

Electrifying Successfully

Customer Intelligence Analytics Will Mean the Difference

BY AUSTIN WHITMAN

Electric load growth has the technical potential to provide customer benefits, reduce carbon emissions, and grow utility revenues. Not all electrification is created equal, however. Without attention to the details, programs will achieve sub-optimal outcomes.

Electrification can be beneficial or strategic. Or it can simply produce uncoordinated and costly load growth. The difference comes down to how well we estimate the costs and benefits and use that information to promote electrification to customers and regulators.

Fortunately, utilities have a head start. Customer intelligence analytics, long used in energy efficiency programs, will mean the difference between coordinated load optimization and uncoordinated opportunism. Customer intelligence will also be key to achieving customer adoption at a pace that delivers benefits sooner rather than later.

Electrification is a familiar concept. During the postwar boom of the 1950s, utilities joined together to encourage households to invest in new technology to bring convenience and comfort into the home. This move was also intended to drive load growth to utilities.

Then, the goal was replacing manual labor with electricity. Now the goal is ending direct consumer use of fossil fuels in cooking ranges, gas furnaces, forklifts, automobiles, and so on. Electrified technologies can utilize excess grid capacity, improve a utility's load factor and reduce

distribution charges, while supporting decarbonization goals.

The Brattle Group recently assessed the potential upside for electric utilities, pegging a deep electrification scenario at seventy-five percent sales growth by 2050. For an industry whose sales had been forecasted to stay flat or decline, that's a welcome alternative.

Utilities in recent years have often sought to shore up revenues by asking for regulatory support. Rate cases, rate design, grid modernization, and performance-based ratemaking introduce new ways to diversify revenues and secure capital investment plans.

Now, utility commissions in California, Maryland, Massachusetts, Ohio, Rhode Island, and elsewhere have explicitly included electrification in grid modernization proceedings. Utilities from Southern



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California Edison to Portland General to Georgia Power have launched strategic plans to increase electricity use in their service territories.

Viewing deep electrification as a critical element in meeting its ambitious carbon emission reduction goals, the state of California has conducted numerous potential studies. EPRI has similarly conducted potential analyses on behalf of numerous utilities.

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From charging stations to cooktops, targeting load growth can generate a win-win-win for utilities, customers, and society, if it is done right. This means prioritizing electrification that achieves load growth when and where it reduces costs.

As they launch new programs, utilities will want to understand how electrification in combination with energy efficiency could save money for each of their customers. This insight should be combined with information about the costs and benefits to the distribution grid to shape the design of programs.

From the customers' perspective, having a single view of efficiency and electrification opportunities greatly enhances their decision-making process. Customer marketing will include bundles of offers for combinations of load growth and load reduction measures that capitalize on the available benefits.

Data helps translate changes in demand and consumption into a simple estimate that is accessible and illustrates the net effects of possible actions.

Simple analysis of load growth and reduction potential can be done on spreadsheets to a limited extent. But as utilities push toward scale, that method is insufficient to tailor outreach to every individual customer. Data from electricity meters, particularly advanced meters, provides a window into building-level energy usage and speaks volumes about the potential of a building.

For example, data analysis can identify buildings with inefficient air conditioners that would be attractive targets for early replacement. Further analysis of wintertime heating loads can isolate buildings with electric resistance heat, propane, or fuel oil.

The remaining set of buildings could be good candidates for heat pumps to reduce electricity use in the summer and add wintertime electric load in place of fossil energy. Analytics can normalize the



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net energy impacts and produce a unified narrative about how the retrofit saves money for the customer, reduces carbon emissions, and adds to utility revenues.

Similarly, some buildings have high peak-to-average load ratios that add inefficiency and cost to both the customer and the distribution system. Data analysis can sort hundreds of thousands of buildings based on this indicator and identify buildings that might have electrification potential.

Then, analytics can identify opportunities to reduce absolute peak. Finally, the utility can use the analysis to educate customers about the optimal times of the day

to charge an electric vehicle or a forklift to improve the ratio.

This combination of activities reduces the customer's demand charges, increases system efficiency and asset utilization, and replaces carbon-emitting end uses with zero-emission electric technologies.

Because of the large size of the light duty transportation market, and the possibility of investing in service infrastructure and charging stations, every utility looking at electrification is weighing an electric vehicle charging program as a top priority.

As lighting measures are to energy efficiency, so charging stations are to electrification: high-potential, ubiquitous, low-hanging fruit.

And yet, a decade of experience with energy efficiency programs has shown that there must be life after lighting. What is needed are measures to sustain deeper market penetration once the low-hanging fruit is exhausted or reaches a market or regulatory barrier.

Energy providers should design strategies to incorporate an array of measures to round out their service offerings.

Providers can expect to run into familiar challenges when they sell

electrification-related products and services. Like all energy technologies, rates of uptake of electric end-use alternatives will be limited by lack of access to information, unwillingness to invest capital, and a poor understanding of the value proposition.

Customers don't know what technology options exist and are reluctant to spend the time researching them. They often have higher priorities for their capital and aren't set up to crunch numbers that detail energy use. The easiest course is to take no action.

Utilities can leverage their market position and vast amounts of customer data to bring clarity into the decision process. The use of data analytics can also relieve the pressure on utilities to illustrate customer benefits from electrification when they go to seek regulatory approval for cost recovery.

Utilities should pursue the "no regrets" options first. Within existing energy efficiency programs, some measures, such as heat pumps, meet existing program standards for cost-effectiveness and provide electrification benefits.

These measures provide a foothold into selling a longer list of electrification technologies. The experience residing with the account managers and sales teams will be valuable as utilities pursue this growth.

Following are some principles for outlining an electrification program strategy.

Clear customer wins are a necessary component, driven by customer return-on-investment. Program design should maximize the value for customers. In some cases, this may mean cannibalizing sales of natural gas. Utilities should be prepared to understand when that is necessary.

Utilities should also work on messaging and engagement tools to communicate the customer benefits, and help customers envision how electrification will change their day-to-day lives. They will

need to test different customer incentives to find the sweet spot.

Utilities should develop broad-based integrated marketing programs to present information to all their customers, illuminating their full potential to improve their energy and carbon footprints with a goal of reducing energy costs.

Clarifying the value potential for a suite of integrated measures will take the guesswork out of the decision process. Utilities ought to make information easy to access both through self-service channels and direct one-to-one sales conversations.

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Electrification is an opportunity to diversify service offerings and provides fertile ground for revenue generation. Utilities should examine several options and choose a strategy that maximizes benefits across potential service areas, such as investing in make-ready infrastructure, providing financing services, owning electrified assets, and providing service contracts.

Rate offer alignment is critical. Customers will wonder how greater electricity use will affect their overall electric bills. Utilities will want to provide guidance to customers about the bill impacts and offer alternative rate structures that mitigate cost increases and provide incentives to limit peak energy use.

It's important to put customers at the

center of distribution planning. Distribution utilities of the future will operate platforms to coordinate and dispatch a multitude of energy sources and uses. Planning for these platforms should shift from a control room view of the system to a grid-edge view. Future distribution system optimization will start with the load curve of each individual customer.

A regulatory strategy is also key. For regulated utilities, the conversation with regulators about the costs and benefits of electrification programs is inevitable. These conversations will go better with facts and data about the potential for electrification to deliver well-rounded benefits and cost savings.

Industry innovation needs to continue. Electric end-uses have become more efficient than their fossil-fueled alternatives, due to advances in technology. Utilities can support continued industry innovation up and down the value chain, from production to end use, by piloting technology and designing programs that are adaptive to newly emerging products.

Lastly, successful programs will rely on a larger trade ally network with participation from more than the traditional trade allies. It will be helpful to map the landscape of vendors of complementary technologies and consider partnerships to conduct joint marketing.

An analytics-enabled electrification program can count all the benefits of electrification for specific buildings across millions of customers, to help ensure there are many benefits to go around.

From the customer's perspective, electrification offers a direct efficiency gain and cost savings of twenty-five to thirty percent over fossil fuel end uses. Functionally, electric devices can improve on the safety and performance of alternatives. Reducing on-site air emissions, for example from diesel-powered vehicles, can also be an attractive proposition.

Margin growth is an immediate and obvious benefit to utilities. Although decoupling policies have reduced the volumetric incentive for many regulated utilities, fifty-six percent of commercial sector energy sales in 2016 were still subject to a throughput incentive, meaning that each utility delivering this energy could boost its profits by selling an additional megawatt-hour.

Utilities can also count other benefits. Load growth, even under decoupled rate structures, reduces the fixed costs of existing infrastructure. Cost savings can be passed through to customers. Many states have rules allowing utilities to reinvest savings in the grid to improve service quality and expand their regulated rate base.

Lifecycle carbon emissions from electric end uses will tend to be lower than fossil-fueled alternatives. This is especially true as the electric grid itself continues to decarbonize. Electric devices become cleaner over their lifetime, an

improvement that gas- or diesel-powered equipment cannot deliver.

As utilities become increasingly focused on customer strategies, the issues of customer satisfaction and mindshare will have growing importance. The energy customer of the future has choices and alternatives, and by capturing a greater share of their energy use, utilities can increase their footprint and value to their customers.

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From the grid perspective, Rocky Mountain Institute has written extensively on the importance of so-called flexi-watts: that is, controllable load that facilitates intermittent resource integration. A good example of this is PJM's pilot with electric water heaters, which

allowed the grid operator to modulate system load remotely to maintain voltage control.

Controllable load can also factor into profitability for energy retailers who use energy management to mitigate their own price risk and improve their offers to customers.

Finally, electrification can eliminate the multiple-fuel hurdles that often limit energy efficiency programs. For example, it can be difficult to administer rebate programs when efficiency investments reduce both electricity and natural gas usage. Electrification creates a single target, kilowatt-hour reductions, for efficiency programs.

A successful electrification program should pursue each of these benefits and establish priorities based on actual customer energy use and behavior. As with energy efficiency programs, customer intelligence will be a key to achieving scale, overcoming market barriers, and realizing electrification's full potential. ❖