

A clear, concise EV vision for the road ahead

A comprehensive strategy for
the age of electric vehicles



Do you have a strategy in place to tackle the EV challenge and create opportunity?

Electric vehicles
(EV) are coming

IEA predicts ...
125 million EVs on
the road by 2030

EVs offer significant
Revenue Growth
Opportunities for
Utilities

~\$540 annually per EV
increase in revenue

When managed properly,
EVs can transform from
a network reliability
concern to a major benefit



Disruption: Rethinking the customer-to-grid relationship

This document serves as a roadmap as you embark on this new era of serving the prosumer, the EV owner.

Disruption is all around us in the utility industry, this has been well established. The proliferation of distributed energy resources and electric vehicles, the sensorization of the grid and increasing sophistication of AMI programs, the constantly connected customer, all of these are sources or symptoms of disruption. But to truly understand the disruption, and to create an environment in which you are prepared to not simply survive, but thrive within the disruption, we must understand how disruptive forces are reshaping our industry.

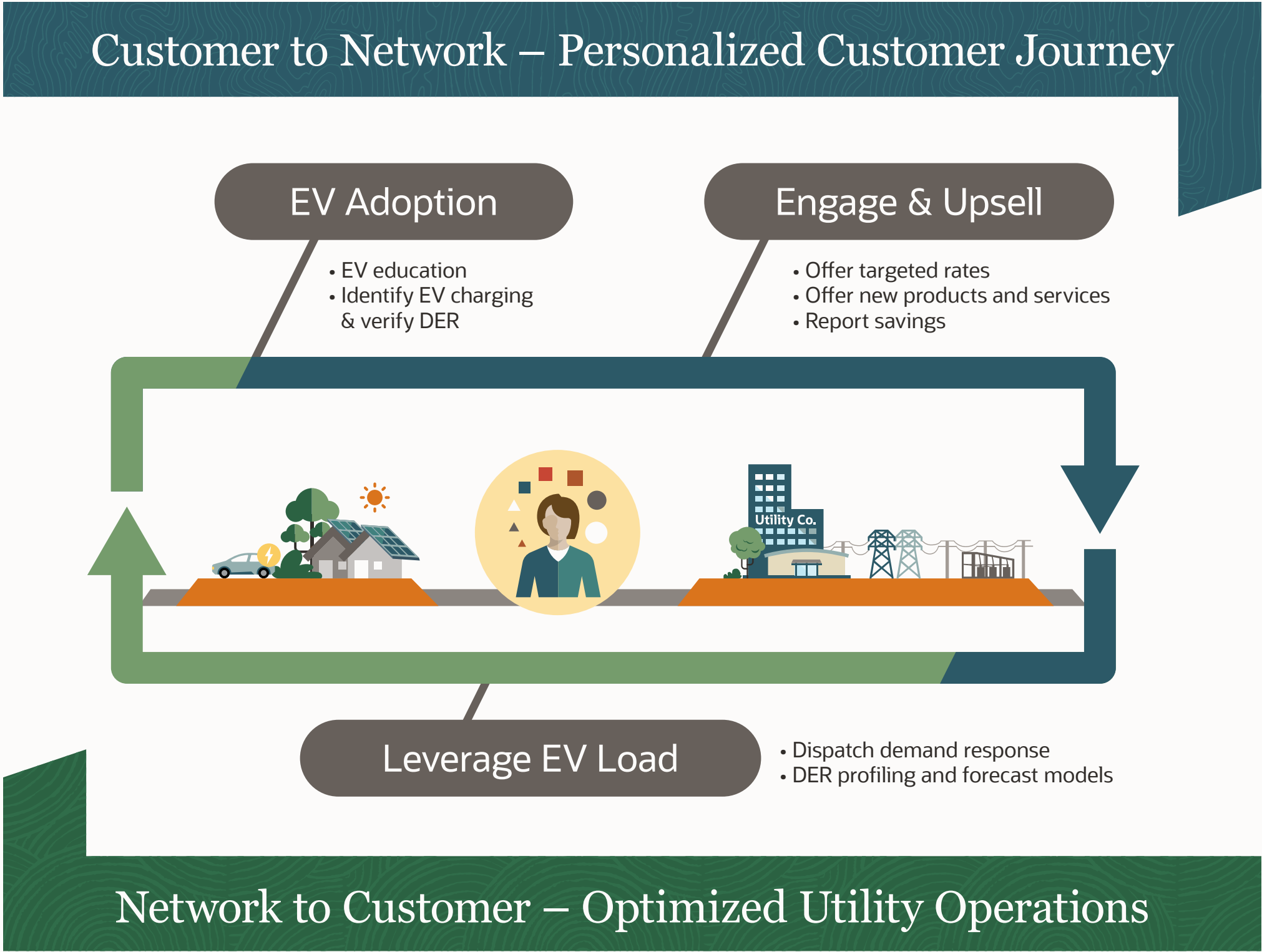
For many decades, the utility industry has run in silos. Customer operations and network operations in particular, two critical pieces of the utility business, have run parallel, rarely intersecting.

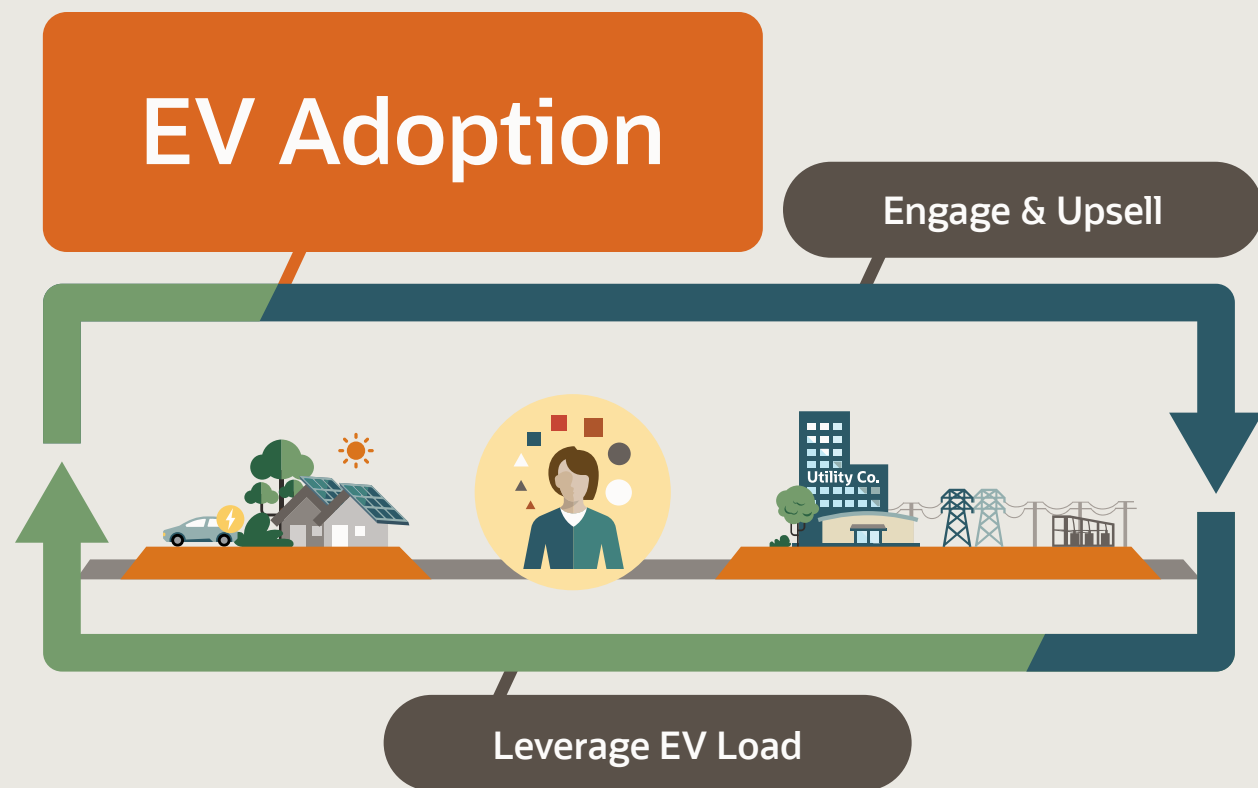
But those disruptive forces are changing this shape forever, pulling network and customer operations together, connecting in a single continuous loop, centered around the customer. In this new era, utilities' customers are also now their generators, and demand management is inextricably linked to customer engagement. There is a great deal of value that will be created by this change.

As Electric Vehicles (EV) pop up across your grid, we have a perfect opportunity to reframe how we think about the interaction between customer and network.

As more of your customers purchase EVs, your network becomes increasingly distributed and serving those customers can seem complex. With the impact they can have on the health of your network, their place in the grid must move from the grid edge to the center of your ecosystem. In this new ecosystem, the relationship between you and your customer, between customer engagement and demand management, can no longer be approached separately – optimization of the customer journey and the grid must be synchronized.

Comprehensive strategy for the complete EV lifecycle





Provide EV education

1. Actively target consumers for EV purchases
2. Offer tools for customers to evaluate options and weigh efficiency benefits
3. Offer calculator to share bill impact to prospective EV owners

Benefit

- Increase revenue by helping customers make the more efficient car selection
- Build customer trust in the utility as an EV advisor
- Improve visibility of EV trends through early engagement

Identify EV charging & verify DER

1. Identify EV charging behavior with Machine Learning algorithms
2. Pinpoint likely EVs on your network
3. Engage customer to confirm presence of EV
4. Update appliance disaggregation in home energy report

Benefit

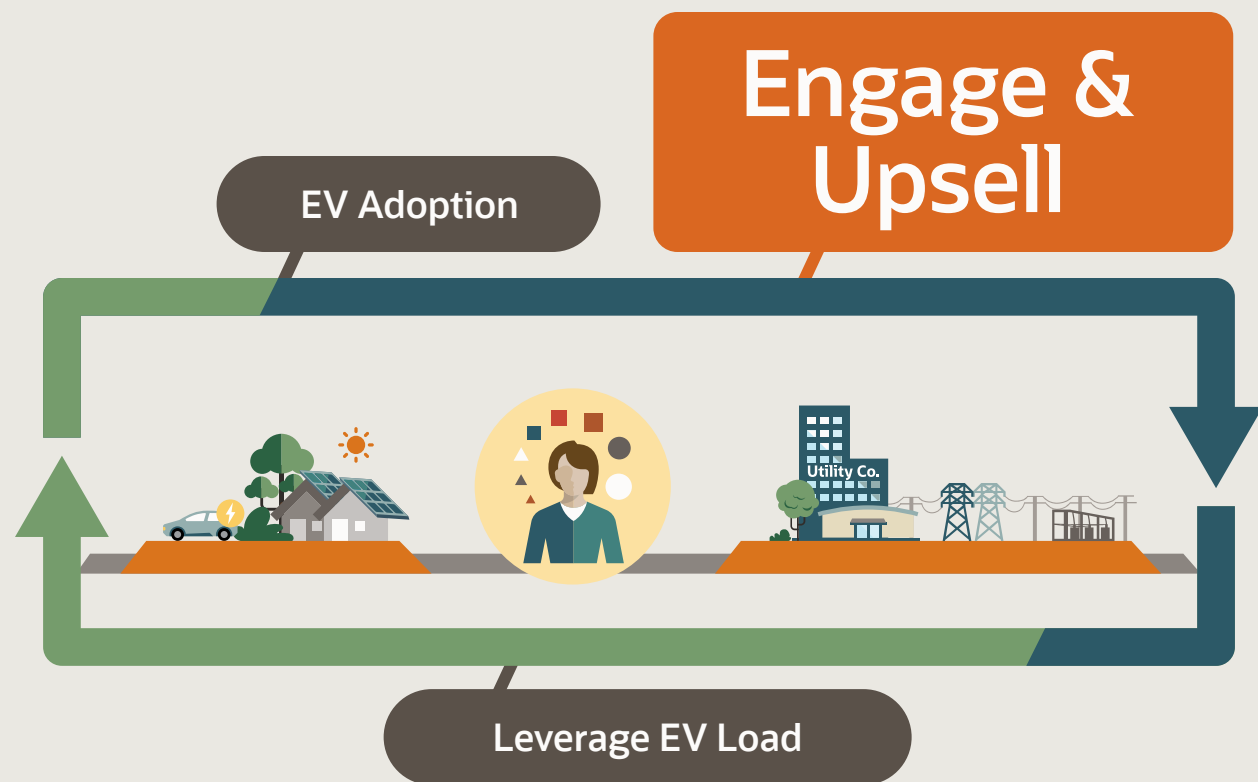
- Improve customer 360 view
- Build customer confidence in personalization of energy guidance
- Improve visibility of DERs on network
- Ability to proactively address grid congestion caused by EVs

EV Adoption

Identification: Tapping deep machine learning, utilities can identify the presence of an EV, show the time and frequency of charging, and disaggregate the energy being consumed from the vehicle with advanced metering infrastructure (AMI) data. With highly trained algorithms, this machine learning insight can pinpoint things that remain indistinguishable to the human eye. For instance, a newly installed pool pump may make a whole-home load curve look astonishingly similar to that of an EV owners, but data science can't be so easily fooled. Machine learning algorithms can identify the signatures that make the EV load unique, and help us isolate only that load.

Confirmation and Education: It's always a good backstop, and a great conversation opener, to reach out to suspected EV owners and verify your intelligence. After identifying EV charging across the network, utilities can confirm with EV owners through normal channels, like email home energy reports. By indicating that you suspect an EV has been charging, and offering up valuable, real-time updates to the home energy report, you can maintain the position as an energy advisor, building trust, and offering positive reinforcement for active engagement with your utility. All of these set the stage for more effective engagement with these customers down the road.

Adoption: Utilities should also consider playing a more active role in educating customers on the benefits of Electric Vehicles from both an environmental and cost perspective. As utilities look for new revenue opportunities, EV education and associated services are a great place to focus. Utilities should start to offer EV cost calculators, car comparisons and incentives to drive adoption.



Rate program

1. Offer rate comparison tools to customers
2. Leverage chatbot to engage, initiate conversation, and handoff to live CSR
3. Arm CSRs with data-driven “Next Best Actions” aligned with home energy report recommendations
4. Offer EV Rate Coach program for educating EV customers

Benefit

- Influence network load shaping with targeted behavioral demand side management
- Ensure consistent customer experience across channels
- Improve CSR resources and experience
- Efficiently serve EV customers

Report savings

1. Deliver personalized home energy reports
2. Report detailed energy savings through rate plan
3. Promote additional programs and savings opportunities

Benefit

- Improve engagement with tailored EV experiences
- Continue to build confidence in utility as an EV and energy advisor
- Improve scale and impact potential of grid programs with continued targeted engagement

Offer new products and services

1. Offer parallel products or services like home energy audits
2. Create hyper-targeted offerings based on detailed energy profile and needs
3. Pilot new programs for EV owners

Benefit

- Create new revenue opportunities for utilities
- Make the buying experience seamless for EV users
- Maintain primary contact with customers

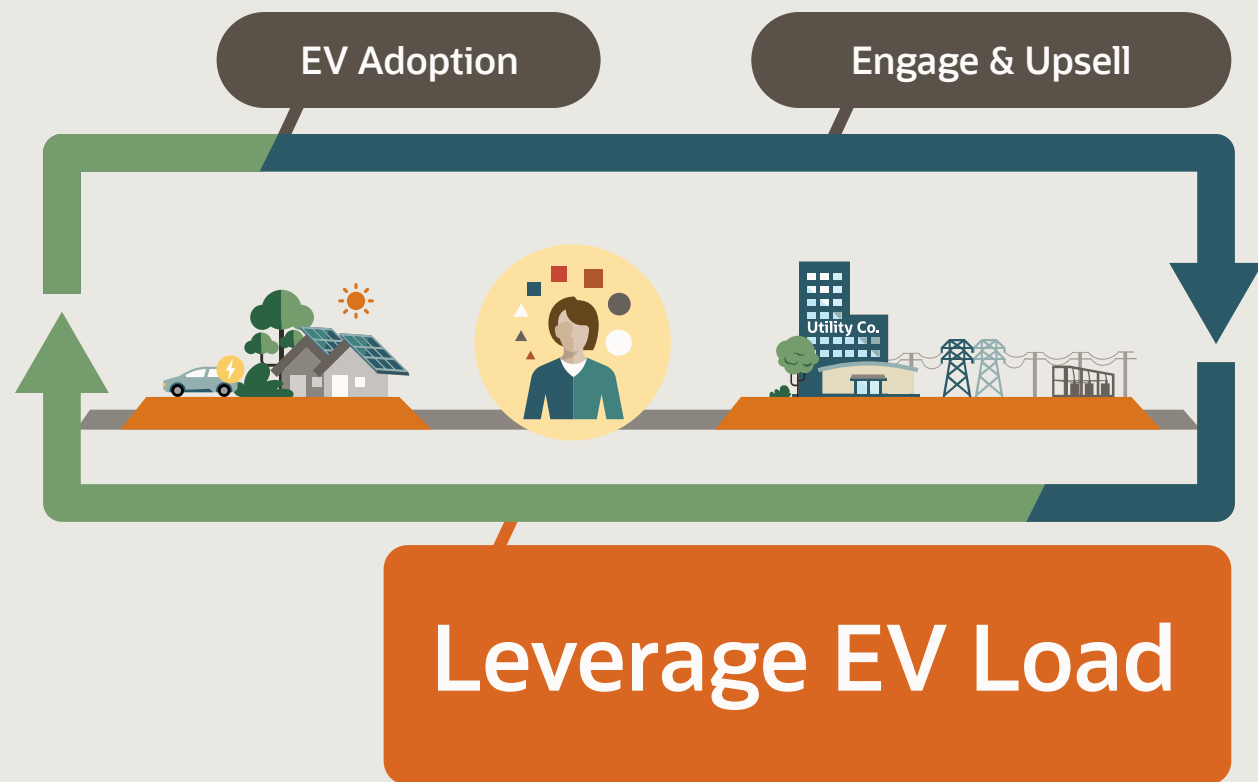
Engage & Upsell EV Owners

Targeted Rates and Programs: Customer adoption of EVs opens up opportunities to engage with customers in a more personalized way. But without a consistent approach and clear information, it also can create confusion for customers. Customers may not fully understand or anticipate the impact on their monthly electric bill. Utilities need to ensure that customers are on the right rate and have proper guidance on when to charge their vehicles to minimize their bill impact.

Utilities should provide personalized digital engagement such as bill comparison, rate engagement, home energy reports and high bill alerts to engage EV customers and improve customer experience – but most importantly avoid surprising the customer with an unexpected outcome. These digital experiences should include assistance from chatbots to enrich the experience and ensure the customer gets their questions answered efficiently, and in their channel of choice. For example, chatbots can simplify the web experience for a customer looking for more information on rates by ensuring EV customers get on the right rate and by providing detailed guidance on the impact to their bill and how they can take advantage of potential off peak pricing.

Tips and Insights: Getting customers on the right rate is important but engaging the customer afterwards to ensure they are maximizing their savings is critical. Utilities should consider offering digital tools and outbound communications to guide customers throughout their service. Offer customers an EV Rate Coach Program that sends them weekly updates and actions to take. Share their savings to date and how they compare to previous periods and to their neighbors that also own EVs. Leveraging behavioral science you can engage with customers in a relevant and personalized way that is meaningful and drives action.

Through personalized communication such as EV Rate Coach engagement, you can continue to build trust and offer valuable guidance to help your customers reduce their electric bill. But even more than that, you now have an open line of communication with the owner of a DER out on your network. As proliferation of EVs increases across your network, this will allow you to tap into these owners and guide their energy behavior to support grid optimization programs.



DER profiling and forecast models

1. Use Machine learning to model EV customer profile and network impacts
2. Integrate EV load models into complete network model
3. Leverage network intelligence to forecast potential peak challenges and identify demand response opportunities

Benefit

- Improve network congestion analysis
- Automate network optimization during increasingly complex scenarios
- Employ low cost options for shifting load and managing grid
- Act quickly and leverage all resources available to protect network reliability

Dispatch demand response

1. Call Localized Peak Time Rebate event using Opower Behavioral Demand Response
2. Give customers insights and behavioral nudges through all channels, including digital assistants
3. Create feedback loops and direct customers to automation to increase demand response effectiveness

Benefit

- Improved cost/benefit ratio for demand response
- Improved customer satisfaction through omni-channel engagement
- Leverage EV owners as a localized network reliability resource

Leverage EV Load

DER profiling and forecast models: Turning to the network management side next. Now that you know where your customer EVs are, your network operations team can truly visualize and manage the entire network, from utility-owned assets to customer-owned assets.

Again bringing in the power of machine learning, network teams can more accurately model broad customer energy profiles and network impacts, including EV and other DER. In an ADMS built for the complexities of this customer-centric grid, you can combine these models into the comprehensive network model for a full, accurate picture of what's impacting your network in real-time. With this full picture, network operators can improve network congestion analysis, tap into network automation capabilities even in increasingly complex scenarios, and this is where the magic begins in the customer-to-grid story of EVs.

- ✓ EV owners signed up for EV rates and engagement programs
- ✓ Comprehensive model of all network assets including DERs
- ✓ Network-wide demand response program ready for action.

This unlocks low cost options for shifting load, managing grid, and mitigating load challenges as they arise.

Leverage EV Load (cont.)

Dispatching Demand Response: EVs provide an opportunity to unlock low cost options for shifting load, managing grid, and mitigating load challenges as they arise. Getting EV customers to join forces with your network operations team is the next step.

Forecasting a particularly high load tomorrow due to a higher than normal temperature forecast, you can now mitigate impact by enlisting your army of engaged EV owners. Using your comprehensive network model, your network operations team can isolate the region that would benefit from a behavioral demand response program (e.g. Peak Time Rebate Event), and your customer engagement program kicks into action, sending communications to customers in the identified neighborhoods.

Targeted e-mails are sent to customers, giving customers a call to action to save electricity and earn money during an Energy Savings day - personalized for each customer. An Energy Savings Day gives customers the opportunity to earn some money by reducing their energy usage during peak hours - 1pm-7pm in this case.

Personalized tips are targeted for the customer to educate them on relevant ways to save money, because you know the EV owner. They receive guidance to shift when they charge their electric vehicle.

Utilities can even tap into emerging channels for customer communication, like in home digital assistants. Your team can directly and automatically reach out, via Alexa or Google Home, prompting customers with the targeted information they need to take action for tomorrow's Energy Savings Day. A Digital Assistant can make adjusting a thermostat or changing EV charging time as simple as a reply: "Google, please change my electric vehicle charging time to 9pm."

After the event has concluded, utilities should send customers an e-mail that walks through their earnings, along with ways that they could save even more money. You can introduce additional value add services here, like a home energy audit, or perhaps an EV charger upgrade, to both keep customers engaged and satisfied, and to give you additional access to diverse revenue streams.

Personalized Customer Journey

Let's take a closer look at what that experience could be, should be, for EV owners across the network. To tap into the abundant opportunities for deeper engagement, and stay ahead of the equally abundant challenges EV proliferation can present, a proactive approach, built for the EV customer, is critical. Each touch point, every bit of energy advice must be tailored to further nurture the relationship between EV owner and utility.



Meet Stacey Miller

Stacey is one of your customers, a rare millennial homeowner with a young family. Environmentally conscious, after a recent promotion at work, she celebrated by upgrading to a sweet new ride: a Tesla Model 3.

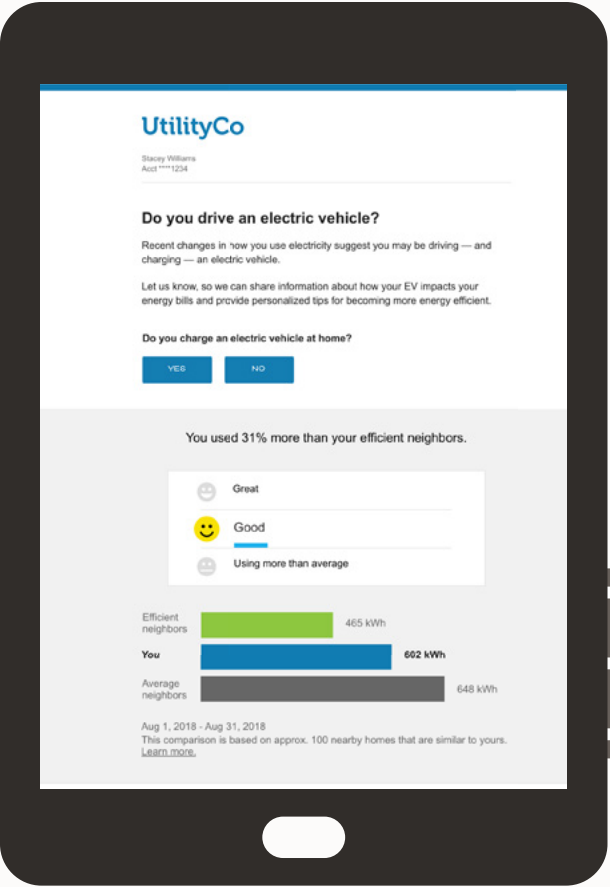
Stacey brought her car home and showed it off to her neighbors, zoomed around the neighborhood with her kids, and even offered to drive a few of her friends on Mom's Night Out. But never once did she think "I should really call my electric utility and ensure they're aware of this new load I'm adding to the grid."

This can present a real challenge for utilities. Not only will grid operators be blind to this new load, customer service teams won't have the intel they need to tailor Stacey's experience.

Working in the dark is the first problem we need to solve.

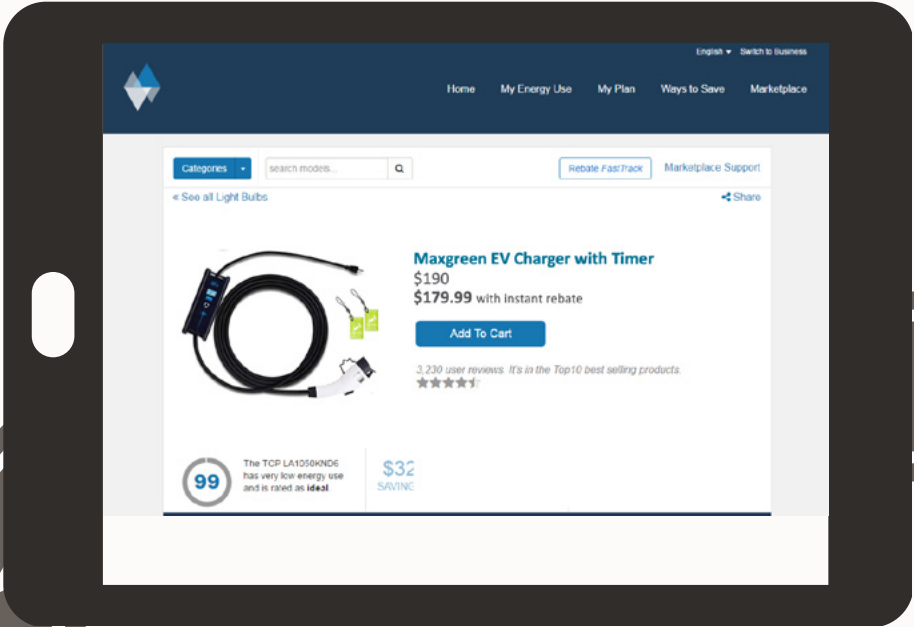


Stacey purchases an EV to celebrate a promotion

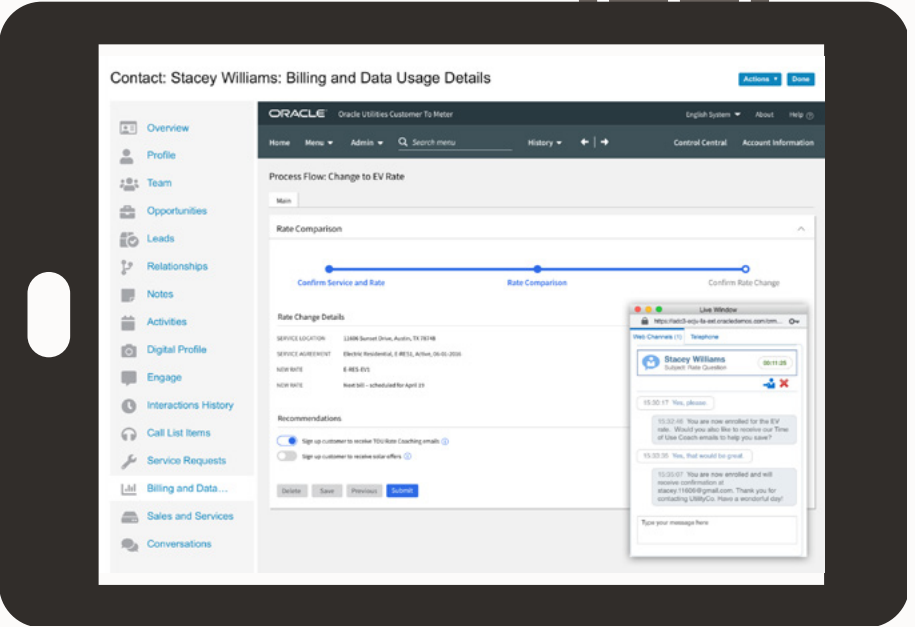


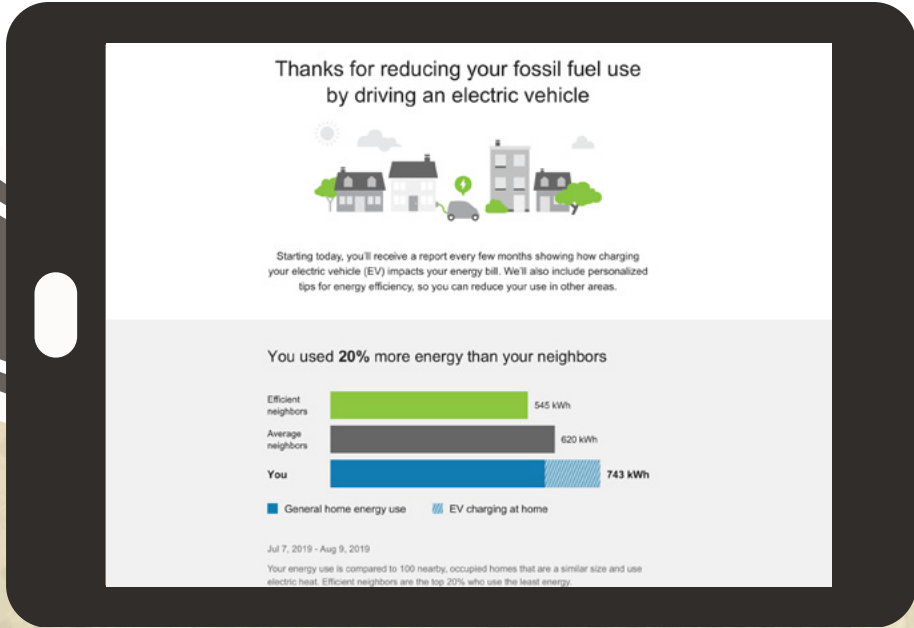
The utility detects Stacey's new EV, and suggests she adopt an EV-specific rate in her home energy report

Stacey receives a recommendation to buy an EV Charger with timer from the utility marketplace. This will allow her to charge in off peak hours

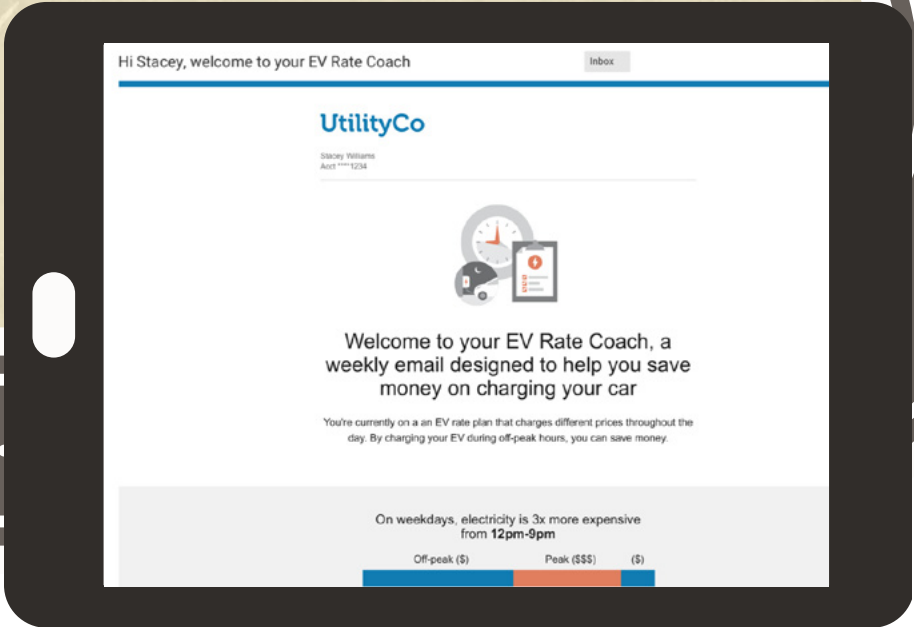


Stacey reviews how the new rate would change her bill with an agent, and makes the switch

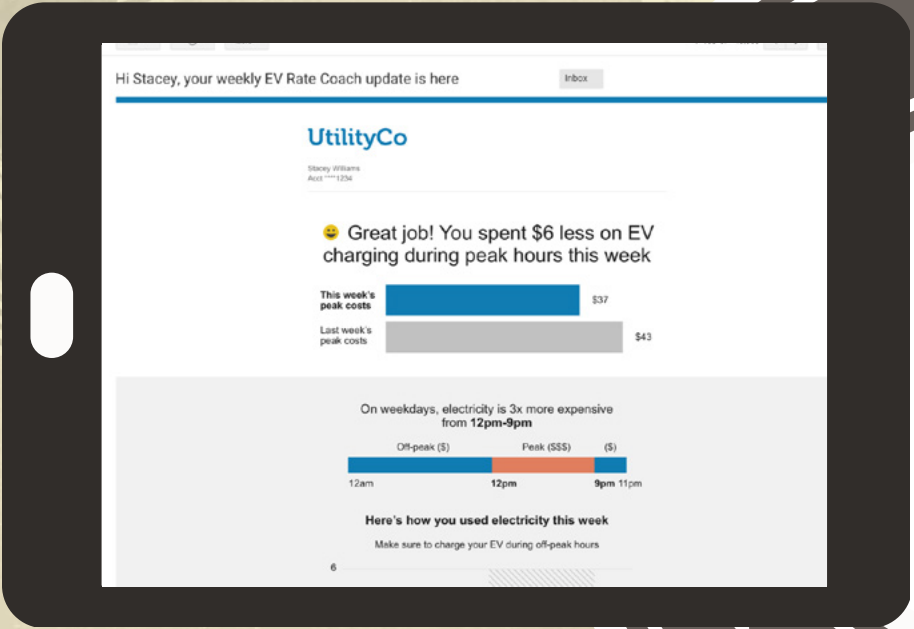




Stacey receives a home energy report on how she is achieving her energy efficiency goals



Stacey opts in for weekly rate coaching on how to save money on her new Demand Response rate



Stacey receives detailed information on the impact of her EV on her bill and advice on how to lower

Stacey continues to receive ongoing tips to change behavior to make the most of the new rate

Stacey receives alerts when her bill is going to be higher than normal

What you spent on electricity

It is more expensive to use electricity in peak hours than off-peak hours.

\$	Off-peak	12am - 11am 11 hours	\$12
\$\$\$	Peak	5pm - 8pm 3 hours	\$35
\$	Off-peak	8pm - 12am 4 hours	\$11

Based on your electricity use between May 18, 2019 - June 6, 2019 excluding weekends and holidays.

SEE MORE ELECTRICITY TRENDS

Hi Stacey, an Energy Savings Day is scheduled for tomorrow

Inbox

Ways to Save on Energy Savings Days

Charge your electric vehicle during off-peak hours
Plan ahead and charge your electric vehicle (EV) fully the night before a peak day event. Remember to unplug your EV during peak hours. If your EV model allows you to schedule charging, make sure to set it to charge during off-peak hours.

Use a virtual home assistant to manage energy
Controlling your energy use is more convenient than ever with hands-free virtual home assistants. They can be used to control some of the largest energy consumers in your home such as your AC, heating system, and lights.

Use a smart thermostat to automate your off-peak savings
Use a smart thermostat to control your home's temperature. Some models let you share your rate plan with the thermostat company so the thermostat will automatically cut down on heating or cooling during peak hours.

SEE MORE WAYS TO SAVE

You used 31% more than your efficient neighbors.

Great

Good

Using more than average

Efficient neighbors

465 kWh

You

602 kWh

Average neighbors

648 kWh

Aug 1, 2018 - Aug 31, 2018
This comparison is based on approx. 100 nearby homes that are similar to yours.
[Learn more](#)

Stacey receives a year in review highlighting her savings



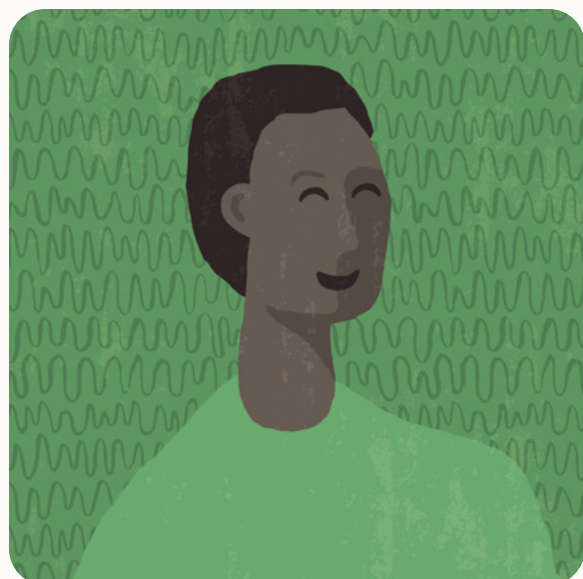
Tomorrow, EVs will be another DER

In the near future, Stacey's electric vehicle will carry her places she needs to go and be a valuable asset for her utility (one they don't have to manage the lifecycle on).

Picture a scenario where Stacey rides to work and parks in a charging station. On this summer day, the temperature is rising, and so is power demand throughout the service area. With machine learning, and a modernized grid, the local utility taps into a small fleet of charging Evs, including Stacey's. As the EVs reach an acceptable charge, the utility begins to pull some current back, bringing a virtual plant online during peak period.

The EVs have enough charge to reach destinations later that day, and the utility delivers electricity without buying expensive power from a merchant plant. (In this way, this utility tale has a very happy ending.)

Stacey progressed from an uninformed utility customer to fully engaged advocate and key part of a demand response team in this story. This evolution of an EV owner can parallel the evolution of EVs overall for every utility—with the right tools and a little outreach.



“

With solar, wind and storage technologies now constituting 90 percent of investment interest, the road is paved for deeper decarbonization of the electricity sector. The case for transport electrification has never been stronger, and the rapid growth in investment interest from car manufacturers is a confirmation of the future consumer demand for EVs. Utilities are now faced with an increasingly clean and decentralized system, and they need new data and analytic packages to support a new planning paradigm.

Ben Kellison

Director, Grid Research

Wood Mackenzie Power & Renewables

Source: “Utilities Test Drive Analytics from Oracle to Manage Influx of Electric Vehicles,” [press release](#), 5-29-19.



More available information:

- [Oracle customers testing analytics for EV adoption](#)
- [AMI-based EV detection & disaggregation](#)
- [Oracle Utilities offers EV charging intelligence](#)
- [Oh the places you'll go \(in your EV\)](#)
- [Why your utility needs to know the whens & wheres of EVs right now](#)
- [Modeling your perfect customer-centric grid? Impossible without DER planning](#)
- [A short list locally on how to make EVs happen globally](#)
- [Tracking the digital journey of Indian utilities from digital tech to the conscious customer](#)
- [Your best recipe to own disruption](#)
- [Introducing Oracle Utilities Analytics Insights EV Detection/Disaggregation](#)

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