

Transforming utilities

The strategic advantage of open digital leadership in the energy sector

Executive summary

Energy providers around the world are in the middle of an industry transformation. Though the traditional electric supply chain has delivered reliable electricity to consumers for decades, disruption has changed the competitive landscape. New ways to generate, store, deliver, and use energy have entered the marketplace. Technology is a primary cause of the industry disruption. At the same time, it is also the agent for transforming the electric enterprise, achieving business goals, and establishing competitive advantage. Technology-based business strategies can transform utilities, establishing smart grids and generating new business opportunities that increase competitive advantage. Open source information technology solutions can power the capabilities that achieve those strategies.

Utility industry challenges

In the global electric utilities industry, generation, transmission, and distribution are no longer the main links in a mostly linear supply chain. Global climate concerns, market drivers, and technology advancements have changed the picture significantly. Power companies seek ways to integrate renewable energy sources, microgrids, and distributed resources into operations. At the same time, they must focus on ways to lower energy use, boost quality of life, and benefit the environment.

Traditional utility companies are competing with newcomers, including startups, global oil and gas enterprises, and corporations generating their own power. Where they once enjoyed monopolies in their service areas, many of these companies now vie with other providers for customers.

Consumer behavior also impacts the utilities industry. Demand continues for renewable energy sources in power generation. Increasingly, individuals are becoming electric generators themselves through use of solar and wind systems, often selling excess electricity to their primary providers by way of meter hookups. Smart products for the home open opportunities for merchandise sales and service bundles that attract new customers.

Technology-based energy business strategies

Technology is a root cause of—and a solution to—utility market disruption. Power companies cannot rely on legacy systems to remain competitive. Instead, technology leaders must offer [Industry 4.0](#) technologies, embedded in strategies for business growth and competitive advantage.

Put data into the customer experience

Consumers want real-time access to electric consumption data to help them analyze usage patterns and reduce costs. Customer-facing interfaces like online portals and mobile apps offer this data access to residential users. Using data to enhance the customer experience can help increase customer loyalty and grow revenue.

Use analytic tools to optimize consumption and costs

The addition of analytic tools to user interfaces helps residential and business customers and energy providers predict, manage, and optimize energy consumption. Through data capture from sources like process monitoring, automation, and production planning systems, energy companies can make decisions that help optimize energy generation, procurement, and usage.



facebook.com/redhatinc
@RedHat
linkedin.com/company/red-hat

Establish intelligent power plants

IT and operations technology (OT) still rely on legacy systems and applications in power plants. Today's technology solutions can take advantage of sophisticated data capture and management that form the foundation of intelligent systems. Edge computing, automation, real-time monitoring, and other capabilities can transform plant operations.

Upgrade transmission line monitoring, maintenance, and workflows

Intelligent systems can substantially increase efficiency and reliability of electric transmission. Automation and real-time monitoring can streamline workflows and increase maintenance effectiveness.

Maintain regulatory compliance

As the electric industry rapidly evolves, so does its regulatory environment. The data capture that improves operations and management also helps to ensure compliance and streamline regulatory documentation processes.

Focus on digital transformation throughout the enterprise

Digital transformation is the strategic way forward for all industries, including the energy sector. Traditional companies with legacy systems may be slower to pursue this transformation than new entrants. However, digital modernization is an imperative for all market players to remain competitive.

Selected use cases

Technology-based business strategies translate to use cases throughout the enterprise. Relevance depends on the type of company and its leadership priorities.

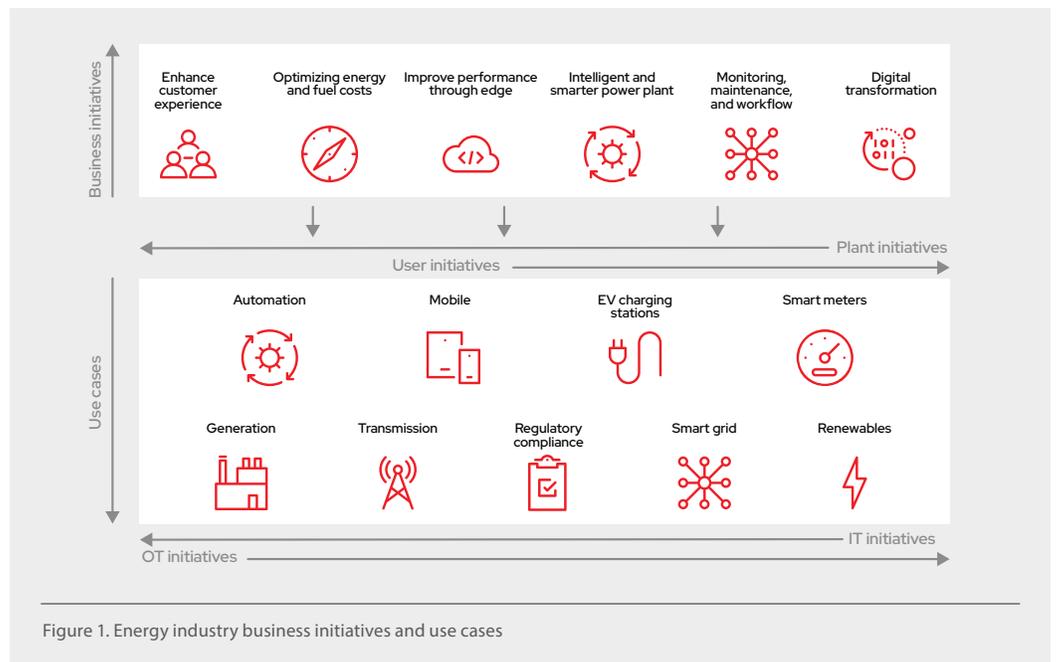


Figure 1. Energy industry business initiatives and use cases

A broad range of open digital leadership use cases apply to the energy industry. Most significantly, a large number of use cases are components of a smart grid that will replace the current generation-transmission-distribution structure that has been in place for decades.

Table 1. Open digital leadership use case detail

Generation	Transmission
<ul style="list-style-type: none"> ▶ Optimize operations by connecting IT/OT applications ▶ Modernize supervisory control and data acquisition (SCADA) systems ▶ Extend SCADA's data for gaining operational intelligence ▶ Modernize back-end systems ▶ Use predictive maintenance and process control ▶ Increase plant security with surveillance, environment monitoring, and workforce safety ▶ Benefit from autonomous vehicles ▶ Introduce statutory reporting 	<ul style="list-style-type: none"> ▶ Use smart SCADA systems ▶ Monitor and optimize lines in real time ▶ Monitor security, surveillance, and risk ▶ Install micro grids ▶ Integrate distributed energy resources and renewables ▶ Manage circuit controls
Smart meter and smart cities	Renewables
<ul style="list-style-type: none"> ▶ Offer energy-as-a-service ▶ Provide real-time access to consumption data and forecasted usage ▶ Optimize analytics-driven networks ▶ Prioritize rural digitization 	<ul style="list-style-type: none"> ▶ Use data-driven production and demand forecasts ▶ Predict and improve production with real-time weather data ▶ Use data science and machine learning (ML) to optimize performance, schedule maintenance, and better understand root cause of device malfunction

Mobile	Automation
<ul style="list-style-type: none"> ▶ Provide real-time access to consumption patterns, historical usage, and analytics ▶ Offer digital billing and payment infrastructure ▶ Provide smart customer support channels ▶ Automate customer alerts ▶ Introduce data-enabled problem resolution for field staff 	<ul style="list-style-type: none"> ▶ Automate business decisions and processes ▶ Optimize IT automation ▶ Benefit from grid and network automation
Smart grid	Electric vehicle (EV) charging station and docks
<ul style="list-style-type: none"> ▶ Prioritize device predictive maintenance and workflow ▶ Monitor, optimize, and analyze line devices ▶ Manage circuit controls ▶ Harden grids 	<ul style="list-style-type: none"> ▶ Enhance customer experience for browsing charging stations, report issues, payment, check availability, charging history, and vouchers ▶ Use data-driven EV charging station infrastructure

Open digital leadership influences

Critical technology capabilities support smart grids, forward-looking customer service, and competitive advantage in the electric industry.

Data consolidation

Consolidation of data residing in different formats and transmitted in different ways is a first step to unlocking the power of data in the electric enterprise. A unified dataset is the basis for getting maximum benefit from other technologies.

Artificial intelligence/machine learning

Applying artificial intelligence and machine learning (AI/ML) to captured data generates business insights that can transform all aspects of the enterprise. Data analyzed by AI/ML tools contribute to new insights, informed business decisions, and effective automation of processes and workflows that allow human workers to concentrate on higher-value activities.

Industrial Internet of Things

The Industrial Internet of Things (IIoT) digitally connects IT and OT and facilitates operational improvement, process automation, and digital transformation. Data from IIoT devices can be managed via edge computing. IIoT data analysis by AI/ML contributes to large-scale optimization efforts, innovative services, and an enhanced user experience.

Edge computing

Edge computing takes advantage of the flexibility of hybrid cloud computing to produce faster, more reliable results. Distribution of smaller servers close to data sources can lower network costs, avoid bandwidth constraints, reduce transmission delays and service failures, and better control the movement of sensitive data.

Automation

Automation is a top strategic advantage of open digital leadership. In the electric industry, it allows companies to automate repetitive tasks, streamline processes, and increase agility. Automation also allows redeployment of workers to human-specific roles and activities, speeding innovation and focus on new business opportunities.

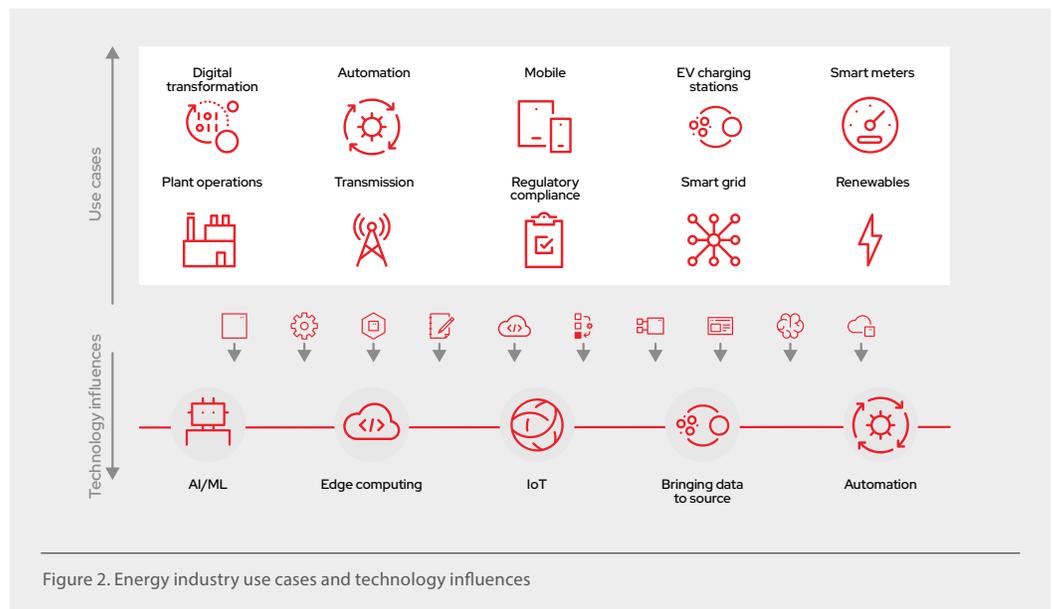


Figure 2. Energy industry use cases and technology influences

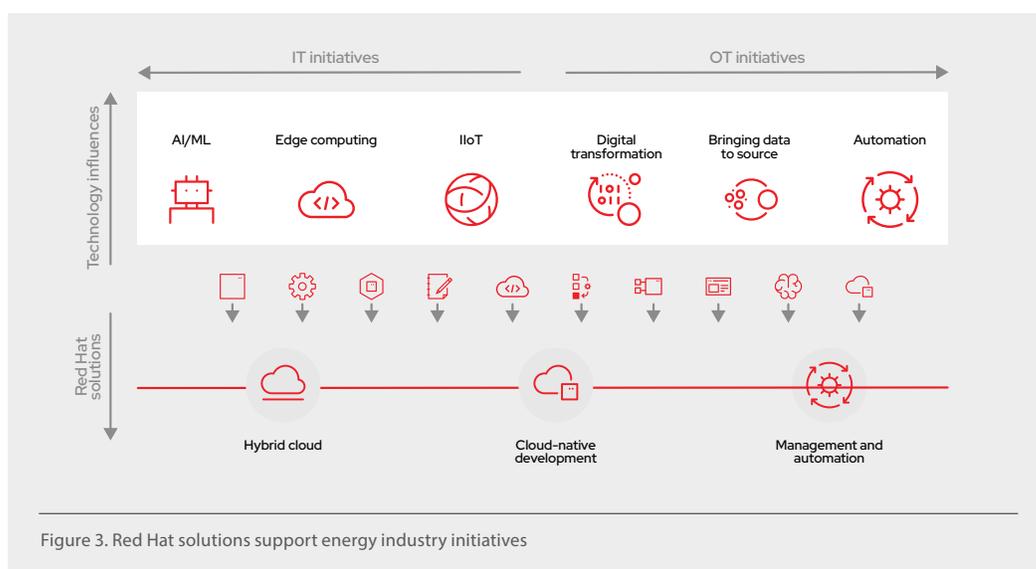
The open source advantage for utilities

Red Hat is the world's leading provider of enterprise open source solutions. More than 90% of Fortune 500 companies rely on Red Hat® products and solutions.¹ In the utilities sector, Red Hat offers open source technology that supports a smart grid, streamlines operations, and contributes to informed decision making:

- ▶ Red Hat's hybrid cloud architecture incorporates workload portability, orchestration, and management across bare-metal, virtual, private, and public cloud environments. The architecture supports an interconnected, consistent computing environment that allows movement of applications between environments without maintaining a complex map of application programming interfaces (APIs).

¹ Red Hat client data and Fortune 500 list for 2020

- ▶ Red Hat’s cloud-native development platform lets you accelerate new application builds, optimize existing applications, and connect them all. The platform supports rapid response to market trends and helps turn ideas into products and services.
- ▶ Red Hat automation and management solutions help scale your infrastructure and teams to keep up with capacity demands. With the right automation in place, you can deploy new applications and services faster, manage IT infrastructure more efficiently, and increase productivity in application development. Use automation to streamline provisioning, configuration management, patching, application orchestration, security, and compliance.



Learn more

To learn more about Red Hat open source solutions for the energy sector and to discuss your company’s specific IT needs, [contact Red Hat](#).



About Red Hat

Red Hat is the world’s leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers integrate new and existing IT applications, develop cloud-native applications, standardize on our industry-leading operating system, and automate, secure, and manage complex environments. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500. As a strategic partner to cloud providers, system integrators, application vendors, customers, and open source communities, Red Hat can help organizations prepare for the digital future.



facebook.com/redhatinc
@RedHat
linkedin.com/company/red-hat

North America
1 888 REDHAT1
www.redhat.com

Europe, Middle East, and Africa
00800 7334 2835
europe@redhat.com

Asia Pacific
+65 6490 4200
apac@redhat.com

Latin America
+54 11 4329 7300
info-latam@redhat.com