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AESP

State of AI in the Utility Industry

SURVEY REPORT

JULY 2024

Take a closer look at the megatrends transforming the energy sector, and it becomes immediately apparent that the rapidly advancing capabilities of artificial intelligence (AI) are perfectly aligned with the industry's need to accelerate innovation.

Whether it is about managing the loads associated with transportation electrification, improving predictions of supply and demand as renewable energy adoption grows, maximizing energy efficiency gains or shifting peak consumption to defer or avoid infrastructure investments — AI makes each of these important goals attainable.
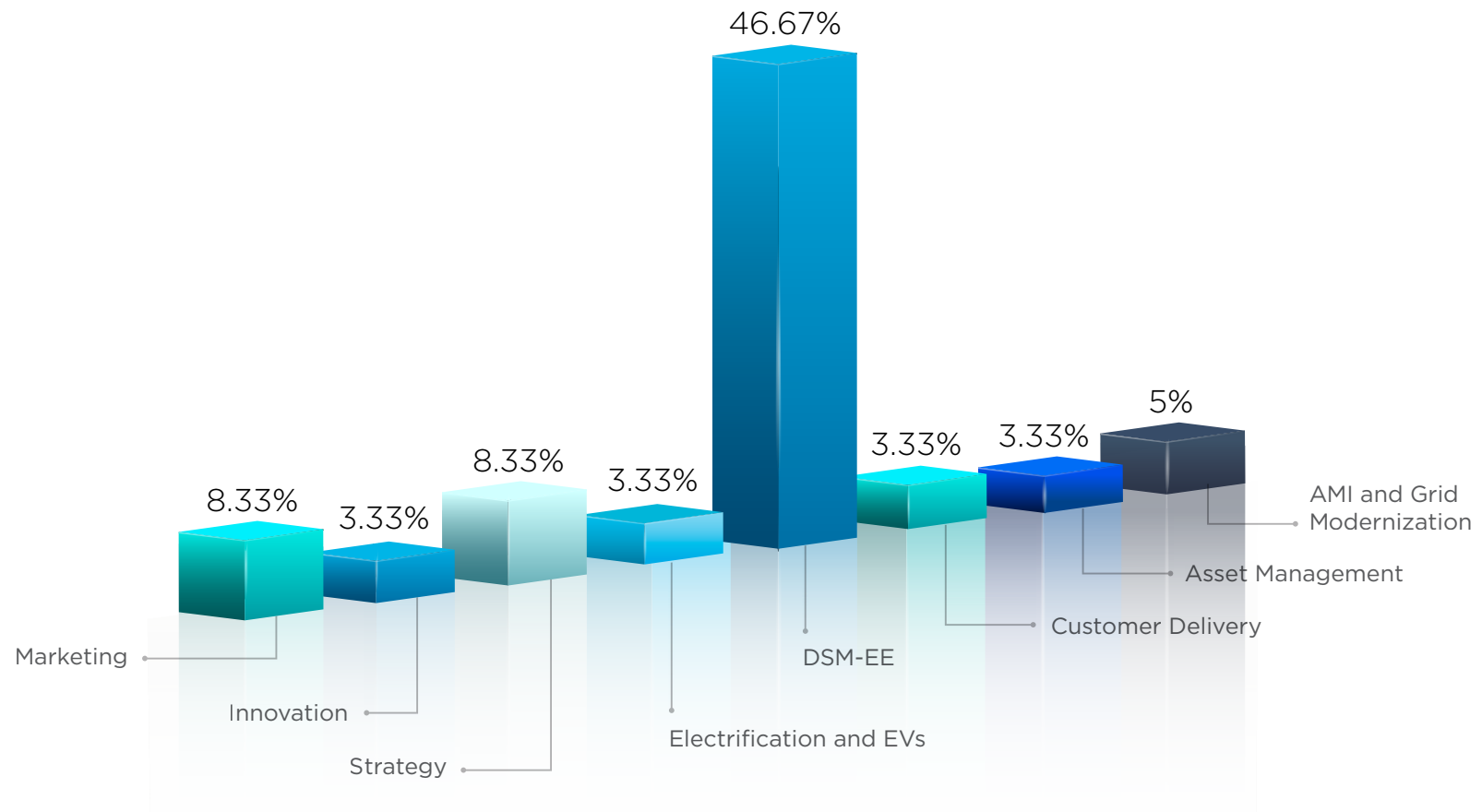
AI is able to make use of the massive amounts of data smart grids generate to enable use cases like those above and more, and thereby advance the deployment of smart grid technology.

That's why Bidgely and AESP, the leading Association for Energy Service Professionals, commissioned a survey in the spring of 2024 to delve deep into the heart of AI's impact on utilities. *The State of AI in the Utility Industry Survey* captured a definitive snapshot of AI adoption, perspectives, and applications within the utility sector.

Survey respondents included representatives from a range of departments from investor-owned, public power and cooperative utilities from across the United States and Canada.
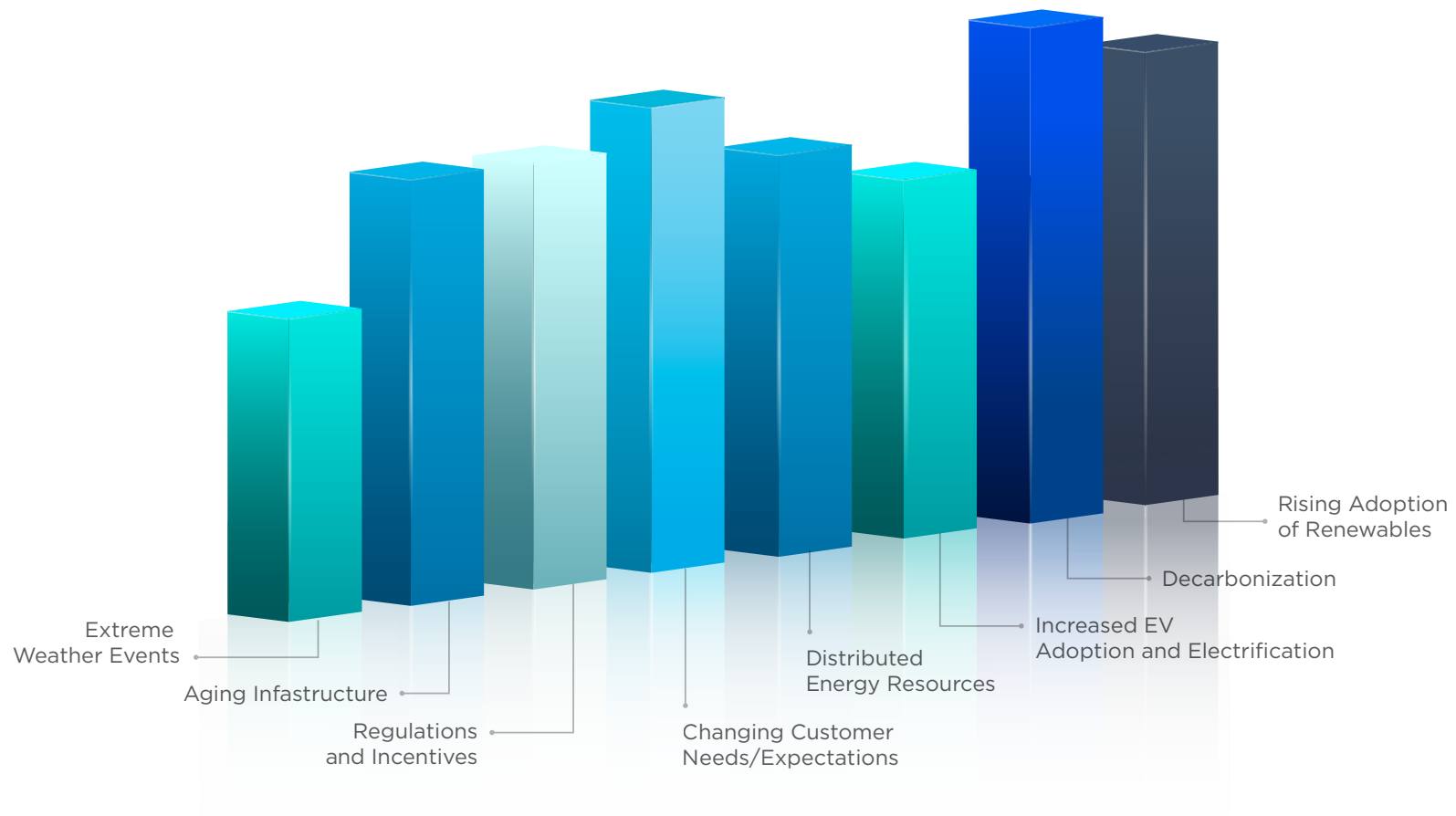
DIVERSE PERSPECTIVES

46.67% DSM-EE
8.33% Marketing
3.33% Innovation
8.33% Strategy
3.33% Electrification and EVs
3.33% Customer Delivery
3.33% Asset Management
5% AMI and Grid Modernization

Survey respondents weighed in as to which megatrends are playing the most critical role in transforming the energy industry. Decarbonization ranked #1 with the rising adoption of renewables not far behind.

MEGATRENDS TRANSFORMING THE ENERGY INDUSTRY

- Extreme Weather Events
- Aging Infastructure
- Regulations and Incentives
- Changing Customer Needs/Expectations
- Distributed Energy Resources
- Increased EV Adoption and Electrification
- Decarbonization
- Rising Adoption of Renewables

More and more utility companies in the U.S. are committing to reduce emissions and shift to clean energy. In fact, more than 40 utilities have adopted a voluntary 100 percent carbon-reduction target. Green Mountain Power is pursuing a 100 percent carbon-free energy supply by 2025, and 100 percent renewable energy by 2030. SMUD's goal is to reach zero carbon emissions in their power supply by 2030. Avangrid recently announced plans to be carbon neutral in connection with its Scope 1 and 2 emissions by 2030. PEPCO is seeking to achieve 100 percent renewable energy by 2032. The number of utilities making similar commitments increases sharply for the years 2040 and 2045.


" While there are many trends influencing the industry like the continued growth of EV adoption, decarbonization efforts, and storage, AI is a new frontier for utilities and regulators. My sense is that we are headed for the same chicken v. the egg conundrum we had with solar: Which comes first, the tech or the regulation? The safety and security of customer information will also be key consideration for utilities as AI grows in influence over the coming years – should be fun! "

- Knox Cameron, Director - Major Account Services
DTE Energy

And the impact of these goals on utility operations spans across departments— ranging from saving more energy through efficiency programs to realizing more capacity and resiliency from existing grid infrastructure.

Given that reality, it's no surprise that when respondents were asked to rank the key threats that these megatrends may pose to their business, increased operational complexity was the greatest concern.

KEY THREATS MEGATRENDS MAY POSE TO UTILITY OPERATIONS

Increased Operational Complexity

Loss of Revenue

Decreased Customer Satisfaction

Regulatory Fines

Threat of Disruption
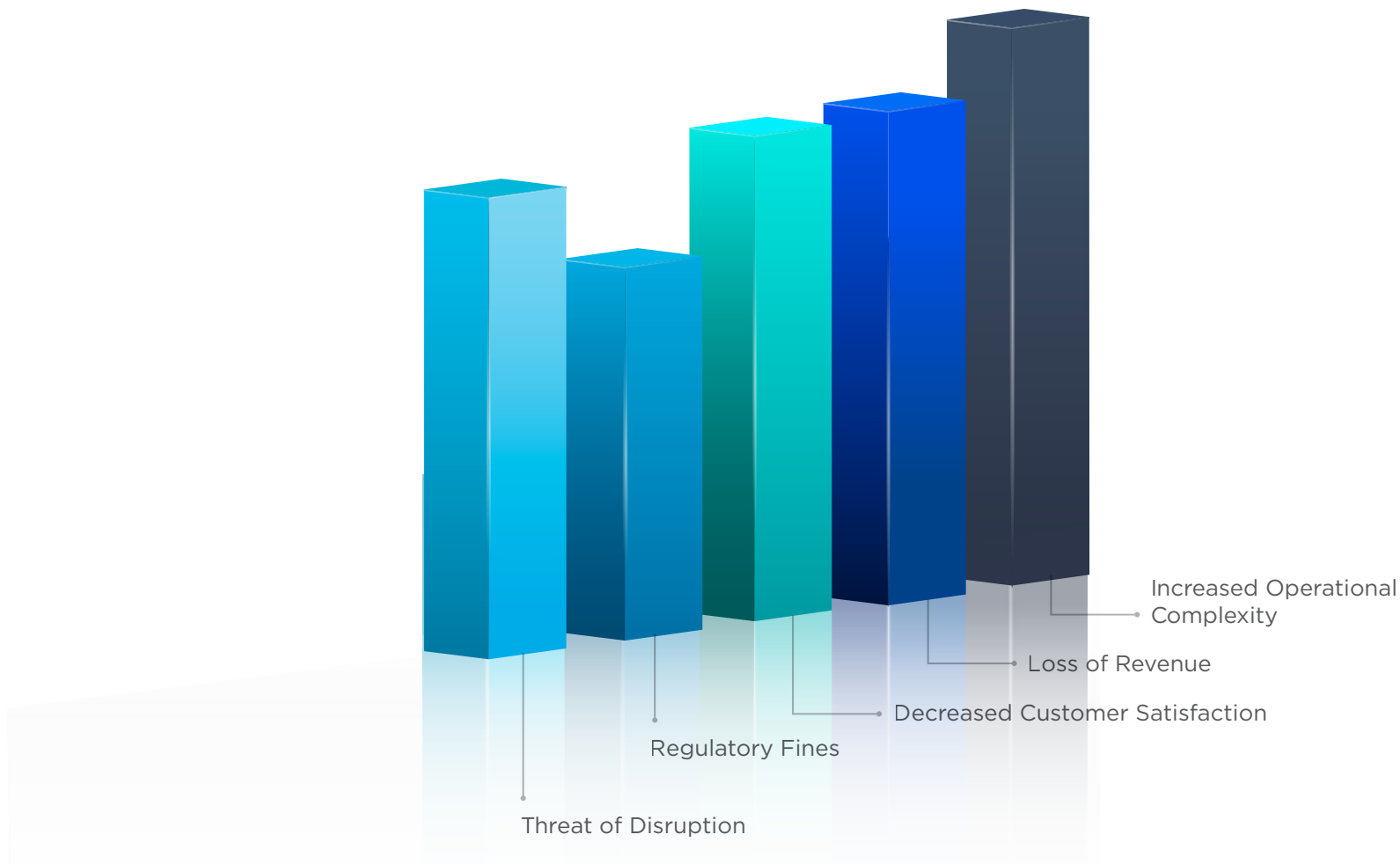
However, when it comes to how prepared utilities are to tackle these challenges, there is a great deal of room for improvement.

On a scale of 1 to 10, respondents ranked utility readiness at only a 3.

Utility Readiness

01   02   03   04   05   06   07   08   09   10

AI ADOPTION

AI is the essential technology that is empowering utilities to meet their challenges and remain future-ready. But how far along is the energy sector in transforming their data into insight-driven action?

Across the board, respondents said their utilities are in the early days, with 57 percent identifying their organizations as "Spectators" that are still observing AI trends from a distance, investigating how AI can potentially impact their business model and operations, and overall reluctant to commit to AI investments at this stage.

The remaining 44 percent of respondents identified their organizations as "Pathfinders" that have initiated a journey into AI by setting up foundational teams and starting basic AI training. These utilities are conducting pilots with AI applications and have a few exploratory projects in the pipeline. None of the respondents identified their utility as either an "Architect" that is integrating AI into workflows and operations nor as a "Champion" that is fully committed to AI-driven transformation.

> " I would say we are in-between a Spectator and Pathfinder at this point. We are not reluctant to invest, but have not set up foundational teams yet either. We are open to pilots for certain applications and are researching what other utilities have done. "

- Brett Feldman, Energy Efficiency Manager
Rhode Island Energy a PPL Company

STAGE OF AI ADOPTION

57%

44%

Spectator Engagement Level

Pathfinder Engagement

Architect Engagement

Champion Engagement
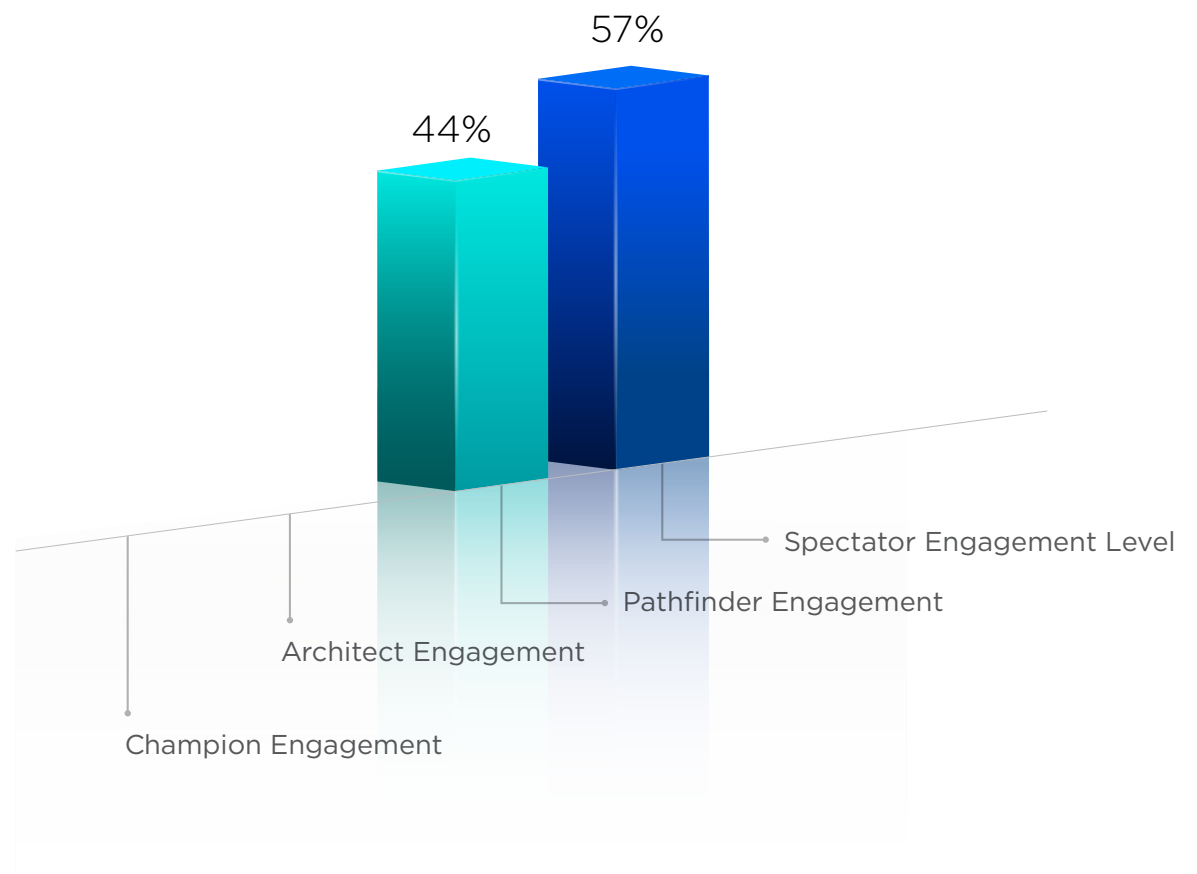
Some of this slow adoption is likely tied to the stance of regulatory bodies on AI. Seventy percent of respondents reported that their regulators are either unfamiliar or indifferent about AI's potential to solve AI industry challenges.

Utilities have also been slow to embrace AI because of a desire to avoid risk before they consider broad adoption. De-risking AI requires specially trained energy data models that are scalable, maintain the fidelity of customer information, and safeguard customer security and privacy.

Many recognize that they don't have the in-house AI talent to adequately mitigate risk or drive the data science needed to create meaningful solutions. More than half of respondents judged their AI talent to be "significantly lacking" while only four percent rated themselves as "excellent" and comparable to sophisticated AI players like Amazon and Google. And, in a separate question, respondents identified "lack of internal expertise" as the leading cause of energy AI project failure, tied with "poor data availability and cleanliness" — another data science expertise-related concern.

IN-HOUSE AI CAPABILITIES
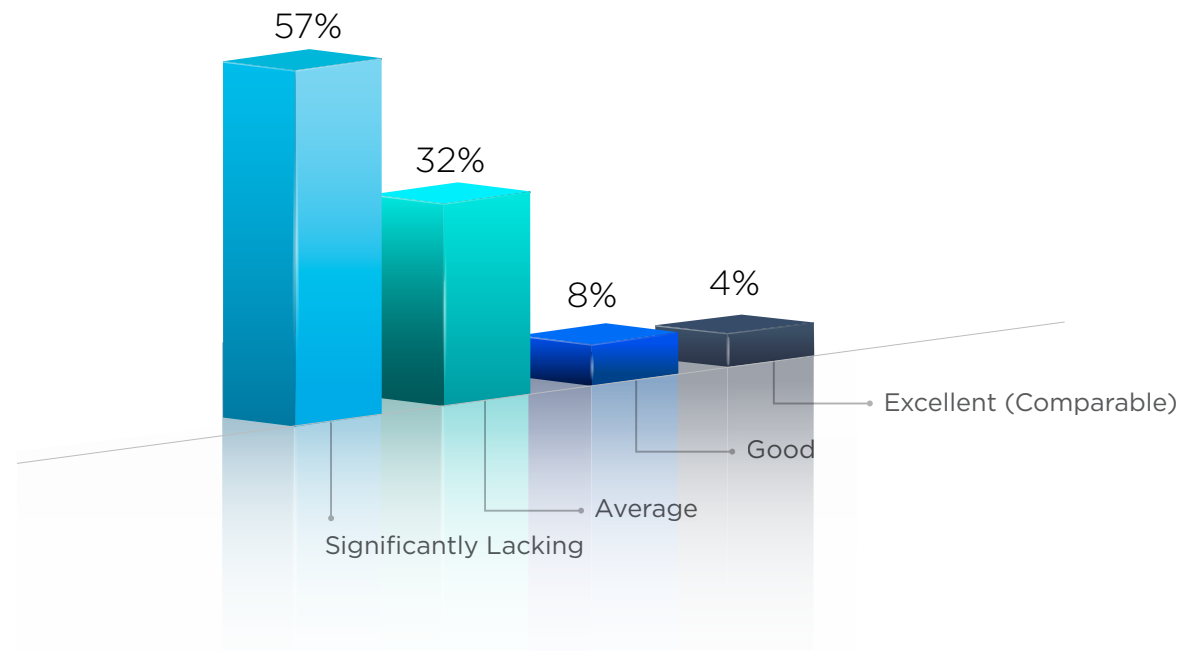
57%
32%
8%
4%

Excellent (Comparable)
Good
Average
Significantly Lacking

This finding points to the importance of partners that offer scalable plug-and-play AI solutions with proven track records in energy AI and data privacy to help utilities accelerate their AI progress while de-risking the process.

For those utilities leveraging AI today, their efforts are most often focused on improving the customer experience, including both self-service (29%) and call center support (17%). However, with the rise of electric vehicles and renewables, fears about grid stability are raising the importance of grid management use cases, including smarter grid infrastructure planning (17%) and smarter demand response (16%).

HOW UTILITIES ARE LEVERAGING AI TODAY

	1 LOWEST PRIORITY	2	3	4	5 HIGHEST PRIORITY	
Offering Energy Efficiency Tips to Customers						2.7
Enabling Smarter Demand Response						3.15
Improving Load Management						3.0
Hyper-Targeting Customers for Electrification and Energy-Efficient Appliances						3.0
Hyper-Targeting EV Owners						2.65
Smarter Grid Infastructure Planning						3.53
Robots/Drones for Infrastructure						2.42
Improving Customer Self-Service (e.g. chatbots/IVR)						3.74
Call Center Agent Support Tools (e.g. personalized recommendations for customers)						3.58

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LOOKING FORWARD

As grid complexity increases with rising penetration of renewables and EVs, utilities have no choice but to adopt a data-driven approach to better engage new-age customers with EVs and DERs, and more effectively m aintain a nd improve grid infrastructure.

That's why the time is now to lay out AI and data strategies that can drive the evolution of utility operations in keeping with smart-grid realities.

Learning from other utilities on this journey will play a big role in advancing the industry. Fostering partnerships with industry groups and vendors with proven AI expertise will also add value to AI investments, as well as better manage the risks that come with big data and AI.

To continue the conversation, learn more about Bidgely's EmPOWER AI conference, hosted by **Avista Utilities.**