

The Future Utility:

Transformation of the utility business model.



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Transformation of the Utility Business Model

No concept elicits more controversy and consternation for utilities than the “utility death spiral.” While the technology and business conditions that could lead to the unraveling of the industry are taking shape, utilities are facing a more immediate existential crisis: the timing of when and how they change their business model. Customer expectations, technology, and regulations are all changing rapidly; however, most utilities are still profitable and will remain so in the short term using the traditional cost-of-service (COS) business model. These conditions create an incentive to maximize asset longevity and ROI for as long as possible. Grid reliability and business model continuity seem to take precedence over transformation. This approach makes sense when looking at short-range profits, but it will be profoundly detrimental over the medium

and long term. Why would utilities change something that is still working? Simply put, they must evolve their business model in order to ensure the long-term viability of the industry. Adopting a more agile structure that shortens the time frame of technology adoption will be key. In the absence of certainty, utility leaders can anchor their innovation around digital ecosystems, renewable integration, and customer centricity during this inflection point.

Zpryme surveyed 150 industry professionals to understand their perspectives on how the utility business model is changing in the short term and the impacts of digitalization. This report explores how utilities can use data, IIoT systems and partnerships to modernize their grid effectively.

Demographics

- **Utility type:** 45% Investor-owned; 34% Municipal or public-owned; 18% Cooperative; 2% District/Federal; 1% Other
- **Services provided:** 47% Electric; 17% Gas; 13% Street Lighting; 10% Water; 7% Wastewater; 3% Solid Waste; 3% Other
- **Utility size by customer accounts:** (24%) >2,000,000; (16%) 1,000,001 - 2,000,000; (16%) 500,001 - 1,000,000; (10%) 200,001 - 500,000; (10%) 100,001 - 200,000; (7%) 50,001 - 100,000; (7%) 25,001 - 50,000; (10%) < 25,000
- **Regions served:** 30% Midwest; 25% Southwest; 19% Southeast; 18% West; 14% International; 13% North East
- **Level of job responsibility:** 37% Professional Staff; 30% Manager; 17% Director; 11% Executive; 3% Administrative; 1% Other
- **Primary roles within organization:** 28% Engineering; 18% Operations; 12% IT; 10% Planning; 9% Customer Service; 9% Executive; 9% Other; 5% Finance; 1% Maintenance

Key Findings

- 61% of utilities report that balancing reliability, sustainability, and financial viability is the biggest challenge they are facing.
- 55% of utilities report that budget limitations will limit their ability to transform their business model.
- Only 22% of utilities are reporting that their IT and OT teams are currently working very well regarding strategic decision-making for IIoT, IoT, data, AI, and other software systems.

What's Driving Transformation?

There are a wide variety of factors motivating utilities to transform their business model. (Figure 1)

Policy changes, regulatory reform, ensuring long-term profitability, and integrating new technologies to remain relevant have all contributed to a decade of modernization. The COO of a southeastern electric co-op described the inspiration for utilities of all sizes as ensuring the *“reliability of the system . . . the customer expects the power to be on all the time. Reliability and quality of service are the keys.”*

The foundational motivation expressed in this sentiment and true catalyst for change are meeting customer expectations.

What are the top three key forces driving any modernization/transformation efforts at your utility?

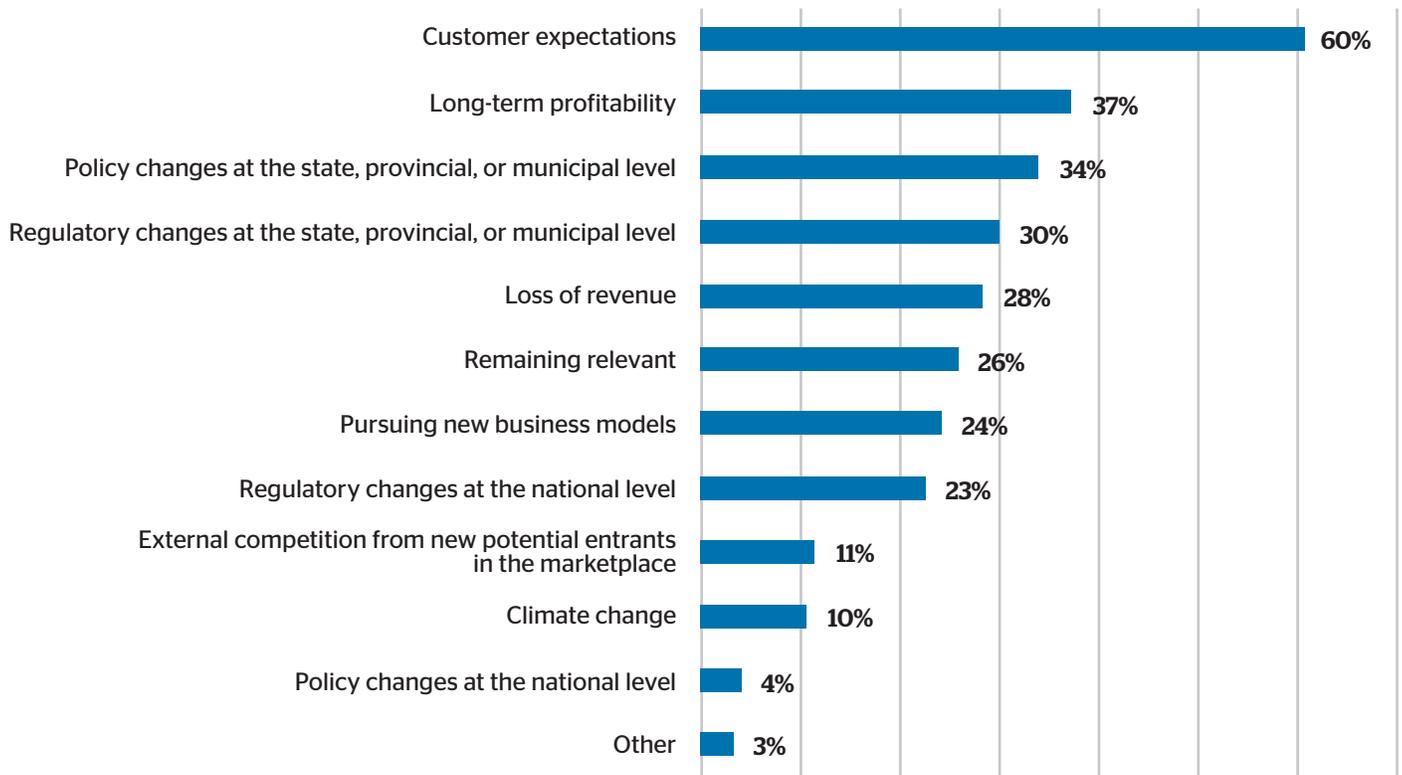


Figure 1: Top three forces driving modernization/transformation efforts at utilities

Transforming Customer Engagement

Three key components of changing customer expectations are reliability, better access to information, and more control over their energy usage and cost. Responding to customer expectations is a positive signal for an industry that had previously been unresponsive to “rate-payer” demands. But will utilities be able to understand customer expectations and address them before other disruptors without significantly raising costs?

Digital transformation can help utilities meet the challenges around customer expectations. Supplementing the data collected from surveys and focus groups with the plethora of usage data gathered from Advanced Metering Infrastructure (AMI) meters will allow utilities to quantitatively and qualitatively define customer expectations. A business strategist from a large Canadian utility framed the challenge around data and customer expectations as a flow of information. *“People want more information. More granular, more breakdown, and*

they want to understand their bill better. Customers are more technically intelligent now. They also want to be frugal with their money. The next generation is more demanding of their own information.”

Automating the analysis of data from customer IoT devices and operational IIoT devices can optimize the grid, speed up innovation, and help keep the costs of energy affordable as renewable energy grows. Utilities can currently capture enough data from assets, AMI meters, and customer sentiment to view the grid and the customer in a holistic context. Predictive analytics that can simultaneously optimize equipment longevity and build a dynamic customer experience across channels requires better data management and integration, as well as automation and machine learning capabilities.

In line with utilities’ commitments to engage with customers more effectively, the

deployment of communication channels like social media (for online interaction with customers), customer experience centers (to streamline support across channels), and social media monitoring (to understand brand sentiment) are the farthest along (Figure 2). However, with only 54% of utilities reporting that they have a CRM/CIS system deployed or underway, there is still a lot of work that can be done to automate, analyze, and make actionable all the data they have at their fingertips. Utilizing this data will be critical for utilities to develop more personalized services and offers to customers, thereby improving customer interactions.

Over the next 36 months, utilities are expecting their analytics platforms to start playing catch-up, which will be foundational for the optimization of programs like distributed energy resources (DERs), electric vehicles (EVs), demand response, and Time-of-Use (TOU) pricing.

How far along is your utility on transforming the following departments and systems?

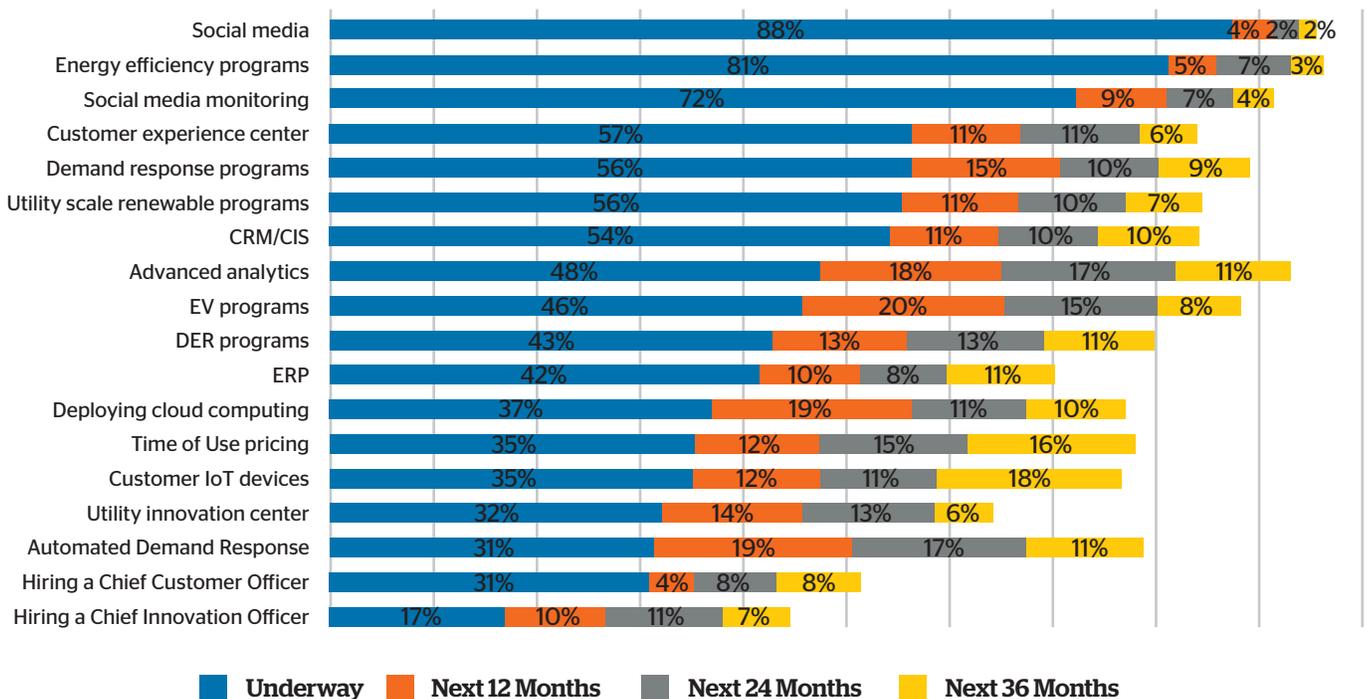


Figure 2: Status of transforming departments and systems

Digital Grid Modernization

Communications and customer programs are just one side of the modernization equation. Utilities have been working toward digitization (the process of moving from analog to digital) for the past decade, but there are many systems that still need to be updated. (Figure 3)

How far along is your utility in modernizing the following operations and grid systems?

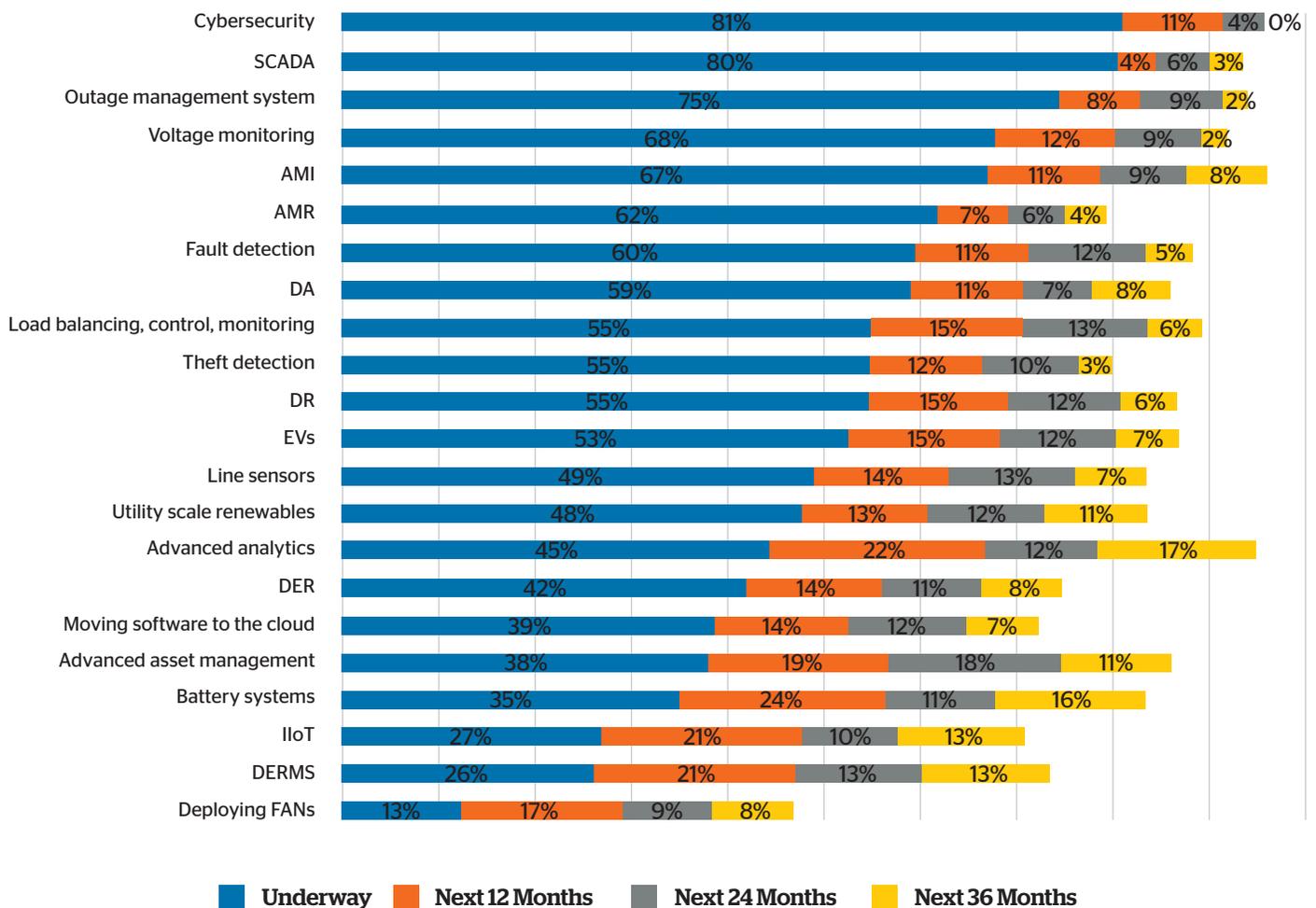


Figure 3: Status of modernizing operations and grid systems

With the cost-of-services model coming to the end of its natural lifecycle, utilities are using digitalization to help solve some of their most significant business challenges, and cybersecurity (83%) is the top system they are updating. This makes sense because of the profound national security implications related to grid security. The news that foreign state actors have attempted to access central and distributed control systems is spurring investment.

After more than a decade of grid modernization, major utility systems like SCADA, Outage Management (OMS), and AMI have been broadly deployed. Utilities reported that the next 12 to 36 months will see advanced monitoring systems implemented into the grid at a faster rate. Deploying and integrating DERMS, advanced asset management systems, and IIoT sensors throughout the grid will be crucial for utilities as they build the infrastructure necessary to update their business models.

Modernizing communication systems and grid operations has not been a straightforward task, and many challenges

remain (Figure 4). Leaders at utilities are by far most concerned with transitioning to a business model that balances reliability, sustainability, and long-term financial viability (61%, Figure 4).

From a purely business perspective, utilities are right to question whether renewables and distributed generation are smart investments. Without widespread storage opportunities to flatten load curves, the financial impacts can be detrimental to a utility's operating budget. Furthermore, as DERs become increasingly commonplace, they are having a profound impact on the grid. Utilities in California and Hawaii are already experiencing the negative business impacts related to load balancing and reduced energy demand from customers as a result of widespread distributed photovoltaic generation. The answer to these challenges cannot simply be opposing customer adoption to DERs. Utilities must work with PUCs to create a new rate structure that properly accounts for the interconnection charge and values the distributed assets that customers are putting on the grid.

Digital Resiliency

Storm and outage resiliency are top priorities for utilities. An increase in the occurrence of natural disasters and weather-related incidents is now expected, and utilities have invested heavily in mitigation systems to ensure expedited response to these events. The same mindset should and can be applied to the digital ecosystem. Hacking will occur, but utilities that use advanced analytics to identify and quarantine system breaches will be in a better position to be digitally resilient utilities. Investing in cybersecurity solutions could also lead to more accurate predictive maintenance, resulting in cost-savings for utilities by notifying both IT and OT personnel that an asset needs attention.

What are the biggest modernization challenges your utility is facing?

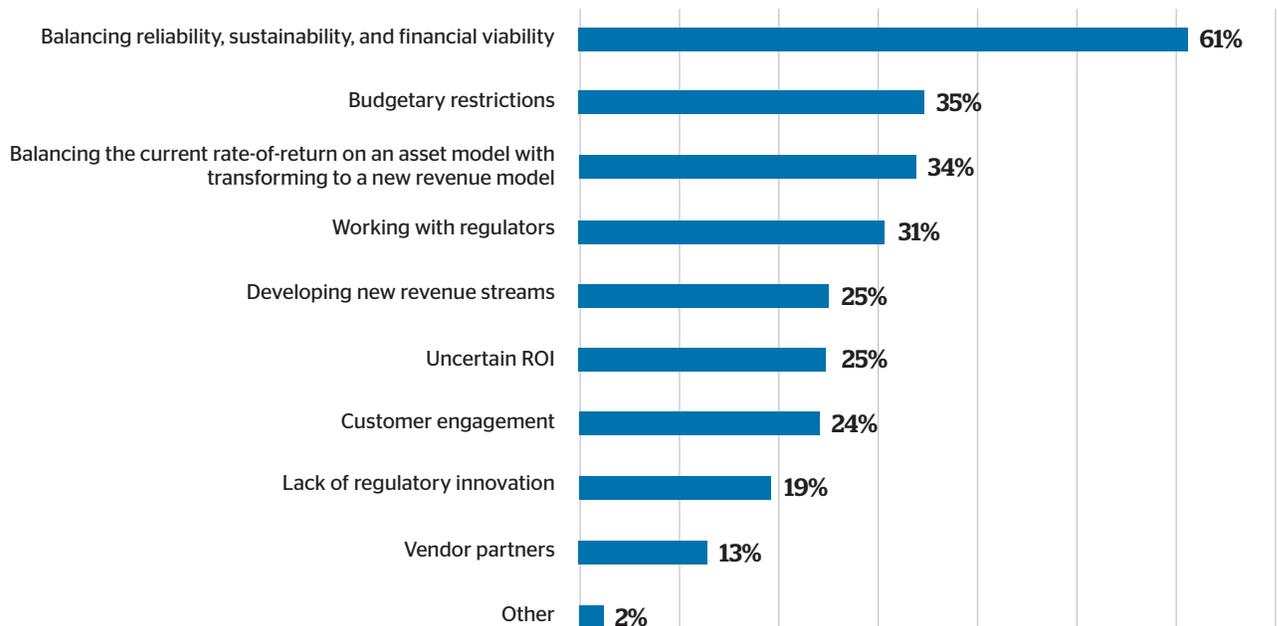


Figure 4: Top three modernization challenges

Innovation and Partnerships

The variety of departments, stakeholders, systems, and priorities within any enterprise make evaluating evolving business models a complex undertaking. New York's Reforming the Energy Vision (NY REV) and the United Kingdom's Revenue = Incentives + Innovation + Outputs (UK RIIO) offer approaches utilities can follow. Both move away from the traditional COS model toward a Performance-Based Ratemaking (PBR) structure that shifts the utility's revenue to incentivize performance improvement. Performance improvement will be different for each utility and public utility commission but will certainly promote digital modernization and a reimagined relationship with the customer. Data analytics and artificial intelligence (AI) will be crucial for utilities as they work to implement PBR, digitally modernize systems, and integrate renewables. Leaders at utilities report that these tools will allow for the proactive monitoring and control needed to optimize grid operations (Figure 5). Digital transformation can unleash a wave of data-driven automation for utilities to meet the flexibility required by a distributed grid.

Performance-Based Ratemaking

Currently, 19 states and the District of Columbia have seen recent legislative and regulatory developments related to PBR. The most common PBR mechanisms today include revenue decoupling, performance incentives for conservation programs, and multiyear rate plans. Although many regulators and utilities are working together to explore these options, only Hawaii has set a deadline regarding the implementation of financial incentives and penalties. Hawaii has set defined incentives for Hawaiian Electric (HECO) around reducing greenhouse gas emissions and peak demand, which other states like Massachusetts and Minnesota have done for utilities like Eversource, National Grid, and Xcel. Hawaii's commitment to attaching a financial inducement will make its performance mechanisms more enforceable. HECO's potential gain or loss is \$6 million for attainment.

What are the top three ways that your utility plans to use data, analytics, and AI to modernize the business model?

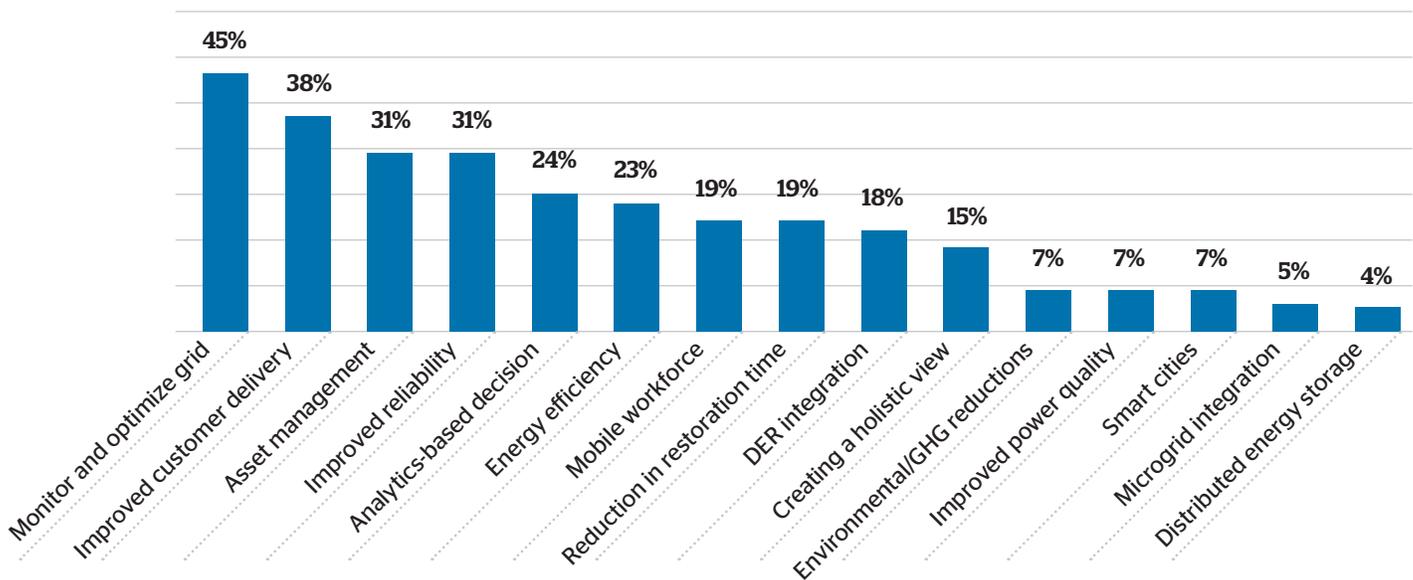


Figure 5: Top three planned uses of data, analytics, and AI to modernize business models

Executives see the ability to proactively monitor and control as providing a series of benefits to the customer and the grid, from better asset management to improved reliability and a reduction in restoration time following outages.

Utilities are quickly starting to recognize the benefits of digital transformation, but the majority of utilities are just now building their innovation strategies or exploring what those strategies should entail. Only 27% are implementing strategies via a center for innovation or an internal "tiger" team (Figure 6).

Does your utility have an internal digital innovation and business transformation plan?



Figure 6: Status of internal digital innovation and business transformation

To effectively implement enterprise-wide business model transformation, utilities will need to move quickly from the planning phase to the implementation phase. For large-scale organizations, a center of innovation and/or a nimble tiger team is often required to help shepherd the change management necessary throughout the enterprise. Utilities still retain some of the vestiges of their siloed structures, but new business models require agile approaches to innovation.

Driving Business Objectives

One of the most effective steps a utility can take to achieve critical business objectives in a relatively short period of time is creating a center of innovation. Centers of innovation bring different teams together from IT, Operations, and Customer Experience to cross-pollinate on solutions that improve performance results. Around the country, dozens of utilities have taken this step, but one of the most intriguing is Duke Energy's Optimist Hall. What separates Duke Energy's approach is the stand-alone office space that houses 300 full-time staff and rotates up to 100 additional individuals in, depending on the project. Software engineers, designers, and data scientists collaborate in two-week sprints to release products like an improved outage map and billing options in waves, so these new services can be tested by users and quickly implemented. Duke and other utilities are attempting to change the utility workplace culture to be more responsive and nimble as they approach solving the most important business challenges.

Which categories are you working with these partners on?

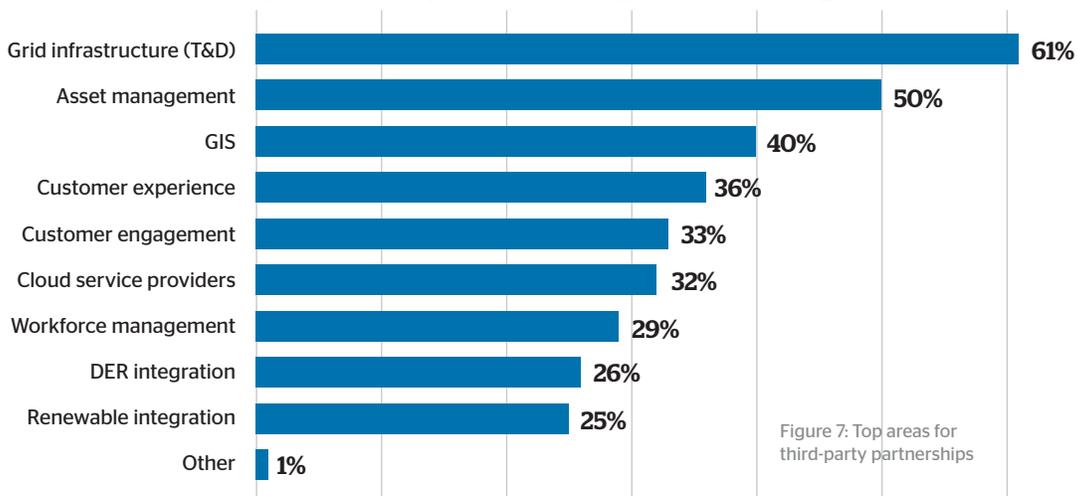


Figure 7: Top areas for third-party partnerships

Are you partnering with external third parties to improve your customer experience?

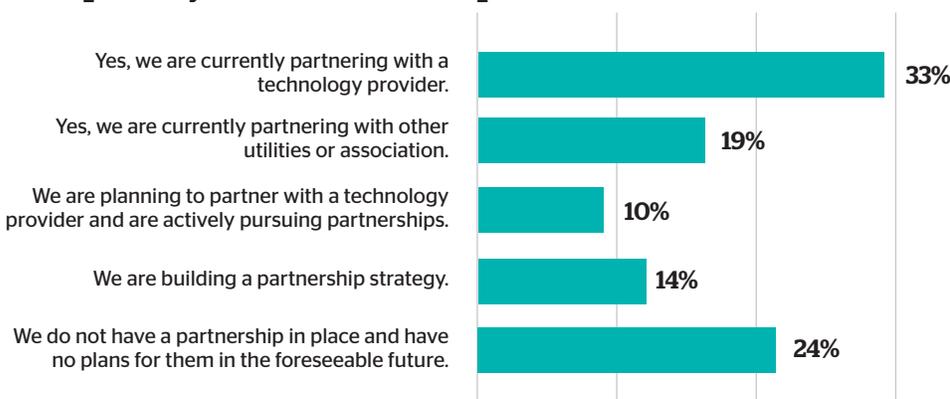


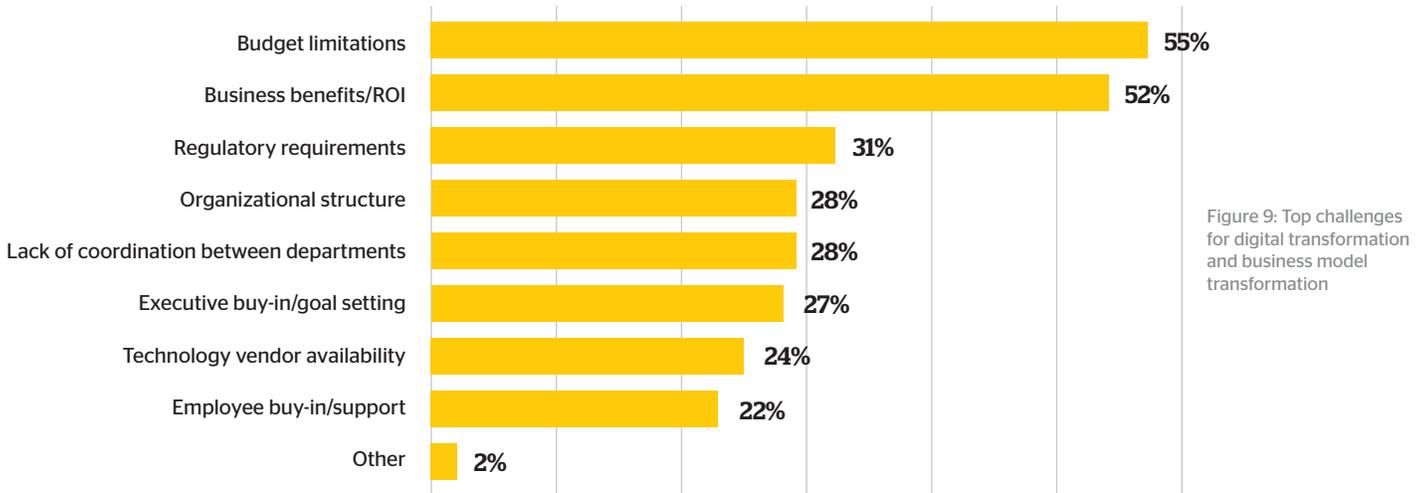
Figure 8: Status of third-party partnerships for customer experience

Being later adopters of digital transformation, utilities can benefit from lessons learned by business verticals that have already made the change and are leveraging the knowledge that innovative partners can bring to the table. The majority of utilities are currently working with external partners to help modernize the T&D grid infrastructure and asset management (Figure 7), but only about one-third of utilities are currently working with external partners to help them improve their customer experience and customer engagement (Figure 8). As utilities accelerate their modernization, there is an opportunity to look to partners with experience supporting other industries' transformations.

Change Isn't Easy

Utilities are quick to point to concerns over budget limitations or regulatory requirements when describing the challenges associated with innovation and business model transformation. (Figure 9)

What are the top challenges for digital modernization and business model transformation?



Moving to a self-funding paradigm of digital innovation while the COS model is still semi-functioning will prevent utilities from having to make these investments when they have less access to affordable credit. Even if regulators do not allow utilities to earn a rate of return for moving systems and data to the cloud, the potential for long-term cost savings is already spurring some utilities into action. Utilities around the country are investing in centers of innovation that are designed to evaluate and test new grid-edge technologies and to train staff to use the new tools. Furthermore, more than a dozen major utilities including Southern Co., National Grid, Xcel Energy, Ameren, Alliant Energy, TransCanada, and TEPCO are backing a venture firm called Energy Impact Partners (EIP). EIP changes their investment focus on a yearly basis, and they have already tackled some of the most significant challenges facing the industry, such as electrification, EV charging, storage, and cybersecurity. These types of investments are only the tip of the spear, and utilities need to shorten their innovation time frames to meet changing customer expectations.

Concerns over budgeting and investment are not the only impediments utilities face. Just over a quarter of utilities acknowledge that misalignment from executives and employees could hamper the ability of the enterprise to make the changes needed to thrive in the future. This tension is perhaps best exemplified in the decision-making process regarding investments in digital technology (Figures 10 and 11).

Who within your organization is responsible for budget decisions regarding digital technology?

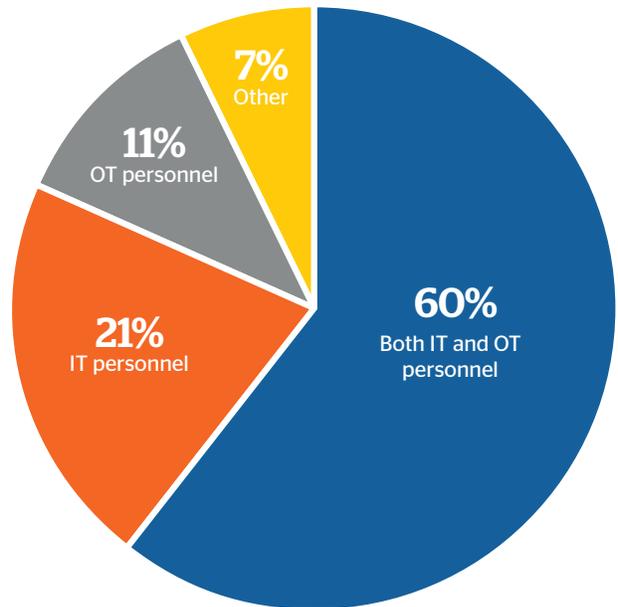


Figure 10: Organizational responsibility for budget decisions regarding digital technology

For the majority of utilities, both IT and OT personnel are involved in the budget decision-making process. This level of cross-departmental coordination is encouraging, but business process transformation will heavily impact both groups, and there are structural impediments to IT and OT departments working together at utilities. Currently, 50% of utilities report that their IT and OT personnel are working well or very well together on the strategic decision-making for advanced systems (Figure 12).

Who within your organization has overall responsibility for implementing digital technology?

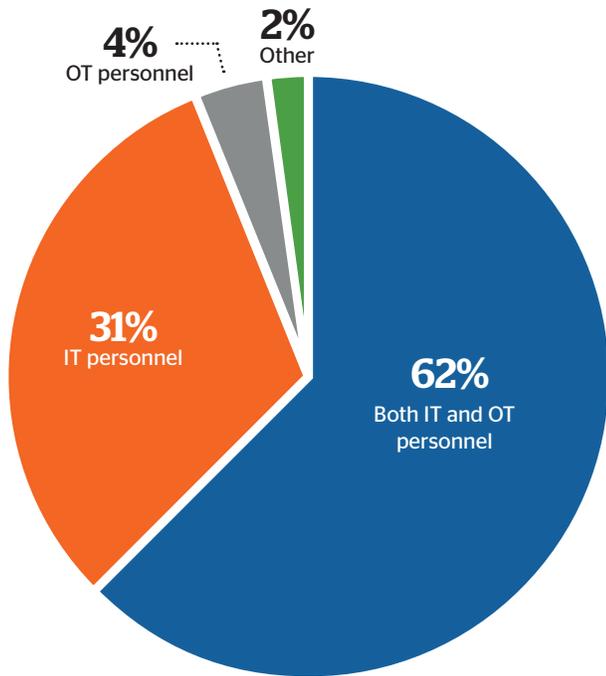


Figure 11: Organizational responsibility for implementing digital technology

How well does your IT and OT personnel work together on budgetary and strategic decision-making regarding IIoT, IoT, data, AI, and other software systems?

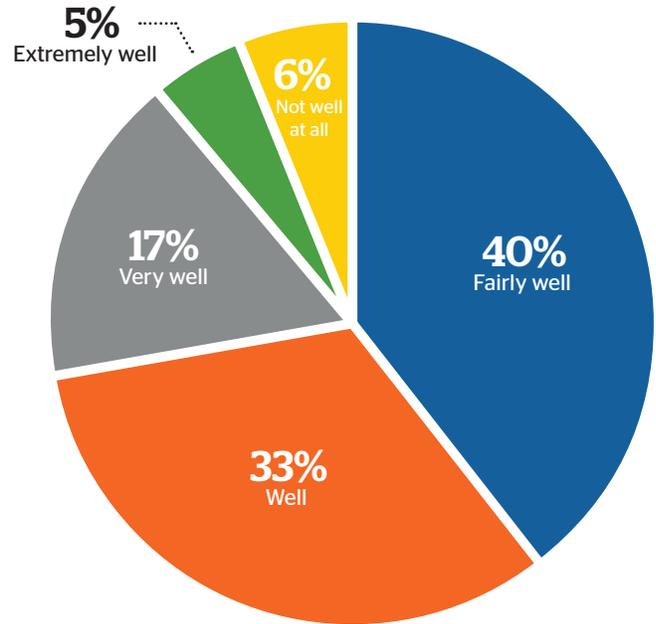


Figure 12: Ability of IT and OT personnel to work together on budgetary and strategic decision-making



Utilities cannot just pay lip service to the idea of digital transformation. The challenges facing utilities are steep, and IT and OT strategic leaders will need to work closely together to effectively make the right decisions about AI, IIoT, IoT, and other technology platforms. Investments in digital infrastructure over the next 36 months will help determine the data that AI systems use to optimize the grid, customer delivery, and customer experience (Figure 13).

Please describe the status of using IoT sensors and resulting data for the following systems over the next 36 months.

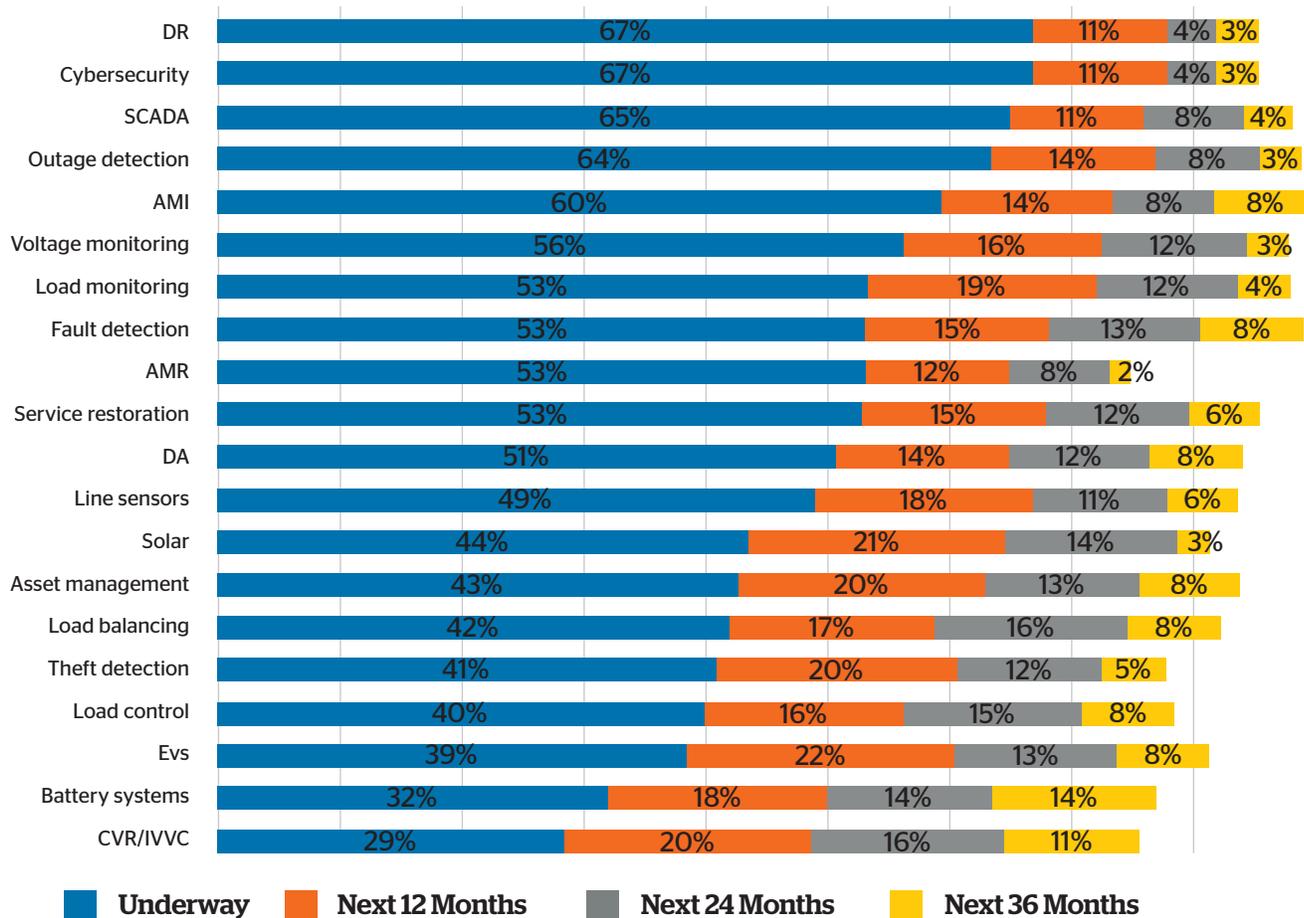


Figure 13: Status of using IoT sensor data over the next 36 months

It is not surprising that utilities have focused heavily on IIoT and IoT sensors related to demand response and outage detection. Reliability remains the key measurement customers have for how their utility is performing, and both DR and OMS are foundational grid-modernization systems that allow utilities to ensure a high level of reliability. Additionally, SCADA systems have been prevalent at utilities for more than 30 years and continue to be central to how operators integrate relatively newer IoT systems like asset management and AMI.

Over the next 36 months, utilities plan to deploy more sensors for solar, asset management, and EVs. This reflects the broad recognition from utilities that renewables are crucial for generation, asset management, and grid optimization. EVs will also be a significant opportunity for load growth and increased revenue.

True Transformation

Digital transformation has been a major industry focus for the past five years, and utilities have been looking for new business models since the specter of the utility death spiral was first raised more than a decade ago. Even so, utilities continue to slowly approach modernization and uncertainty, moving in the direction of new transformative business models. Unquestionably, the current regulatory framework that most utilities operate under does not incentivize a wholesale change. Although load growth has stayed flat, most utilities still make a profit, but without a conscious effort to move toward

performance-based rates, utilities will see their ability to operate severely limited in the near future.

One of the key market disruptors on the horizon is storage. Utilities will be able to speed up their adoption of large-scale renewable assets and DER integration as storage prices go down. A distribution planner from a large Northeastern utility described the opportunity and challenge: *“Energy storage is going to be the game changer. We’re all basically waiting on that. Regulatory policy hasn’t been set for that,*

which is a little concerning since we’re all getting our applications and systems in order.”

Change requires investment, and over the next 36 months, most utilities have moderate plans to modernize (Figure 14). Even for the most crucial systems like AMI, analytics, and cybersecurity, less than 40% of utilities report that they will be increasing their investment levels by more than 25%. Many utilities are expecting to increase their spending more modestly in the next 36 months for renewables, DERs, and AI.

What are your plans for investment in the following areas over the next 36 months?

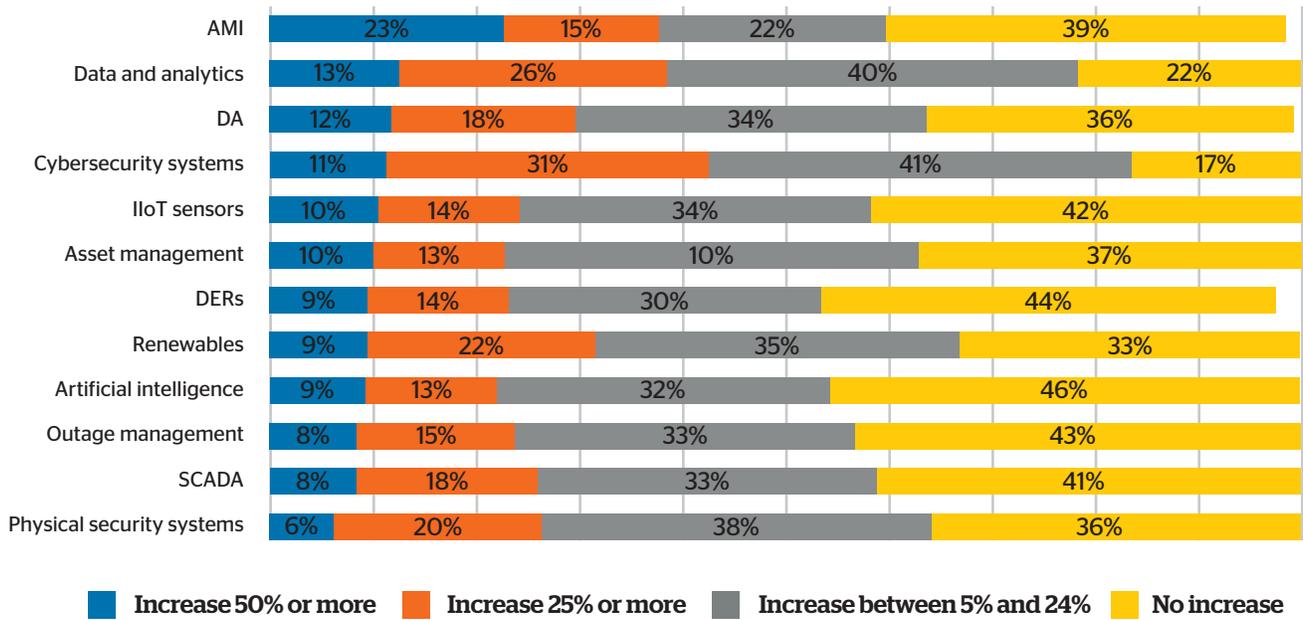


Figure 14: Investment plans for systems over the next 36 months

Conclusion and Recommendations

Increased spending is only one measure of modernization, and it alone will not guarantee that utilities can effectively transform their business processes. Utilities will need to work with regulators to develop PBRs based on a more intelligent rate design and use data to offer more customer control and engagement. Business model transformation will not be easy, but there are five steps that utilities can take to smooth their transition.

In the late 19th century Samuel Insull, Thomas Edison's secretary, developed the COS business model for utilities. It incentivized investment in electricity asset development to ensure widespread access based on the promise of a rate of return. This model was one of the most durable approaches to business in the 20th century, but it will not have the staying power to last through the first half of the 21st century. As utilities develop a new business model that ensures long-term viability, there are five principles to consider:

1. Work with regulators to develop a performance-based rate structure that properly values the importance of DERs in the grid, incentivizes technological investment, and allows for the development of new products and services to better engage customers.
2. Leverage digital capabilities using a portfolio-based approach to solve business challenges. This will allow utilities to invest in one or more use cases with the potential for strong ROI over a shorter period of time and one or two use cases that are more strategic and require a longer time frame to see a return.
3. Develop a culture of innovation by actively hiring digitally-minded people and investing in training for existing staff.
4. Identify and engage trusted technology partners that can assist with the digital transformation process.
5. Create a customer-centric organization that prioritizes long-term success over maximizing shorter-term return on investment.

Although utilities are facing significant headwinds, it's clear that they recognize the importance of addressing long-term reliability, sustainability, and profitability challenges. By focusing on meeting changing customer expectations, utilities can invest in digital capabilities that will enable them to innovate more rapidly and effectively transform their business model.

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Learn more about Atos solutions for energy and utilities: <https://atos.net/en-na/lp/iot-utility-2019>

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