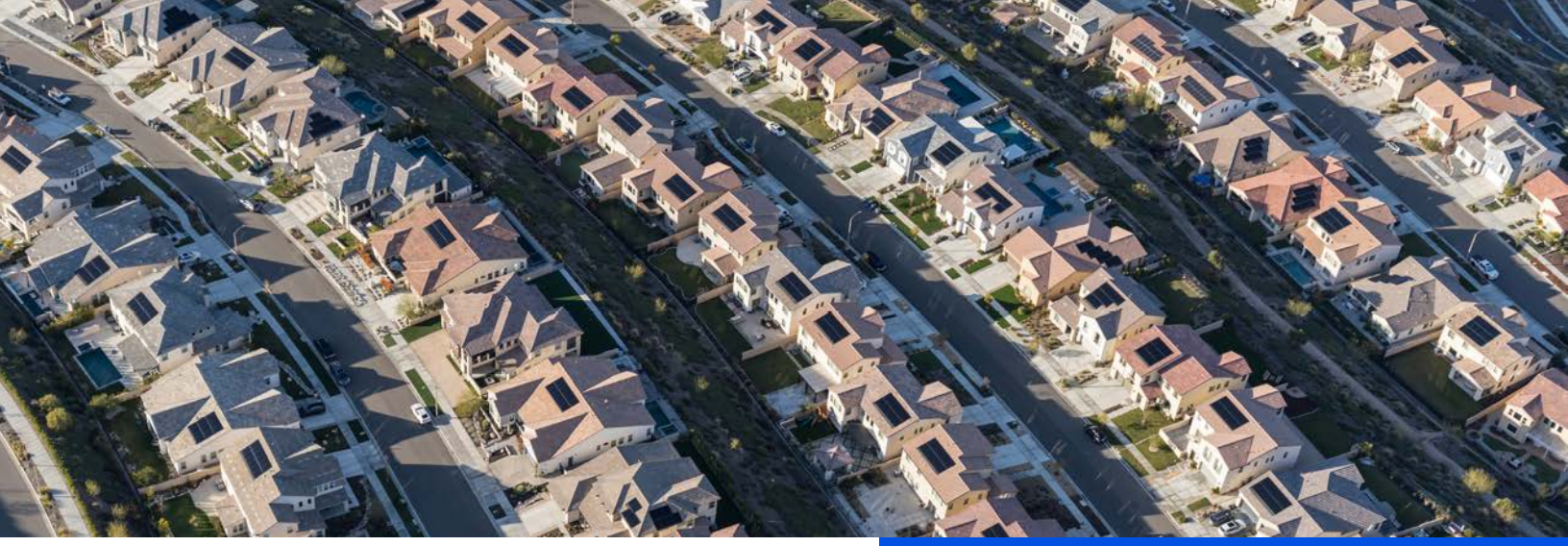
bidgely

LEVERAGING BEHIND-THE-METER INTELLIGENCE

to Better Inform and Achieve Clean Energy Plan Targets

SEPTEMBER 2023



More and more utility companies in the U.S. are committing to reduce emissions and shift to clean energy.

To guide these efforts, many utilities have developed clean energy or carbon plans to serve as a roadmap to guide their clean energy actions, programs and investments to deliver a reliable and equitable carbon-free future for all customers.

Many of these plans have been crafted to align with state-government-level decarbonization policies. In fact, nearly 500 Individual utilities are preparing to meet their state's 100% carbon-reduction requirement. They also typically tie to the bigger picture utility Integrated Resource Plans (IRP).

By necessity, these plans include aggressive targets. Forty-two utilities have adopted a voluntary 100 percent carbon reduction target. Green Mountain Power is pursuing a 100 percent carbon-free energy supply by 2025, and 100 percent renewable energy by 2030. SMUD's goal is to reach zero carbon emissions in their power supply by 2030. Avangrid recently announced plans to be carbon neutral in connection with its Scope 1 and 2 emissions by 2030. PEPCO is seeking to achieve 100 percent renewable energy by 2032. The number of utilities making similar commitments increases sharply for the years 2040 and 2045.

Clean energy plans also call for accelerated progress across utility operational areas to contribute to organization-wide decarbonization goals — ranging from more energy saved through energy efficiency programs to realizing more capacity and resiliency from existing grid infrastructure.

An audit of the plans across the United States yields common goals: reduction of carbon emitting

UTILITY CARBON REDUCTION GOALS BY THE NUMBER

INDIVIDUAL UTILITIES

497 Individual utilities are preparing to meet a state's 100% carbon-reduction requirement

56 Individual utilities have adopted a voluntary carbon-reduction target

42 Individual utilities have adopted a voluntary 100% carbon-reduction target

UTILITY PARENT COMPANIES

28 Utility parent companies have adopted a voluntary carbon-reduction target

26 Utility parent companies have adopted a voluntary 100% carbon-reduction target

Source: SEPA Utility Carbon Reduction Tracker

resources; increases in renewable generation; energy equity; transportation electrification; building decarbonization; maximizing energy efficiency and conservation; reducing peak demand; establishing resiliency standards and guidelines; and adopting advanced communication and digital technologies to better enable demand flexibility.

Achieving system-wide transformation of this magnitude over such a short timeline presents some of the most significant operational challenges utilities have ever experienced. Success will require rethinking business as usual. To remain future-ready, utilities need to embrace new tools and methodologies that enable greater gains from customer and grid programs, optimize the integration and management of renewable generation, and empower more accurate and nimble infrastructure or optimization decisions.

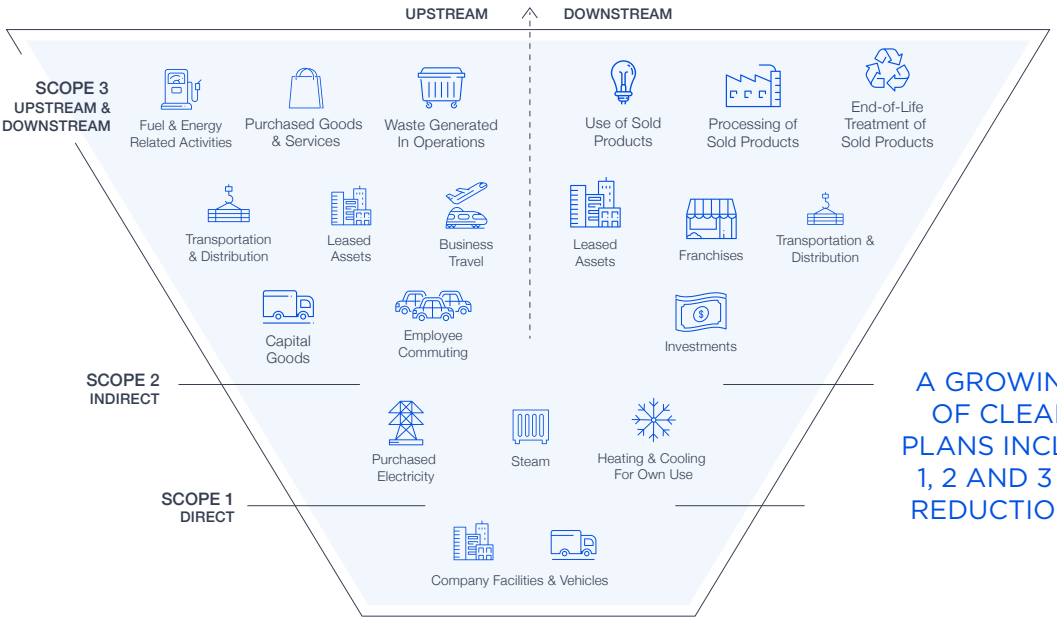
EVOLVING BEYOND SCOPE 1 AND 2 TO TAKE ON SCOPE 3

Though it's common for utility clean energy plans to include a focus on reducing Scope 1 and 2 reductions, a number of utility leaders — including Dominion, Sempra, PSEG, Duke, National Grid and Entergy — are evolving their climate plan goals to include Scope 3 targets. According to a 2019 survey by S&P Global, Scope 3 emissions make up approximately 75 percent of the energy sector's total carbon emissions, and most of those emissions are generated from customer use of the energy that utilities supply.

Potentially adding to this momentum, the U.S. Securities and Exchange Commission (SEC) is drafting new climate disclosure requirements that may include a Scope 3 requirement for public companies to disclose emissions associated not only with their operations and electricity use, but also their customers' and suppliers' emissions.

Successfully reducing Scope 3 emissions requires a new era of collaboration between utilities and their customers in which energy users are better motivated and empowered to make smarter energy decisions.

We believe utility-customer clean energy partnerships start behind the meter, where advanced AI transforms data about how energy is being used into energy intelligence that reduces emissions and



A GROWING NUMBER OF CLEAN ENERGY PLANS INCLUDE SCOPE 1, 2 AND 3 EMISSIONS REDUCTION TARGETS.

makes grids work better. Who is charging an EV? When are appliances running and how are they performing? How much solar energy is being generated and stored?

With true AMI disaggregation, utilities can harness personalized insights to help people learn how to conserve, shift their usage and help supply more clean energy. It also provides utilities with a household-level view of how energy is flowing on their grids, so they can manage the grid home-by-home and community-by-community – from the meter up rather than the transformer down – preventing outages and reliably meeting energy demand while reducing carbon impacts.

PRECISE CUSTOMER ENERGY USE PROFILES AND TARGETING

AI-powered analytics applied to appliance-level energy use make it possible for utilities to design a catalog of programs that target narrowly defined customer segments with personalized and relevant calls to action and hyper-target every program based on appliance ownership, time of use and efficiency.

Consider the strategic value of these AMI-derived customer energy intelligence examples:

End-Use Ownership	Understand exactly which appliances customers are using in their homes
Appliance-Specific Consumption	Identify, isolate, and target customers based on their highest, weekday, on-peak or other appliance-specific load profiles
Appliance Characterization Attributes	Understand each customer's specific appliance attributes including: • All Appliances: detection, estimation, inefficiency, time of use • Heating: fuel type (heat pump), room vs central, size, saturation, short cycling, and degradation • Cooling: type (heat pump), size, saturation, short cycling, and degradation • Pool Pump: single speed vs variable • Water Heating: fuel type, size, timed or untimed, tank vs tankless
Customer Attributes	Identify key engagement attributes for every customer, such as communication preferences, low and medium-income (LMI), program enrollment status and more.
Premise Attributes	Pinpoint premise-related eligibility requirements such as home ownership vs. leasing, single-family vs. multi-family dwelling, etc.
Geographic Characteristics	Identify customers who are in specific geographical areas, such as underserved zip codes.

Personalized communications can then deliver timely and actionable interactions, which provide program recommendations that are hyper-personalized to each customer's specific behavior, appliances and home. By leveraging this hyper-focused approach to segmentation, utilities are able to cost effectively improve carbon-reducing program outcomes, including improved overall participation, total energy savings and demand savings.

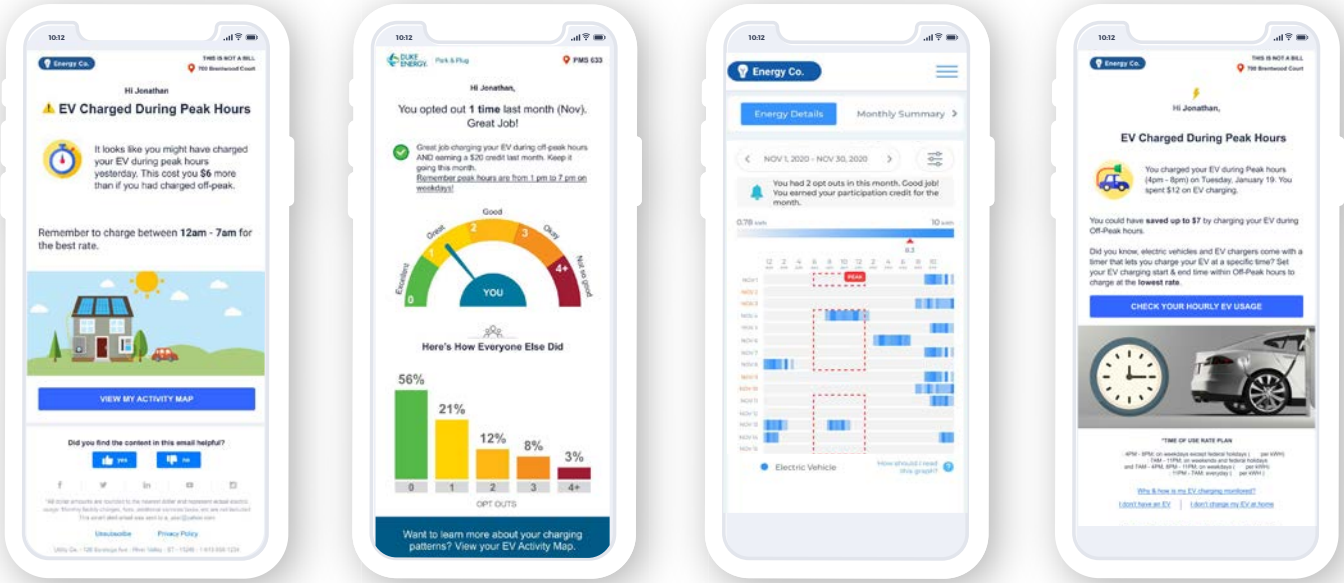
This sort of sophisticated data-driven segmentation and targeting has a significant impact on emissions-reduction strategies common to most clean energy plans, including: transportation electrification, home and building electrification and flex demand.

USE CASE #1: TRANSPORTATION ELECTRIFICATION

Reducing Scope 3 emissions requires shifting EV-related load to align charging with periods of low-carbon generation. This is particularly true in states that have adopted low carbon fuel standards.

Successfully shifting EV load starts with behind-the-meter insights on charging behaviors. The most sophisticated AMI disaggregation technology is able to detect typical hours when EV charging happens, if charging is occurring on a schedule, and monthly EV consumption. When utilities are able to identify those customers who habitually charge on-peak, it's possible to focus load shifting programs on those priority targets to derive maximum grid benefit.

Beyond behavioral load shift, direct managed charging programs will also figure prominently in clean energy planning. Basing these programs upon detailed data about who is charging when, for how long, at what locations and with what charging equipment, utilities are able to manage charging activity to align with renewable generation periods, while also ensuring customers are able to receive the charge they need to maintain customer satisfaction and EV owner participation in managed charging programs.



USE CASE #2: HOME AND BUILDING ELECTRIFICATION

When it comes to decarbonization and beneficial electrification, the looming electric vehicle wave receives most of the attention. But reducing building emissions is an equally critical part of the solution. In fact, energy use by buildings — both residential and commercial — contributes approximately 27 percent of global CO2 emissions, much of which stem from heating and cooling.

Many customers aren't familiar with heat pump technology, including how it has advanced to make it a more viable option for more geographies, the benefits of electric water heating, or the new incentives that make these appliances more accessible — especially in colder climates. In addition, many aren't yet motivated to replace their working HVAC or water heater until their existing systems reach their end of life.

Targeting every household with the same marketing outreach is both costly and inefficient. Some customers, for instance, may already have heat pumps, while others may not use enough air conditioning to warrant an appliance upgrade. Utilities are best served to instead hyper-target their program outreach to distinct precisely defined customer segments, such as those with high-use heating and cooling habits and/or inefficient HVAC systems and water heaters.

For example, when it comes to determining which homes should be targeted for heating programs, understanding which homes have electric heating and which homes have gas or oil-based heating is an essential first step. Similarly, it's essential to understand whether a home has a window, mini-split, portable or central air conditioning. Disaggregated household energy use data makes fuel and appliance identification easy.

In addition, since appliances often start consuming more energy as they approach end of life due to degradation, utilities can also run queries to identify changes in the duty cycle curve or other cycling patterns to identify inefficiencies.

It's important to note that customers who fall into high use or inefficient appliance categories are better electric appliance targets because their payback period will be faster, even after initial rebate amounts. Demonstrating a clear, measurable, short-term and easily attainable appliance ROI is one of the most effective ways to accelerate electric appliance adoption and beneficial electrification.

USE CASE #3: FLEX DEMAND

Clean energy plans require much more precise management of energy supply and demand and greater customer participation to align customer usage with times when low-carbon electricity is supplying the grid.

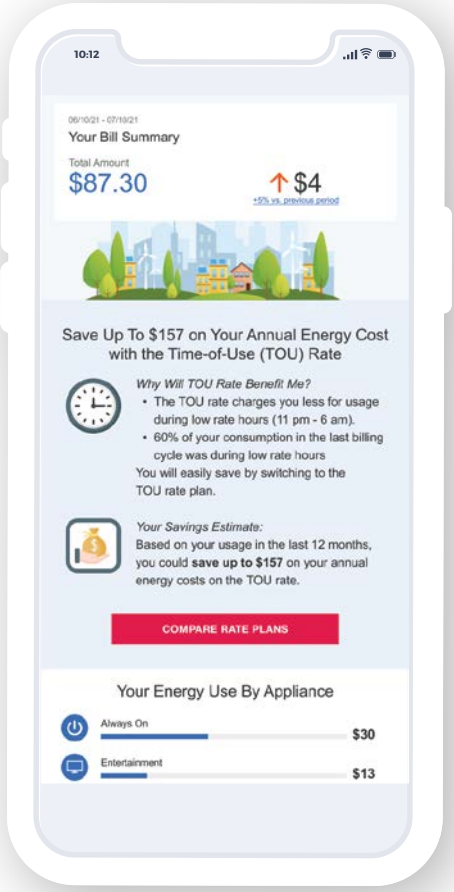
The most successful flex demand programs are built upon behind-the-meter energy use data which reveals the unique load profile and load-shifting potential of every customer, segment, grid asset and geographical region.

Utilities are able to leverage AMI data to maximize the efficacy of the full range of flex demand strategies, including time of use (TOU) rates, Event-Based Behavioral Demand Response (BDR) and EV load management that align customer flexibility potential with grid capacity potential.

Consider load shaping through rates. Whole-home and EV TOU rates will become increasingly critical to establish and maintain system-wide flexibility and resiliency. 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.

After rates are designed, AMI analytics further 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.

By leveraging AMI data, utilities are able to deliver personalized TOU rate education and recommendations that help customers successfully adjust to time-based rate structures and realize positive outcomes immediately and over time. The more enthusiastic and consistent the customer participation in TOU rates, the greater the grid benefit and progress toward clean energy goals.



TAKING STEPS TOWARD GREATER PROGRESS

Bottom-up, behind-the-meter grid intelligence puts utilities in a stronger position to achieve Scope 3 emissions reductions and other clean energy plan targets by positively impacting the success metrics of virtually every use case that contributes to decarbonization outcomes.

Whether it's for precision EV load management, TOU shifting, or delivering a better customer experience – the difference is in the data. Bidgely has long been recognized as the trailblazer in energy disaggregation, having pioneered the science and spent the last decade partnering with energy companies worldwide to refine and perfect our approach.

Our patented AI extracts granular and highly accurate energy use insights from meter data, such as time of use, DER proliferation and EV detection. This actionable intelligence is critical to managing today's grid from both the grid and customer side — empowering both to collectively take steps to more effectively manage energy usage, save money, and reduce carbon footprints.

When it comes to the use cases described above, Bidgely's AI-powered data science helps utilities achieve their goals:

TRANSPORTATION ELECTRIFICATION

Data-driven demand management, load management and managed charging programs require sophisticated disaggregation capabilities. 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. 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 required.

The advanced data science foundation of our EV solution is empowering utilities to develop highly targeted transportation electrification programs that more successfully and economically engage EV drivers as grid resiliency partners.

HOME AND BUILDING ELECTRIFICATION

As utilities encourage heat pump adoption to increase efficiency, grid load simultaneously increases every time a fossil-fuel space or water heating appliance is upgraded to electric. With so much in flux, energy providers need appliance-by-appliance grid insights to maintain reliability, plan for future infrastructure and keep decarbonization plans on track.

Bidgely's energy intelligence expands and improves the accuracy of the insights energy providers are able to draw upon. Our patented data science makes it easier to achieve home and building electrification goals on or ahead of schedule through hyper-targeted and personalized customer engagement, more accurate electrification-related grid forecasting and more successful demand side management.

FLEX DEMAND

The most successful flex demand programs are built upon behind-the-meter energy use data which reveals the unique load profile and load-shifting potential of every customer, segment, grid asset and geographical region.

Bidgely's Flex Demand Solution brings together TOU engagement, Event-Based Behavioral Demand Response (BDR) and EV load management strategies that leverage behind-the-meter data to value, design, and execute flexible demand programs that align customer flexibility potential with grid capacity potential.

TAKING THE NEXT STEP

To learn more about how you can leverage advanced data science to successfully achieve your clean energy goals on a faster timeline, email **info@bidgely.com** to schedule a meeting. We look forward to learning more about how we can help you realize greater carbon reduction gains from your customer and grid programs, optimize the integration and management of renewable generation, and make more agile infrastructure optimization decisions to facilitate a clean energy future.

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