5 Ways Utilities Can Plan a Better Future with Analytics
Ongoing disruption has made the once-predictable utility industry more risky and uncertain. To manage risk and create ongoing opportunity, utilities are leveraging data and intelligent analysis to gain insights that can help future-proof their business.

In short, data and analytics supports better choices. Together, they can help utilities plan the most effective way to invest in all kinds of assets: from generation to distribution, both physical and digital. This planning occurs over three key timespans, each with different goals:

- **Short term (1-3 years):** Utilities primarily seek to optimize maintenance and repair tactics, extend asset life, control costs, and ensure system stability.

- **Near future (5-25 years):** With data-informed asset performance management, utilities can plan holistically for the complete lifecycle of specific asset choices. For many assets, this will be less than 10 years. But some assets (such as generators) have a considerably longer lifecycle. This requires both tactical and strategic planning.

- **Far future (10-50 years or more):** With advanced investment planning, utilities can plot a staged progression of strategic investments to support a flexible, resilient, decarbonized power system, as well as a viable utility business model for well into the 21st century.
The challenge is to align regulatory policy...with a quickly evolving technological landscape in a way that benefits customers.”

Brien Sheahan, Commissioner with the Illinois Commerce Commission

These three scopes of planning, informed by data and analytics, allow utilities to better understand and manage risk and capitalize on opportunity—even risks and opportunities that have not yet emerged. At present, however, many utilities struggle to plan investments beyond the short term.

“Most utilities are constrained by the short-term thinking that is baked into how they are incentivized and compensated. The challenge is to align regulatory policy, which tends to lag, with a quickly evolving technological landscape in a way that benefits customers.” said Brien Sheahan, Commissioner with the Illinois Commerce Commission (ICC), which has been pushing to allow utilities to recoup costs for software and analytics to optimize operations. He added that such analytics can give regulators insight to improve utility oversight and incentives.

This playbook examines how each of these three timeframes for data-informed planning can complement each other and benefit utilities and stakeholders—and also how they can affect two technology areas (cloud computing and 5G) that are likely to significantly impact the future of utilities.
Optimize the Life and Performance of Existing Utility Assets

Sound long-term planning begins with making better choices on a daily basis. Increasingly, utilities are instrumenting more of their generation and distribution assets. This data supports more nuanced and timely operations and maintenance (O&M) than people can provide alone — a key consideration as many utilities struggle to transform their workforce.

Granular, reliable data from utility assets and systems must be analyzed intelligently, in real time, to accurately identify emerging issues. This helps utilities optimize O&M plans and spending. It also extends asset life and performance, maximizing the value of asset investments.

According to Cognizant research, preventive maintenance schedules prescribed by manufacturers rarely suffice to help utilities avoid asset failures. Nearly 60% of the utilities Cognizant surveyed said they still need a system to predict asset failures. When informed by good data, such systems can help utilities enhance power reliability and customer satisfaction, reduce total cost of ownership, increase field crew efficiency and improve safety and compliance.

Still, utilities are challenged by the volume and quality of data they gather from assets, smart meters, the Internet of things (IoT) and distributed energy resources. When this data is not managed and verified appropriately, the “garbage in, garbage out” phenomenon can compromise downstream and future uses of that data, including longer-term planning.
Asset Performance Management: Getting the Most Out of Asset Investments

The disjointed nature of operations, data and processes at utilities has made it harder to manage the full asset lifecycle. According to Frost & Sullivan, the current state of asset performance management (APM) at utilities and similar infrastructure industries is mostly “siloed and broken.”

Frost & Sullivan also found that, when making operational and investment choices, infrastructure industries typically utilize less than 5% of the asset-related data they gather. They noted that “weaving a digital thread across the asset performance value chain” by implementing an APM system with analytics could increase asset productivity by at least 10%.

APM systems encompass technologies connected to multiple existing and emerging data sources: IoT, SCADA, work and asset management, inspection and test data, outage management and other sources. APM also integrates data stored both on-premise and in the cloud. It often features advanced engineering models, analytics, machine learning and data visualization.
“Utilities must be equipped to assess risks related to asset health,” said Jill Feblowitz, President of Feblowitz Energy Consulting and a longtime utility asset management analyst. “APM lets utilities compare options to approach potential asset failure in the context of risk and criticality. It clarifies tradeoffs.”

For instance, how a utility opts to prepare for the eventual failure of a specific motor depends on that motor’s criticality to operations. For a less-critical motor, a moderate investment in storing spare parts on-site might be appropriate. A highly critical motor might warrant the extra expense of having a fully assembled spare motor available nearby, which could be swapped in immediately.

The key to data-informed asset decisions is to present risks and options in ways that are useful across the enterprise, especially in the C-Suite. “Ultimately, utilities need full-fledged APM across the enterprise, but it can be hard to get to that point,” said Feblowitz. “Today, many utility financial decisions are based on surprisingly little real data. They tend to rely on general assumptions about average lifecycle and age. That’s a starting point, but there are more dynamic dimensions to consider.”

Jill Feblowitz, President of Feblowitz Energy Consulting
Maximize Long-Term Options with Advanced Investment Planning

How utilities will evolve in the next 30-50 years is not entirely predictable. To maintain the ability to respond to emerging opportunities and challenges, utilities must procure physical and digital utility assets that are, above all, flexible.

Achieving a strategically flexible asset portfolio requires utilities to integrate more data and analytics into long-term planning processes. That data will come in an increasing variety of formats, and from an expanding array of internal and external sources. This will include more frequently updated projections and trends for:

- Energy consumption
- Weather and climate
- The economy
- Demand for energy-related services
- Impacts of emerging and evolving technologies (such as battery energy storage and transportation electrification)
- Customer expectations and experience
In most states, such visionary planning happens via mandated Integrated Resource Planning (IRP) processes. IRPs are very complex and require regulator approval, but they often do not predict utility investments.

Lawrence Berkeley National Laboratory (LBNL) found that information produced for IRPs is largely disconnected from utility procurement processes. The IRP process allows such flexibility, but the level of disconnect that LBNL found raises questions about whether a different process (one more directly informed by data and analytics) might prove more useful for creating stakeholder consensus around a utility’s long-term vision and investments.

“IRPs are a very thorough and complex exercise,” said study author Juan Pablo Carvallo, Senior Scientific Engineering Associate at LBNL. “Why do that exercise if it’s not directly guiding procurement?”

That said, IRPs do serve positive functions. “IRPs offer regulators a useful window into how utilities work, which helps them design better incentives and ultimately guarantee that procurement is prudent,” said Carvallo. “There just might be a more efficient way to attain current objectives for utility investment and resource planning.”
More complex analytics, fueled by significant increases in computational power (which cloud computing can affordably offer), can help utilities account more accurately for uncertainty, via more sophisticated algorithms and models.

To support utilities’ long-term planning, LBNL launched the Resource Planning Portal, an analytics platform containing data from over 100 IRPs from around the U.S. Carvallo said that if load forecasts and other key projections in IRPs could be automatically updated monthly, rather than every few years, IRPs might have more direct impact on utility investment decisions.

The main challenge with long-term investment planning is uncertainty, which is essentially about risk assessment and management. More complex analytics, fueled by significant increases in computational power (which cloud computing can affordably offer), can help utilities account more accurately for uncertainty, via more sophisticated algorithms and models.

This practice is more common in risk management than resource planning. Therefore, as utility roles evolve to include more risk managers, and as risk management tools proliferate in the industry, that discipline might reshape how utilities make long-term plans and investment decisions.
Historically, many utilities have been reluctant to rely on cloud computing. Their computational workloads tended to be fairly stable and predictable, undermining the most common business case for cloud adoption: the ability to quickly scale computing resources.

Also, as critical infrastructure providers, utilities are keenly aware of the need to maintain customer privacy, as well as digital and physical security for their data, systems and assets. For the last three years, cybersecurity has topped the list of utility executive concerns.

For the last three years, cybersecurity has topped the list of utility executive concerns.
In recent years, the level of cybersecurity offered by major cloud providers has improved steadily. Cloud providers usually provide more dedicated staff with the latest cybersecurity skills, and more sophisticated cybersecurity tools, than is possible for most on-premise data centers. Consequently, many utilities today have expanded their operations to blend on-premise resources with some cloud computing services.

Utility digital workloads are now becoming more changeable as utilities increasingly:

- Adopt more digital technologies, including sensors, across their asset base and smart metering.
- Deploy more advanced tools, especially machine learning and artificial intelligence.
- Integrate more real-time data from customers, DERs and other external sources.
- Bridge internal silos, especially by integrating IT and OT (operational technology).
- Utilize more software-as-a-service (SaaS) tools, including cloud-based analytics.
As digital workloads grow less predictable, it becomes nearly impossible for utilities to manage their digital needs and achieve strategic goals without adopting the cloud across the enterprise.


- **Unified process management.** “Distinct business applications work cohesively to achieve organizational targets and objectives for all stakeholders. DERs are fully in balance with traditional generation, transmission and distribution.”

- **Optimized business delivery.** “Integrated analytics optimize process and systems across the enterprise. The utility also has a 360-degree view of the customer that improves delivery, digital communication, and customer experience.”

- **Automated innovation.** “Utilities can continuously and seamlessly innovate as operational, customer, regulatory, and business opportunities present themselves.”

“Most utilities have strong asset data around what’s happening at the substation, or they’ve deployed smart metering to most of their territory,” said Chris Moyer, Director of Research at Zpryme. “However, they cannot easily connect those datasets to make good predictions for optimizing and controlling the overall flow of energy.”

Attaining a deep, granular, system-wide understanding of the health and lifecycle of utility assets ultimately supports more creative long-term business strategies. “The future of utilities is not simply sending electrons down the wire,” said Moyer. “The utility will become more of a platform or network, a provider of energy services. They’ll need to be quite adept at handling vast amounts of data to accomplish that.”
As utilities eye investments that will position them for a better future, network technology investments will form the foundation of what's possible. Data quality is one of the most fundamental considerations of networking.

“You need secure, fast, and resilient end-to-end solutions to supply trusted data,” said Robert Worden, Fujitsu North America’s Executive Practice Leader for smart cities and IoT. “If you can’t trust your data, what’s the point? Without a capable network, digitalization is all for naught.”

Writing for Electric Light & Power, Worden outlined five building blocks that enable utilities to move real-time intelligence from sensors and devices across a high-speed network, for aggregation and analysis in the cloud. Networking, the second building block, supports the subsequent building blocks: data infrastructure, cloud services and smart apps.
5G is a leading technology candidate for future utility networking because it promises vastly increased bandwidth and speed. However, it requires high cell density: microcells might be located only 150 feet apart. Also, 5G networks handle more processing at the network edge; less data is backhauled. Consequently, 5G has spawned an emerging market for “connected real estate” — essentially, siting tiny data centers in widely distributed locations. This real estate/telecom hybrid presents an emerging revenue opportunity for utilities. They can deploy 5G infrastructure on utility poles and rights of way.

“A tiny data center for 5G might be the size of a shed, built on a concrete pad. It might be colocated with a cell tower, or in proximity to major rights of way,” explained Achmad Chadran, Senior Solution Specialist for Atonix. “These tiny data centers also have very exacting power reliability and quality requirements. Utilities could provide power services designed for this market, as well as lease the space.”

Providing services that support 5G network deployment can dovetail nicely with other long-term strategic utility projects, especially for smart city infrastructure. Fortunately, utilities need not step too far beyond their existing expertise to explore 5G opportunities. Partnerships with telecom carriers, local governments and other 5G players may become a bigger part of future utility business.

Another 5G revenue opportunity for utilities is pole attachment fees and services. Utility poles are an attractive location for 5G transmitters. Utilities can gain an edge in this emerging market by deploying comprehensive, reliable pole management systems.
Real-time intelligence about pole conditions and attached equipment is needed to comply with Federal Communication Commission (FCC) regulations about response times for pole attachment requests. Once utilities have that data, they can sell access to it as a service to carriers and other 5G market stakeholders.

“Each pole is a mini database of geospatial data, age, loading characteristics, inventory of attached equipment, and more,” said Chadran. “How you visualize and process that data mathematically and statistically can make it valuable to the entities that own or lease 5G resources, or to other third parties. They can use that data to add margin and value, to help recoup their own 5G investment. So they may be willing to pay utilities a premium for that.”

Taking the long view, Chadran observed, “Utilities have long been at the forefront of providing basic infrastructure. It’s easy for people to take basic infrastructure for granted, but it’s critically important.

“As the technology landscape shifts, the kinds of services that are considered lifelines will change, and there’s a big role for utilities to play in that emerging framework,” he continued. “Their mission of service can continue to translate into good business, as long as they have high-quality data and analytics. Then they can plan well for investments that enable them to keep pace with change.”

As the technology landscape shifts, the kinds of services that are considered lifelines will change, and there’s a big role for utilities to play in that emerging framework.”

Achmad Chadran, Senior Solution Specialist for Atonix
Conclusion

Strategic, early investments in robust, flexible data and analytics solutions initially yield high-quality data from utility assets and networks. This real-time intelligence helps utilities operate more efficiently right now.

In addition, such investments set the stage for more extensive and strategic long-term investments that consider the full asset lifecycle. In turn, data and analytics can inform some of utilities’ most important long-term decisions.

How utilities will continue to serve society will be determined, in large measure, by the quality of their data and how well they use it. Utilities cannot foresee every aspect of the future, but they can plan to be flexible and resilient. Data and analytics help utilities reduce risk, even though uncertainty will always be with us.

Utilities cannot foresee every aspect of the future, but they can plan to be flexible and resilient.
Atonix Digital helps companies simplify asset performance management by putting data to work—to detect emerging risks, enhance efficiency, improve accuracy of planning, and provide an easily justifiable return on investment. We help customers connect the power of math and data as they leverage our products throughout the infrastructure life cycle, including design, build and operation. Our products are powered by ASSET360, a cloud-based data analytics platform that improves the efficiency of operations and planning for complex and distributed assets. Atonix Digital is a Black & Veatch Company.

LEARN MORE
Industry Dive’s Brand Studio collaborates with clients to create impactful and insightful custom content. Our clients benefit from aligning with the highly-regarded editorial voice of our industry expert writers coupled with the credibility our editorial brands deliver. When we connect your brand to our sophisticated and engaged audience while associating them with the leading trends and respected editorial experts, we get results.