The Sustainable Utility: Data-driven transformation and the granular grid

Seeing the forest for the trees
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In my previous post The Sustainable Utility: Data takes center stage, I introduced the idea of The Sustainable Utility, the desired endpoint for every utility balancing the competing (and costly) demands to become more environmentally friendly, safe, reliable, and equitable while keeping rates affordable. I view this as an existential challenge—one we can, must, and will overcome.

Are you on the journey to become The Sustainable Utility? Let us help get you there.

Contact our team today to start a conversation:

Why do I have such faith? I've seen the data up close and personal. The ability to process mass volumes of data at a granular level is transforming utility operations. And that's incredibly empowering. Our industry has the capability now—no *deus ex machina* necessary—to make The Sustainable Utility a reality.

To do so, utilities must become more adept at gathering, augmenting, and applying data to make better decisions. I see this capability maturing quickly in two key areas common to all utilities: grid performance (the infrastructure side of the utility business), and program performance (the customer side). Today, I want to focus on the grid. Particularly on optimizing it.

Optimizing the digital grid

Operating, maintaining, and investing in the grid is a multitrillion-dollar effort. Bound by regulation—and enormous responsibility—the utility sector has been characterized by a conservative approach to change, defaulting to tried-and-true approaches like cadence-based maintenance.

And such approaches used to make sense. When you have a legal obligation to inspect and maintain every circuit every five years, you divvy up the work accordingly and get it done on schedule. This thinking has permeated our industry's approach to maintaining just about every aspect of the grid, and, truth be told, it has worked reasonably well.

Until now. The prevalence of extreme weather and the insistent calls for equity and affordability are forcing utilities to pivot from conventional thinking to an ethos of practical innovation to rise to The Sustainable Utility challenge.

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And while external conditions have gotten worse (how many times are once-in-a-century weather events happening in a five-year span? and how many states are now facing down yearly wildfires and record-setting hot and cold temperatures?) some things have improved dramatically to help utilities fight back.

Data availability. Utilities now have more data at their disposal than at any time in history. That data comes from smart meters and sensors (I'll save customer information systems for my next article). It's also supplementary grid, environmental, and remote-sensing data from solution partners like E Source. Exponentially more data—in breadth and depth—is a great starting point, but utilities still need to *do* something with it.

Cloud-based computing. Utilities now have the power to process all that data in a way that's quicker, easier, and less costly than ever to manage. Today's decision-support solutions are IT-light, tapping into the scalability of cloud-based services to dial up and down capacity, on demand, as needed. This enables utilities to do things like process interval voltage data generated every five minutes from millions of meters or analyze five years of actual and forecasted weather data in minutes to deliver data-driven guidance.

Artificial intelligence (AI) and machine learning. Utilities now have the data and the ability to process it, but they also need the algorithms, models, and AI and machine-learning capabilities to make that data useful. Fortunately, advances in this field are continuing at a jaw-dropping pace.

Five years ago, utilities couldn't dream of handling all this data and handling it so capably. Now they can do more than dream, they can embed it into their planning and decision-making!

Using data to make better decisions

The punchline of all these improvements is that utilities are now able to make better decisions based on data. And we need better decision-making to thread the needle on costs relative to the investments required to become The Sustainable Utility. The ability to develop a digital replica of the grid and predict risk at a granular level exposes additional risk and a lot of waste in the traditional cadence-based approach. Imagine finding out that 30% of your annual vegetation management plan costs were on low-risk activities and that dangerous trees in and out of your right-of-way were not in your plan.

Which brings me to my key point: The era of the granular grid is upon us. We have the data, processing power, AI, and machine learning (and the know-how to bring them all together) to change maintenance from cadence-based to risk-based with newfound precision, saving billions of dollars that can be better

applied elsewhere across a utility's competing, critical needs. But the story doesn't end there. It really just begins.

Armed with data and the powers of prediction it can unleash, utilities can now play offense to narrow the gap between thinking about and becoming sustainable.

Take it a step further. What if you could predict the outage risk and impact associated with specific capital and maintenance investments? What a different conversation you would have with regulators and policymakers as you collaborate on expected *results*, like SAIFI and SAIDI, instead of *activity*. At E Source, we call this risk-spend efficiency and we calculate the difference in risk based on specific investments. Here's a hint: your best return on investment is probably not your worst-performing circuits.

Vegetation management is the largest cause of outages for electric utilities and the biggest annual expense, so it's a natural place to start. That said, the ability to predict storm outages three days in advance, transformer failures, wildfire risk, where it makes sense to move wires underground, and even where to place avian guards, all use the risk-spend efficiency approach.

The same logic applies to gas and water, where leaks and aging infrastructure are top of mind. In some municipalities, more than 50% of water never makes it to customers. This is another great example of waste we need to eliminate by optimizing spend based on risk, not time.

Which brings me back to data.

Data is delivering on its promise across use cases, and a new data-driven paradigm for utilities is rapidly emerging. The potential for massive cost reductions in operations and maintenance across the industry is palpable, as is a new way to justify, target, and improve the results of capital investment.

These are amazing developments with revolutionary implications. Armed with data and the powers of prediction it can unleash, utilities can now play offense to narrow the gap between thinking about and becoming sustainable.

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