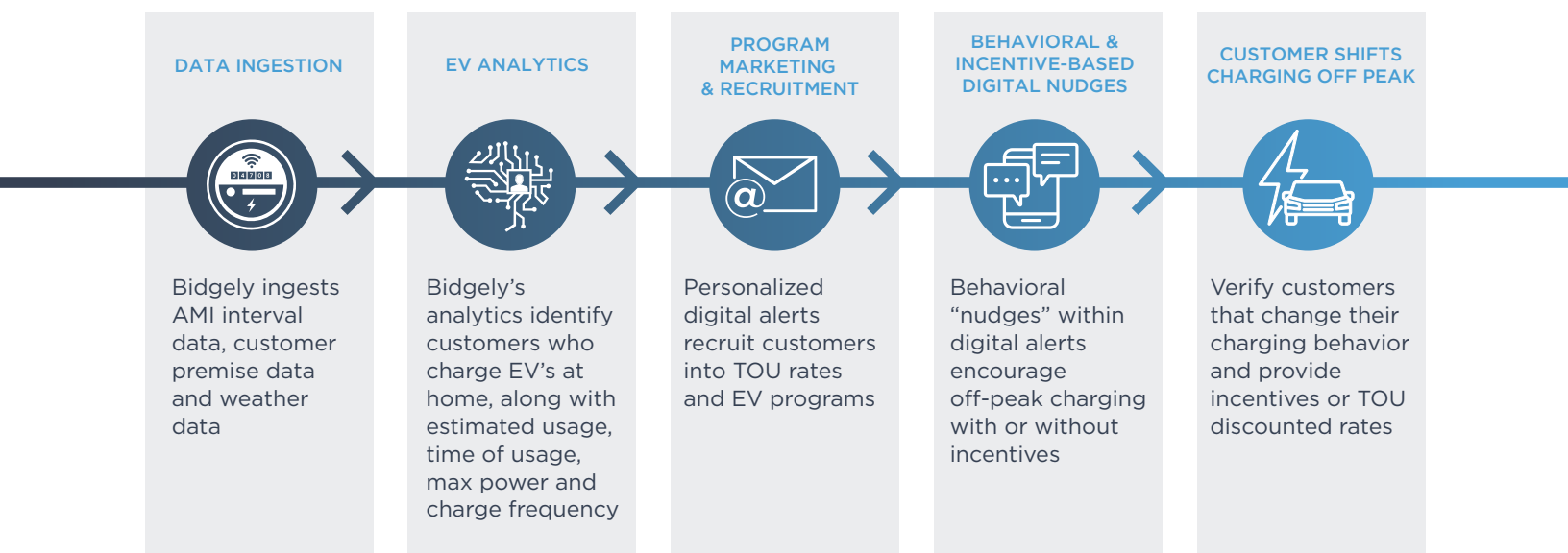

Energy providers are also able to **design EV rates and incentives** based on time and location of use for the entire EV population in a given territory and with respect to forecasted EV growth. EV rates can be informed by usage patterns that are expensive to serve (peak hours) and customized based on driver lifestyles (i.e. charging at work vs. charging at home). Data-informed rates more successfully encourage consumers to opt-in to the rate plan best suited to their electric vehicle and energy usage and nudge them toward load-shifting activities.
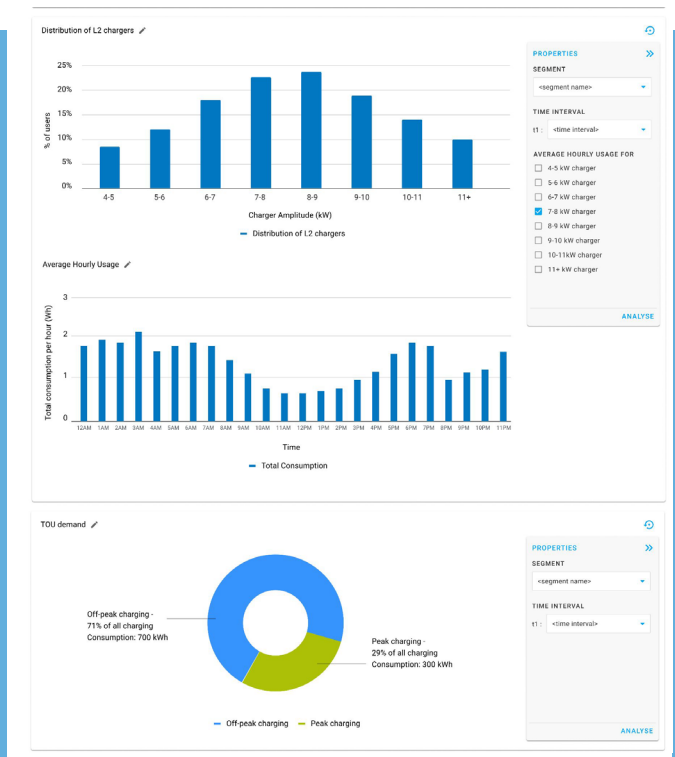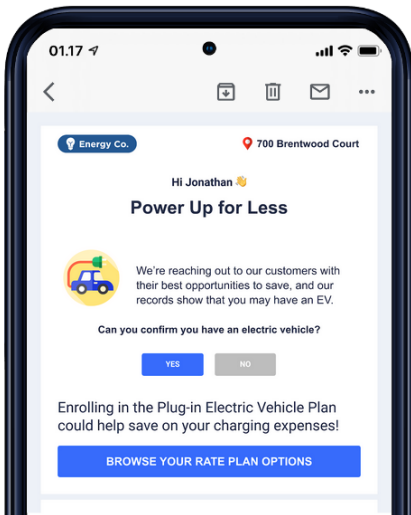
PHASE 3: BEHAVIORAL LOAD SHIFTING

When EV adoption surpasses three percent, system constraints likely will begin to emerge and load shifting will become an imperative. As energy efficiency programs have demonstrated for many years, opt-out behavior management can serve as a powerful load balancing mechanism in these conditions.

| DATA INGESTION	EV ANALYTICS	PROGRAM MARKETING & RECRUITMENT	BEHAVIORAL & INCENTIVE-BASED DIGITAL NUDGES	CUSTOMER SHIFTS CHARGING OFF PEAK
Bidgely ingests AMI interval data, customer premise data and weather data	Bidgely's analytics identify customers who charge EV's 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

On-peak charging behaviors can further constrain the grid and require expensive power to serve, while off-peak charging is generally lower cost for the energy provider and therefore enables higher margin kilowatts. Bidgely's disaggregation technology detects when customers are charging, identifying those who are ideally suited for load balancing programs and empowering energy providers with more effective enrollment outreach and program management tools. With Bidgely's EV Solution, energy providers are able to message EV owners with peak use charging detection and send behavioral nudges designed around their personal charging insights to motivate them to change their behavior to charge off-peak—with or without an incentive that pays EV owners for charging their vehicle at optimal times. Energy providers can further gamify incentives with a strikes-based system through which customers lose the incentive if they exceed too many on-peak charging strikes.
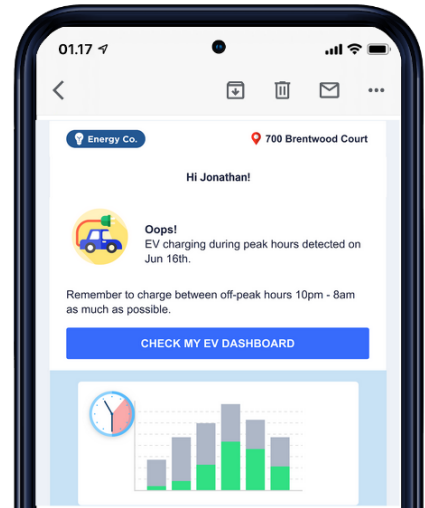
PROGRAM
RECRUITMENT

MONTHLY EV
CHARGING INSIGHT
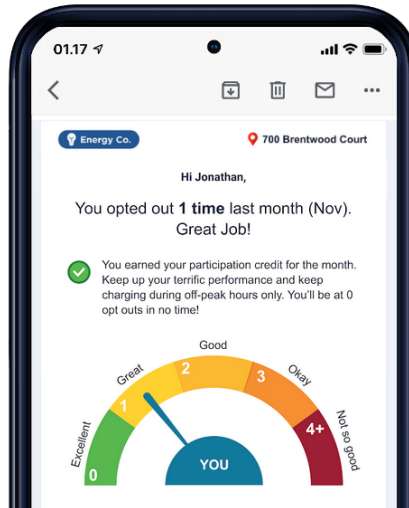
DYNAMIC EV
CHARGING INSIGHT

One of the most powerful aspects of a Bidgely-informed behavioral load shifting program is the ability to target the highest grid value customers to optimize grid-edge load. Traditional EV incentive programs offer the same incentive to all EV owners. A more impactful and cost-effective approach is to target load-shifting programs based on the value each customer can bring to the grid. When incentive programs are focused on EV owners who are charging their vehicles on-peak or in congested areas, the grid realizes the greatest possible benefit through relief in a given location or at a particular time, and both energy consumers and providers enjoy the greatest ROI with improved grid resiliency and reliability.

Bidgely is partnering with a North American utility to design and implement an incentive-based behavioral managed charging program through which customers are offered a $20 incentive for charging their vehicle during off-peak times. In this model, on-peak charging is labeled as a "strike," and customers can incur up to three strikes a month and still earn the $ 20 incentive reward. Customers receive an alert when on-peak charging is detected and receive a recap at the end of every month, indicating that they've either met the goal with three or fewer strikes and received the incentive, or that they exceeded three strikes and have to modify their behavior in the future to earn the incentive.
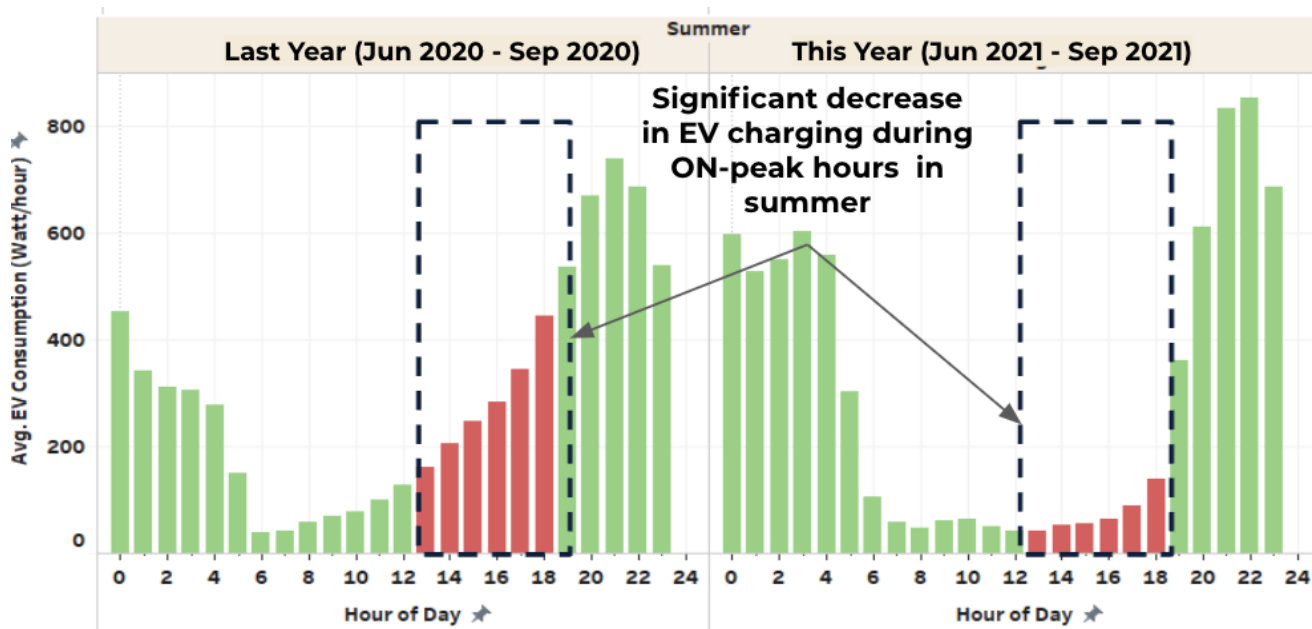
The program has been very successful, so far shifting 75% of on-peak loads off-peak, receiving 100% like ratings from customers, and realizing very high email open rates and customer engagement.

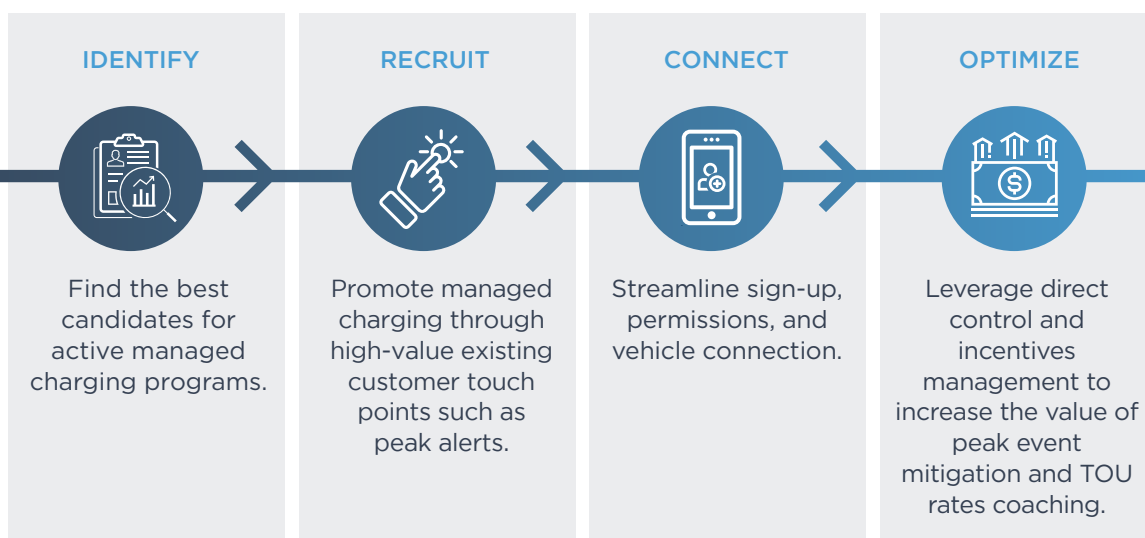# PHASE 4: ACTIVE MANAGED CHARGING

Today, EV penetration is around 2-3%. But when EV penetration reaches 10% and beyond, load balancing could be precarious if providers must rely on EV owners to act on peak event communications—not to mention becoming financially unsustainable if providing blanket incentives for all EV owners at $200 or more per vehicle.

The precision of disaggregation-based EV targeting combined with the control of telematics-enabled Active Managed Charging provides a better way forward.

Bidgely's Active Managed Charging brings together the EV detection, analytics, customer engagement capabilities described above with direct load control, providing a turn-key, end-to-end active managed charging solution that includes:

- **EV Identification & Targeting**
    - Detect EVs with 90%+ accuracy
    - Understand charging behavior for each EV owner
    - Target the highest load-shift value customers for programs
- **EV Recruitment & Onboarding**
    - Educate and drive enrollment through existing customer touchpoints

- Easily capture permissions
- Streamline vehicle connection

• **EV Charging Optimization**
  - Control load directly through telematics and EVSE chargers
  - Manage and disperse incentives
  - Leverage EVs for Peak Event mitigation
  - Increase TOU rate performance though automation

• **Incentive Management**
  - Incentive calculation
  - Incentive disbursement through popular channels like PayPal, Venmo, gift cards

• **Program Measurement & Verification**
  - Monitor program performance in near-real time
  - Make changes on the fly to ensure program results

• **EV-Focused Grid Analytics**
  - Plan for EV adoption at the feeder level
  - Enhance Non-Wires Alternatives and DER Management

IDENTIFY	RECRUIT	CONNECT	OPTIMIZE
Find the best candidates for active managed charging programs.	Promote managed charging through high-value existing customer touch points such as peak alerts.	Streamline sign-up, permissions, and vehicle connection.	Leverage direct control and incentives management to increase the value of peak event mitigation and TOU rates coaching.

Identify & Target: Focus on Your Highest-Value EV Owners

Bidgely's UtilityAI™ Analytics Platform powers our EV Solution, enabling energy providers to detect EVs on the grid with over 90% accuracy, using AI-enabled behind-the-meter EV disaggregation technology that requires no hardware, historical DMV data, or customer self-reporting.

This appliance-level grid visibility—an advantage of Bidgely's solution—gives utilities unparalleled program targeting. Consider the following scenario …

Generic Programs
+$1020

Bulk Power Operational System Benefit	$100
Bulk System Investment Cost Reduction	$600
Avoided Distribution System Investments	$300
Reduced Renewable Curtailment	$20
Total Value	**$1,020**

Targeted Programs
-$250

Customer Incentive/Benefit	$200
Utility Admin	$15
Software Cost	$35
Total Value	**$250**

ROI
308%

As EV penetration moves toward 10% and beyond, providers will need a better tool than blanket incentives for all EV owners, due to explosive costs. At $200+ per car to enroll in managed charging, costs remain under control while penetration is in the 2-3% range, but if 100k EV owners enroll at $200+ per car, that's not cost effective—and the problem grows as more EVs come onto the grid.

Bidgely's precision EV targeting enables utilities to understand charging behaviors at the customer level, so they can target the highest value candidates for "peak to off-peak" dynamic EV programs, deliver the right messages and incentives, and provide EV rate coaching.

Now, with EV targeting you can control not only who is eligible for incentives but also your grid's future.

Others (No Targeting)

~$225/kW

Bidgely (With Targeting)

~$65/kW

○ Low on-peak user
● High on-peak user
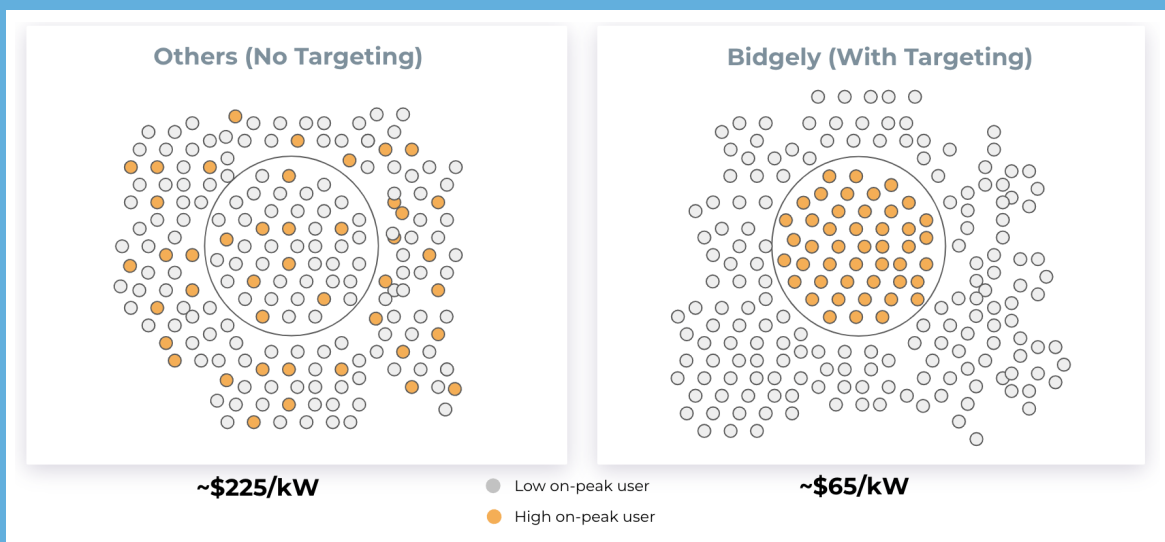
Knowing the individual charging behaviors of each EV owner on your grid eliminates the need for broadcast-marketing-based recruitment programs and finds the best candidates for active managed charging programs. This granularity in targeting yields more kWh shift for the same incentive paid out!

Recruit & Onboard: Simplify Partnership With EV Owners

Bidgely's platform makes recruitment for Active Managed Charging a natural progression in the customer journey, embedding right-time, right-context recommendations across existing communications for maximum repetition and visibility.

For example, personalized prompts for Managed Charging programs appear in the context of actual peak usage, providing a customized experience to each customer based on their individual ability to contribute to load-shifting efforts.

Once customers follow the prompt, a streamlined enrollment sequence guides customers through enrollment and onboarding:

Education ———

Enrollment ———

Enrollment: Streamline sign-up, terms of service, and permissions capture.
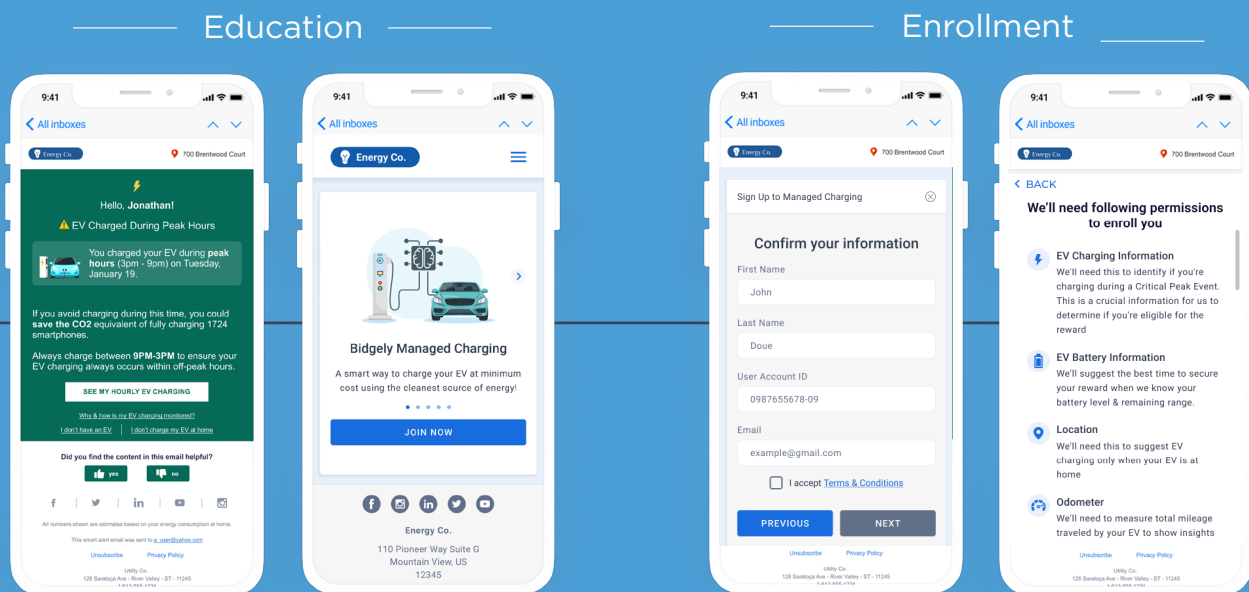
Education: Place enrollment prompts in the context of relevant touch-points, such as peak event notifications.

Step 1: Educate & Enroll - Educate customers about the program within existing channels or independently, explain incentives, confirm their information, and capture consent for active control.

Step 2: Connect - Guide participants seamlessly through connecting their EVs, including vehicle-based permissions such as location, battery status and, most importantly for active managed charging programs, the ability to start and stop their vehicle charging.
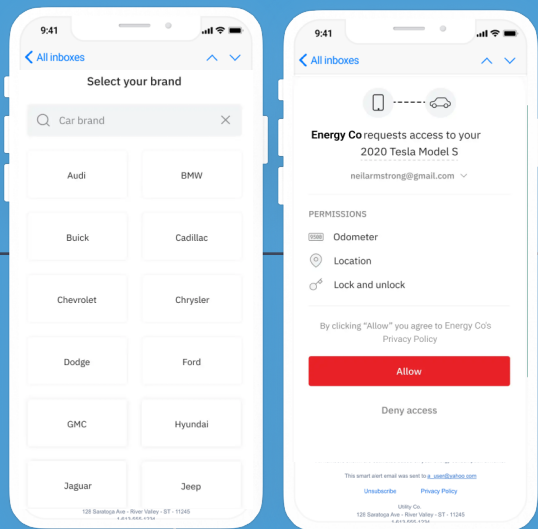
Over 25 OEMs are available for data connection with 7 available for control:

FORD	LAND ROVER	VW
HYUNDAI	TOYOTA	
JAGUAR	TESLA	

Data-only OEM connections:

AUDI	CRYSLER	MINI
BMW	JEEP	NISSAN
CADILLAC	LINCOLN	VOLVO
CHEVROLET	MERCEDES-BENZ	

Connection   Enablement

Car Connect: *Make connecting to EV telematics a self-serve experience.*
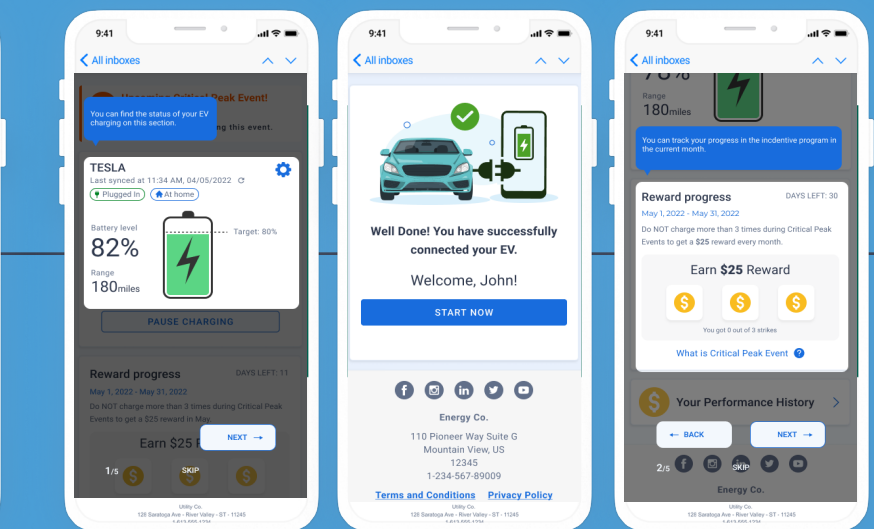
Enablement: *Guide participants through their new Managed Charging experience, and equip them for active engagement.*

Step 3: Enable - Focus participants on key features of the interface to ensure they have a positive experience and receive value immediately.

What is telematics?

The automotive industry uses telematics to describe **onboard communications services and applications** used in cars, trucks, buses and other vehicles using GPS receivers and telematics devices installed in each vehicle. With a customer's permission, Bidgely can access the vehicle's data (vehicle attributes, battery level, location, etc.) and know who is charging when and by how much. Active control of the EV charging is also possible for some vehicles, which allows us to control EV charging behavior and provide incentives valued by the EV owners. With connections in place through OEM and customer permissions, the foundation is laid for vehicle-to-grid (V2G) management in the future as utility programs mature.

Optimize Charging: Manage & Incentivize Frictionless EV Load Control

With customers onboarded and their vehicles connected to the Bidgely platform, charging can be automated and optimized flexibly to fit a utility's objectives—including the two most common optimization schemes: critical peak events and time of use.

Critical peak events can be handled in a similar fashion to traditional demand response—but with the utility able to automatically stop charging during the event period.

Time of use rates can predictably (daily or other cadence defined by the utility) allow regular, automated curation of the customer's vehicle charging.

In both scenarios the customer can override the managed charging, ensuring a positive experience is maintained. To reduce overrides, Bidgely uses gamification—a strikes and rewards-based approach that directly connects incentives to consumer actions.

Incentives Management

As a comprehensive EV solution, Bidgely's EV Active Managed Charging includes incentive calculation—which customers are in or out of compliance over time—and disbursement of incentives across a variety of choices, including Paypal or Venmo and gift cards.

Program Measurement & Verification

Traditionally, Measurement and Verification (M&V) occurs after a program is complete, leaving no opportunity to steer the program in the direction of success. However, Bidgely's EV solutions platform enables program managers to monitor program performance in real-time through dashboards build for EV program managers, allowing them to make program alterations in order to meet their goals.

Bidgely's M&V solution allows you to take a proactive approach instead of a reactive approach to your program performance.

EV-Focused Grid Analytics

Bidgely's Analytics Workbench provides granular EV analytics for every EV owner in a service territory, allowing energy providers to optimize EV program development and improve real-time grid operations and infrastructure planning. With Analytics Workbench, providers are able to see:

- The total charging consumption and EV load by region, zip code, substation or feeder
- The percentage of Level 1 vs. Level 2 chargers
- EV load forecasts
- Percentage of on- vs. off-peak charging
- Specific geographies with the highest charging
- And more.

By connecting disaggregation-based analytics to specific grid assets, providers are able to see true load shapes across location and time, making grid planning decisions faster and more intelligent and enabling innovative possibilities such as Non-Wires Alternatives and detailed Distributed Energy Resource management.

BEHIND THE SCIENCE

Electric vehicle charging disaggregation is incredibly complex. EV signals overlap with many other appliances, requiring sophisticated AI for accurate EV identification.

As the leader in energy disaggregation with 16 patents and experience with more than 40 energy companies and over 30 million homes worldwide, Bidgely possesses an EV knowledge base that consists of advanced ground truth for geographies in both North America and internationally that other technology providers cannot match.

Bidgely's EV analytics work on 15min/30min/60min interval meter data with at least six months of historical loads. Our data set allows Bidgely to pinpoint who has an EV and their monthly consumption, charger size and typical hours of charging with high confidence—even in traditionally hard-to-detect cases. All of this intelligence is made possible without any hardware or customer inputs.

GETTING STARTED

Interested in learning more about how Bidgely's EV Solution can set you on a transportation electrification road to success? Contact one of our representatives at utilityai@bidgely.com to schedule a demo and see how Bidgely can drive more EV value for both your customers and your business.