



UNLOCKING AI IMPACT ACROSS THE UTILITIES VALUE CHAIN

Abstract

The utilities industry is seeing vast structural change driven primarily by four forces: evolving consumer expectations, increasing complexity, climate change, and expanding regulatory requirements. While the industry today generates large volumes of operational data, many organizations struggle to convert this data into insightful intelligence. AI adoption, therefore, remains fragmented across different models and tools. This limits its real impact across uses cases within the organization.

This paper outlines an enterprise AI approach to unlocking intelligence in utilities, moving beyond point solutions to integrated, enterprise-wide intelligence. It introduces the six-pillar Infosys AI First Value Framework. It stands for responsible and secure AI, digital twins and autonomous operations, AI-led modernization, agentic AI platforms, AI-grade data foundation, as well as domain AI and process redesign for the utilities sector. It highlights how the six pillars—Assure, Orchestrate, Insight, Transform, Modernize, and Innovate—can unlock AI value in utilities.

Introduction

With several pressures shaping the evolving utilities sector today, consumer expectations are also seeing a shift. They now want instant and personalized always-on interactions and incident resolution. Grids that were designed for one-way power flow are now managing a complex web of distributed energy resources (DERs), electrification, and smart meters. Climate variability is witnessing increased uncertainty in demand patterns. Regulatory requirements are becoming data-intensive and audit-driven.

Understanding how to coherently embed AI in utilities, with safety, trust, and explainability as a part of the design, is critical to seamless operations. From customer service to grid dispatch and regulatory filings to predictive field maintenance, AI will help tomorrow's utilities be future-first. Organizations will be able to sense what customers want. They will be able to turn signals into incident resolutions,

while working with assets that predict and grids that respond at speed. Enterprises will be able to anticipate trends before they happen and mitigate breakdowns before they disrupt operations. Creating such a future will take enterprise AI and a digital energy orchestrator like Infosys.

Infosys brings deep expertise in utilities spanning customer operations, transmission and distribution, energy generation, and shared services. This is combined with proprietary domain-specific AI platforms, our extensive partner ecosystem, and a proven track record with leading utilities globally. Together, these capabilities power Infosys to help utilities successfully navigate their next.

Our answer to the utilities' AI challenge is the Infosys AI First Value Framework—a purpose-built framework of six interconnected pillars, designed to unlock AI value from source to supply, across every layer of the enterprise.



Infosys AI First Value Framework: Built for Utilities

Infosys AI First Value Framework is not a generic AI adoption model adapted for utilities. It is a bespoke framework for the real operational challenges faced by the industry. Some of these include enhancing customer engagement, modernizing grid infrastructure, enabling agentic field operations, and ensuring responsible as well as auditable AI governance.

UNLOCK AI VALUE IN UTILITIES

Responsible and Secure AI

- Governance, guardrails, and auditability
- Explainable, human-in-the-loop AI
- Safety-critical and ESG-compliant operations

Digital Twins and Autonomous Ops

- Grid and asset digital twins
- Drone-led inspections and vegetation management
- Predictive maintenance and outage forecasting
- AI-driven load growth and grid planning

AI-led Modernization

- AI-augmented meter-to-cash, outage, and asset systems
- API-driven integration of legacy and cloud
- Business rule extraction from legacy platforms

Agentic AI Platform

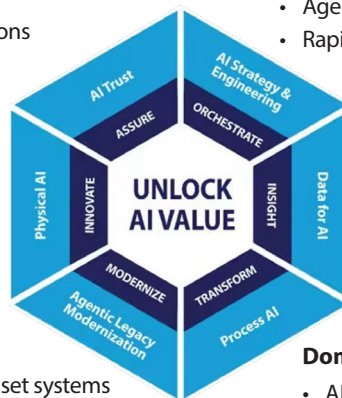
- Utility AI playbooks with ROI focus
- Agentic workflows across CX, grid, and workforce
- Rapid prototyping via digital fabric

AI-grade Data Foundation

- Unified IT + OT data (SCADA, AMI, GIS, EAM)
- Grid, asset, and Customer 360 data fabric
- CV-based asset inspection from UAV imagery

Domain AI and Process Redesign

- AI co-pilots for grid ops, outages, and field scheduling
- Intelligent CX agents for billing and fraud
- Automated regulatory and finance reporting



Together, these six pillars work as a connected system of intelligence: from data to decision, prediction to action, and execution to accountability.

Deep Dive: Each Pillar in the Utilities Context

This section explains each of the six core pillars that make up Infosys AI First Value Framework for utilities. Each pillar represents a key capability area where AI can be embedded across utility operations. Together, they show how the framework translates into practical transformation across the enterprise.

Orchestrate: Agentic AI Platform

The challenge

Most utilities lack the infrastructure to pursue and persevere with their ambition. Despite many organizations designing proofs-of-concept (POCs) and launching pilots, very few have successfully scaled them. Without a structured operating model, which includes a playbook, a return on investments (ROI) framework, and the ability to rapidly prototype use cases, AI initiatives often remain episodic and isolated, struggling to deliver sustained business value.

What this means in utilities

Infosys helps utilities establish the foundation required to operationalize AI at scale. This starts with defining a structured AI playbook for utilities focused on customer experience, grid reliability, workforce productivity, and financial return. Utility-specific canvases help identify and define use cases across customer operations, grid reliability, and field workforce. A digital fabric for rapid prototyping and POC development enables teams to test ideas faster, validate value earlier, and better align use cases to measurable business outcomes.

Key capabilities

- AI playbook and ROI model tailored to utilities' business outcomes
- Utility-specific AI canvases for customer operations, grid reliability, and field workforce
- Digital fabric for rapid prototyping and POC acceleration
- Agentic AI platform build and implementation across enterprise use cases

Case studies:

GenAI-powered customer service transformation

One of the largest electric utilities in the United States, serving 15 million customers, was handling more than 1.1 million calls each month. Long wait times of close to 10 minutes and abandonment rates of nearly 20% were adversely affecting customer experience. Agents spent considerable time manually searching across 1,900 standard operating procedure (SOP) documents and knowledge sources to respond to customer queries.

Infosys deployed a chatbot and virtual assistant (VA) powered by generative AI (GenAI) using Azure OpenAI Service, Azure Cognitive Search, and semantic search based on Retrieval-augmented Generation (RAG). The solution supports chat, voice, and SMS interactions, drawing on the utility's knowledge base to generate structured, source-linked responses in real time.

The result was reduced manual effort per interaction, improved response accuracy, enhanced explainability through source citations, and lower average handling time (AHT). The platform has been deployed to support more than 400 concurrent users.

Intelligent digital assistant for customer transformation

A large California utility needed to extract business requirements from complex legacy systems, including Java, COBOL, and change control board (CCB) configurations.

As part of their billing modernization program, they also required a digital assistant to extract rate structures, eligibility criteria, and applicability conditions from voluminous documentation.

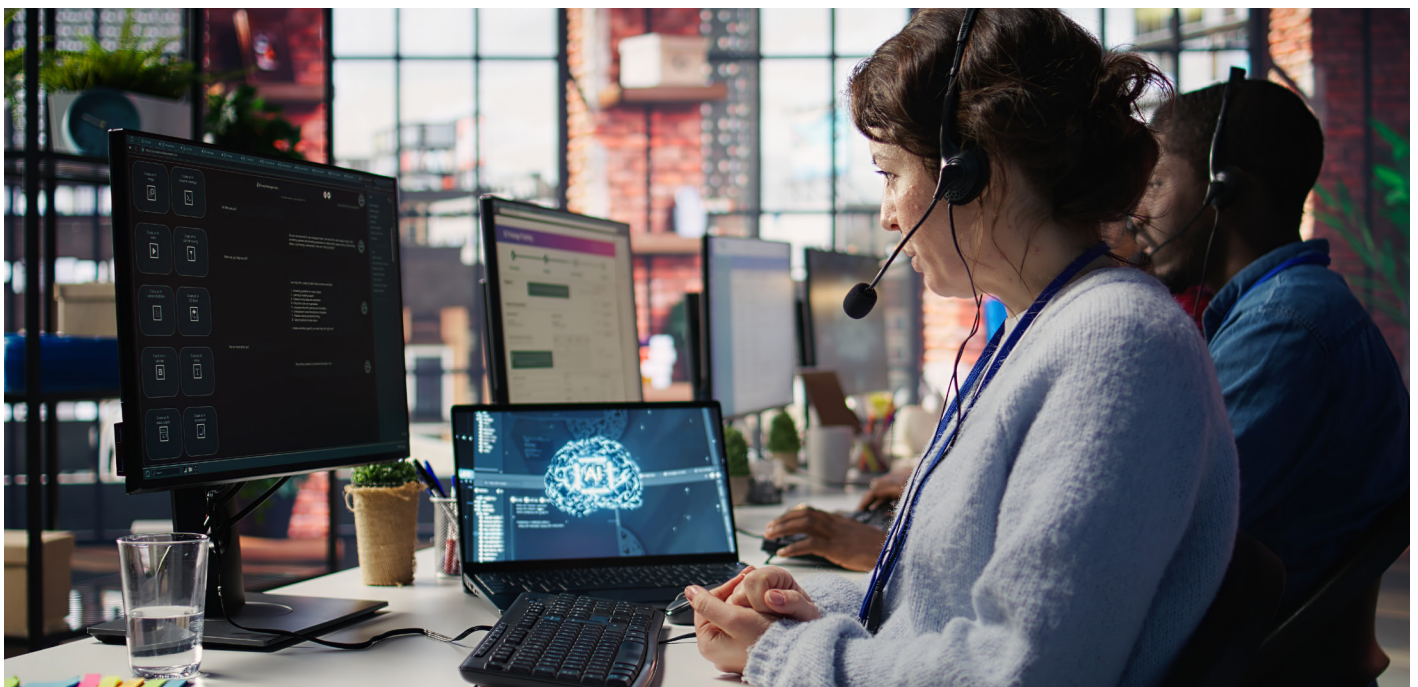
Infosys deployed a solution using semantic search, requirement extraction, and logic translation using Azure OpenAI and GitHub Co-pilot, along with a rate/tariff digital assistant tool. This helped with faster requirements documentation, reduced SME dependency, and a scalable GenAI platform that continues to support ongoing billing and tariff transformation.

RPA-driven transformation in operations and customer experience

A major North American utility needed to scale automation across customer service and AML operations workflows to reduce costs, improve KPIs, and address growing backlogs.

Infosys implemented a Blue Prism robotic process automation (RPA) managed services program. It covered more than 100 processes and over 55 utility-specific automation use cases. The solution integrated with mainframe systems, Pega BPM, and external applications. It delivered approximately US \$6 million in savings over three years, reduced turnaround time by 30%, and cleared over 20,000 backlog accounts. It also introduced advanced governance and Power BI reporting dashboards to measure delivery efficiency.

Infosys offerings: Cortex + Einstein Contact Center; Agentic Energy Advisor; AI playbook and ROI model.



Insight: AI-grade Data Engineering

The challenge

Utilities generate massive volumes of data from Supervisory Control and Data Acquisition (SCADA) systems, advanced metering infrastructure (AMI), geographic information system (GIS) platforms, enterprise asset management (EAM) systems, and customer databases. However, much of this data remains fragmented across operational technology (OT) and information technology (IT) environments. Without a unified data foundation, AI cannot extract and deliver the full value of this data. Predictive maintenance without unified asset hierarchies, demand forecasting without integrated meter data, and grid planning without geospatial context—all fall short of their potential.

What this means in utilities

Infosys helps utilities create a unified utility data platform across both OT and IT systems. It brings SCADA, AMI, customer, GIS, and EAM data into a single intelligence layer.

This platform supports three critical 360^o data views:

- **Grid 360** for network visibility
- **Asset 360** for performance and lifecycle intelligence
- **Customer 360** for customer engagement and service insights

Standardized asset hierarchies, geospatial data integration, and regulatory-grade reporting datasets ensure that all AI models are built on trusted data. The foundation also supports AI-powered computer vision to detect insulator defects, corrosion, and missing components from unmanned aerial vehicle (UAV) imagery.

Key capabilities

- Consolidated utility data platform spanning OT and IT (SCADA, AMI, customer, GIS, EAM)
- Data fabric powering Grid 360, Asset 360, and Customer 360
- Harmonized asset hierarchies and geospatial data integration
- Regulatory-grade reporting datasets for compliance and audit readiness
- Computer vision on UAV imagery for infrastructure defect detection

Case study:

Energy trading intelligence and market conformity checks

A German utility company wanted to modernize its energy trading operations by replacing legacy threshold-based market conformity checks with more adaptive machine learning (ML) models. They also wanted to enable easier access to trading data through natural language queries.

Infosys implemented threshold-based K-Nearest Neighbors (KNN) ML models to improve market conformity validation. The team deployed a chatbot powered by a large language model (LLM) that allows users to query data using natural language. The solution also supports algorithmic trading automation, with the capacity to scale from about 350 to 5,000 trades per hour.

The ML solution resulted in smarter trading decisions, improved access to market intelligence, reduced regulatory risk, and a more efficient trading operation.

Infosys offerings: Grid 360/Asset 360/Customer 360 Data Fabrics.

Transform: Business Process Redesign and Agent Foundry

The challenge

The most valuable AI transformation in utilities can be achieved by rethinking how existing processes can be better designed and executed. Grid dispatch, outage triage, billing enquiries, load balancing, and regulatory reporting, though critical functions, are still largely governed by rigid, rule-based workflows. Moving to intelligent, agentic operations requires both technology and process redesign.

What this means in utilities

Infosys combines business process redesign expertise with a domain-specific agent foundry to help utilities design and automate workflows. AI copilots support activities such as grid dispatch, load balancing, outage triage, field work scheduling, and switching plans. In customer service, they assist with billing enquiries, anomaly detection, and fraud identification, allowing employees to focus on higher-value interactions. Rule-based automation is progressively transformed into intelligent agents that adapt, learn, and escalate when needed. Automated reporting also helps reduce effort and improve accuracy.

Key capabilities

- AI copilots for grid dispatch, load balancing, outage

triage, field work scheduling, customer service-billing enquiries, anomaly detection, and fraud identification

- Domain-specific agent foundry for utilities workflows
- Transformation of rule-based RPA into intelligent, agentic operations
- Automated regulatory compliance and financial reporting

Case studies:

AI-powered technical help desk for field agents

A German utility wanted to improve how field service agents diagnosed triage issues and accessed resolution guidance in the field. Existing processes often relied on call center escalations and manual reference lookups.

Infosys deployed a GenAI-powered semantic search system accessible via handheld devices. Using Anthropic Claude, RAG via LangChain, Amazon Bedrock, and Amazon Postgres vector database, the solution enables field agents to query historical data, receive resolution guidance, and trigger automated actions on-site. Infosys' solution helped achieve faster issue triage, fewer escalations, and measurable improvement in field service productivity.

AI-powered rate case discovery

Regulatory rate cases are among the most resource-intensive processes in the utilities industry. They involve hundreds of data requests, tight response timelines, and deep cross-functional coordination. Manual effort, dependence on subject matter experts (SMEs), and inconsistent response quality across filings can result in significant risk and costs.

Infosys developed an AI-powered rate case discovery solution using custom language models with semantic search and document ingestion, with a human-in-the-loop (HITL) review framework on Microsoft Azure. The solution automates data request response preparation, synthesizes historical filings, and generates submission-ready responses. Quantitative outcomes include a 40–80% reduction in response preparation time, improved response consistency across filings, and reduced dependence on SMEs.

Infosys offerings: Rates GPT on Azure OpenAI; Custom LLMs + semantic search; RPA/intelligent automation.

Modernize: Agentic-led Full-stack Modernization

The challenge

The utilities industry has among the most complex legacy technology environments. Aging COBOL and mainframe systems continue to support mission-critical functions such as meter-to-cash, outage management, asset management, and grid operations.

While these systems remain essential, they are increasingly difficult to maintain, extend, or integrate with modern AI platforms. Modernization is a critical imperative and must be achieved without disrupting day-to-day operations.

What this means in utilities

Infosys helps utilities modernize legacy systems while maintaining operational continuity. Our agentic-led full-stack modernization approach combines AI-augmented commercial off-the-shelf (COTS) platform modernization with an application programming interface (API) integration, enabling legacy systems to work alongside modern AI and cloud platforms. Tools like iLEAD and Amazon Q help identify dead code and generate user stories from embedded business logic.

This approach enables utilities to modernize progressively while unlocking the agility that AI-first operations demand.

Key capabilities

- AI-augmented COTS and platform modernization: meter-to-cash, outage, asset management, grid ops
- API economy to connect legacy systems with modern AI and cloud platforms
- AI-enabled business rule extraction from legacy mainframe and COBOL systems (iLEAD + GenAI)
- Agentic-led reverse engineering and code migration
- Progressive modernization with zero operational disruption

Case study:

COBOL legacy modernization with GenAI

A leading California-based utility with a large customer base needed to modernize a core legacy mainframe application. They wanted to do this by migrating to a cloud-native AWS environment and transitioning key business functionality



to SAP. The project faced multiple challenges that included limited SME knowledge and outdated documentation.

Infosys deployed its iLEAD + GenAI approach to reverse engineer the COBOL codebase. iLEAD was used for application sizing, dead code identification, and interface analysis during discovery. AI tools were used for code summarization and business rule extraction as well as rules classification and user story generation.

The project identified and removed 65,000 lines of inactive or dead code, which is about approximately 20% of the codebase. This resulted in 30–35% savings in business rule extraction and documentation efforts. It also accelerated migration timelines while reducing program risk.

Infosys offerings: iLEAD + GenAI for COBOL reverse engineering; Azure AI + EVCI-CHARM; API Economy framework.

Innovate: Digital Twins, Autonomous Systems and Edge AI

The challenge

Utility networks span power lines, substations, transformers, gas mains, and generation assets. Managing these

assets through periodic inspection cycles and reactive maintenance is becoming increasingly difficult. Asset failures, grid faults, gas leaks, and outages carry significant safety and financial risks. Technologies such as AMI 2.0, drones, and edge computing are creating newer opportunities to continuously monitor assets and respond to issues before they escalate.

What this means in utilities

Infosys helps utilities move from reactive operations to predictive, autonomous asset management. Digital twins provide a virtual view of power grids and network assets, allowing operators to simulate, monitor, and optimize in real time. Drones, robots, and AI-enabled image and video analytics transform vegetation management and infrastructure inspection. Predictive and prescriptive maintenance models help identify potential failures, enabling condition-based intervention. At the grid edge, AMI 2.0 data can be used to predict outage, detect leakage, and assess asset failure risk ahead of time. AI agents also identify emerging load growth scenarios such as data center and AI infrastructure demand, while helping prioritize grid-enhancing technologies like dynamic ratings and reconductoring.

Key capabilities

- Digital twins of power grid and network assets
- Autonomous field inspection with drones, robots, and AI vision analytics
- Predictive and prescriptive maintenance across generation, transmission and distribution (T&D), as well as field assets
- Real-time edge AI for outage prediction, gas leak detection, and asset failure risk (AMI 2.0)
- AI-driven load growth identification and grid investment prioritization

Case studies:

Utility AI based energy analytics platform

One of the largest utilities in US required a scalable mechanism to convert vast amounts of AMI, billing, weather, and customer data into actionable business insights. While large volumes of smart meter and operational data were available, extracting meaningful intelligence for grid operations, customer engagement, forecasting, and energy management remained challenging.

Infosys implemented an AI-powered analytics platform leveraging load disaggregation models, appliance profiling, appliance inefficiency models integrating with weather and AMI data sets. Fourteen AI/ML models were integrated into a unified analytics platform delivering operational, customer, and planning insights through enterprise dashboards and advanced analytics capabilities.

D-COMET (Distributed Computational Optimization for Energy Transition)

Distribution utilities face rising operational complexity due to rooftop solar, battery storage, community energy systems, bidirectional power flows, congestion risks, and hosting-capacity constraints. Traditional centralized analysis approaches often struggle to provide rapid, localized, and scalable insights needed to support real-time DER management and renewable integration.

D-COMET combines distributed computing, agentic AI, grid optimization, Integration Capacity Analysis/Hosting Capacity Analysis studies, and DER orchestration into a unified intelligent grid management solution. The platform deploys edge-level intelligence capable of performing localized power-flow and congestion analysis while continuously recommending actions to grid operators and

planners. It incorporates AI-driven optimization, distributed energy management, VPP enablement, and peer-to-peer energy trading concepts using open and interoperable architectures.

AI-driven gas leak detection

A large Midwestern gas utility needed a proactive approach to detecting gas leaks across its distribution network, particularly in unoccupied or remote locations.

Infosys deployed ML models on the Databricks Lakehouse AI platform to continuously monitor AMI gas meter data for anomalies in consumption patterns. The solution successfully detected more than 25 gas leaks, including a significant leak in an unoccupied residential complex. This enabled early intervention for improved public safety, and shifted the focus of operations from reactive incident response to predictive hazard prevention.

XR-based field force training

One of the largest electric energy companies in the US wanted to improve workforce readiness and reduce accident rates for field technicians without increasing classroom training time.

Infosys delivered seven projects based on extended reality (XR) over an 18-month period. The solution leveraged Oculus Quest 2, WebGL, and iOS platforms to deliver a substation virtual reality (VR) training application, with hazard scenarios and damage assessment exercises for first responder teams. It also included equipment orientation tools and immersive neighborhood training environments.

Assure: Responsible AI and Security Governance

The challenge

In utilities, the stakes of AI failure can often be markedly high. A grid dispatch decision that cannot be explained, a trading recommendation that cannot be audited, or a compliance filing generated without human oversight carry real operational, regulatory, and reputational, risks. As AI becomes embedded in critical utility functions, trust and transparency must be built in right from the beginning.

What this means in utilities

Infosys builds responsible AI governance into every layer of Infosys AI First Value Framework. AI guardrails, model evaluation frameworks, and audit trails help ensure that every automated decision can be understood, explained,

and reviewed. HITL and explainable AI capabilities support operator trust in dispatch, outage management, and energy trading.

The approach also addressed safety, compliance, and grid security standards as well as emissions reporting requirements. Consumer fairness principles govern AI-driven pricing and service decisions. Security testing and validation protect AI systems operating within increasingly connected grid environments.

Key capabilities

- AI guardrails, model evaluation, and audit trails for grid operations

- HITL and explainable AI for dispatch, outage, and trading decisions
- Safety-critical AI governance aligned to grid safety and environmental, social, governance (ESG) compliance
- Consumer fairness frameworks for AI-driven pricing and service operations
- Security testing and validation for AI systems across connected grid infrastructure

Infosys offerings: AI guardrails and Model Evaluation framework; HITL review workflows; ESG-compliant AI governance.

The Road Ahead for Utilities



From reactive to anticipatory

Utilities that partner with Infosys move from reacting to incidents to preventing them. Whether it is a gas leak detected through AMI anomaly patterns, an outage predicted at the grid edge, or a customer issue resolved before a call is placed, Infosys helps transition from response to foresight.



End-to-end transformations

Infosys AI First Value Framework ensures that no part of the utilities value chain is left behind. It connects customer self-service, billing, grid dispatch, asset inspection, regulatory filings, and energy trading.



Modernization without disruption

Utilities cannot afford downtime or operational instability during a modernization program. Infosys' agentic-led approach extracts business rules from legacy systems, connects existing infrastructure through API economies, and delivers cloud-native capability without requiring a complete system replacement.



AI that operators trust

In utilities, decisions carry real, operational, safety, regulatory, and financial consequences. Therefore, explainability and governance are essential. Infosys builds HITL workflows, audit trails, and responsible AI governance into every AI deployment. This ensures that AI-generated recommendations remain transparent, traceable, and trusted.



Scale, ecosystem, and domain depth

Infosys brings together global delivery scale with deep utilities expertise across customer operations, T&D, generation, and shared services. We work with a broad ecosystem of partners, including hyperscalers, domain software vendors, and specialist AI companies such as Microsoft Azure, AWS, Salesforce, Databricks, Anthropic, and NVIDIA. This allows utilities to access best-in-class technologies with a single, coordinated approach.

Explore your Future

The utilities industry is being redefined. Organizations that embed AI across the value chain, from source to supply, through consumer, complexity, climate, and compliance perspectives will lead the way.

Infosys is the digital energy orchestrator that helps utilities achieve that transformation. Connect with us to explore how we can help you reinvent your enterprise.

For more information, contact askus@infosys.com



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