

**TOUGHBOOK**

# POWERING THE FUTURE of the utilities industry

Key technology trends and operational requirements for tomorrow's field workers

# The forces of change in utilities

Across energy, water, and power distribution, the utilities sector is facing a combination of pressures that are fundamentally reshaping how they operate, compete, and deliver value.

With the energy transition a key focus demanding immediate action, utilities providers and sector at large are navigating the complex challenge of balancing surging power demands with aggressive decarbonisation goals. Additionally, electrification is accelerating across transportation and industrial sectors, while digital infrastructure and AI applications continue to push consumption higher.

As a result, we're seeing a fundamental evolution in energy systems. Traditional centralised grids are giving way to hybrid models incorporating microgrids and virtual power plants, changing how utilities generate, distribute, and manage power and water supplies.

Yet in amongst all the energy and technology associated with the energy transition, there is a human workforce challenge. As generations of experienced technicians retire, attracting new talent has become difficult, and the nature of the work itself is changing.

Remote monitoring, predictive analytics, and AI-driven insights are transforming what field workers need to know and do, and there is still a degree of resistance to new tools, with many preferring hard-won experience over algorithmic recommendations.

Externally, the picture is equally complex. Supply chain disruptions, rising capital costs, geopolitical tensions threatening energy security, and an increasingly complex permitting environment are all barriers that can slow innovation.

**Rising electricity demands, the nuclear revival, geopolitical pressures, grid modernization, and digital innovation all intersect to shape the sector's future.<sup>1</sup>**

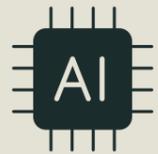
**The market for AI in energy systems is projected to reach USD 14 billion by 2029.<sup>1</sup>**

<sup>1</sup>Capgemini, 2025 Energy and Utilities Trends



Over the next few pages, we'll look at the key technology trends shaping the future of utilities management, and what this means for mobile field workers:

# Key technology trends



## ARTIFICIAL INTELLIGENCE From hype to strategic necessity

The use of AI across the utilities sector is diverse. From optimising grid operations in real-time and forecasting consumption patterns, to enabling predictive maintenance and enhancing customer service, there are many ways that AI can help create smarter energy management systems.

But getting from idea to impact is challenging. Talent is scarce, and many field workers reluctant to embrace and trust AI-driven insights. To fully unlock AI's potential the sector must both bridge the skills gap and win over the workforce.

At the customer end, there are rising expectations for AI-powered personalisation and service. With LLMs and robotics enabling new forms of human-AI partnerships, there is huge potential to transform service delivery. But with the high level of regulation across the industry there are challenges to overcome in balancing AI's benefits with ensuring appropriate guardrails and human oversight are in place.

### AI is transforming utilities operations through:

- Real-time grid optimisation
- Consumption forecasting
- Predictive maintenance
- Enhanced customer
- AI-powered personalisation and service delivery service
- Human-AI partnerships via LLMs and robotics



# 62%

of utility executives see an urgent need to upskill employees in AI tools, making AI education a priority.<sup>2</sup>

# Key technology trends



## PREDICTIVE MAINTENANCE Transforming asset management

Closely linked to AI is the rise of predictive maintenance. Traditional reactive or scheduled maintenance approaches are giving way to data-driven strategies that anticipate equipment failures before they occur. By analysing sensor data, historical performance, and environmental conditions, utilities companies can identify early warning signs of degradation and intervene proactively.

And in an industry built on extensive legacy infrastructure, predictive maintenance offers a way to do more with less and optimise the performance of existing assets rather than simply replacing them.

But knowing when equipment or infrastructure might need repair or replacement is only half the battle. Any technicians sent into the field to conduct maintenance – predictive or otherwise – must be able to connect with the physical components and external networks and systems.

### Benefits of predictive maintenance include:

- Reduced downtime
- Lower maintenance costs
- Extended asset lifespans
- Improved safety
- Optimised legacy infrastructure performance



# 34%

of executives expect AI copilots and automation to streamline workflows, reducing manual effort and boosting innovation.<sup>2</sup>

# Key technology trends



## CYBERSECURITY Protecting critical infrastructure

Critical infrastructure is an attractive target for cyberattacks, and a successful breach could have devastating consequences for public safety and economic stability. But as utilities become more digital and interconnected, the attack surface is expanding.

Any data breach could expose sensitive customer information, while operational technology attacks could disrupt power delivery or water treatment.

Protecting these systems requires a multi-layered approach: robust authentication, encrypted communications, continuous monitoring, and a security-first culture that extends from the control room to the field.

The challenge is compounded by the distributed nature of utility operations, with field workers accessing systems from remote locations, often in harsh environments where connectivity is unreliable.

### Key cybersecurity challenges:

- Expanding attack surface due to digitalisation
- Vulnerabilities from remote sensors, cloud platforms, and mobile tools
- Risks to customer data and operational technology
- Connectivity issues in remote field environments



**48%** of utilities or production businesses have identified breaches or attacks in the last 12 months.<sup>3</sup>

# Turning trends into operational reality

These technological shifts translate directly into operational requirements, particularly for the mobile workforce that keeps utilities running around the clock all year round.

Modern field technicians are expected to interact with AI-powered diagnostic tools, access real-time data from sensors and legacy systems, perform complex maintenance guided by predictive analytics, and document their work digitally.

And of course, for technicians to access any cloud-based systems and AI tools, reliable, secure connectivity is another prerequisite for enabling digital productivity in the field.

On their own these are significant technological challenges, yet utilities field technicians need to accomplish all of this while working in remote locations, extreme weather, and harsh physical environments.

Whether it's a technician climbing a wind turbine, inspecting and oil or gas pipeline, or conducting maintenance at water treatment infrastructure, their equipment needs to perform in the most challenging of conditions.

This new reality demands tools that can keep pace. Only specialised and customisable mobile devices can deliver the reliability and resilience modern operations depend on.

## To stay productive in the field, technicians require:

- AI-powered diagnostic tools that can process data in real time
- Access to cloud-based systems and legacy infrastructure
- Predictive analytics to guide complex maintenance tasks
- Reliable, secure connectivity—even in remote areas
- Rugged devices that withstand extreme weather and physical conditions



# Panasonic TOUGHBOOK Made for the challenge

## Connectivity

TOUGHBOOK has unique proprietary antennas and high-speed Ethernet and 5G standalone modules, with pass-through antenna capabilities on vehicle docks, giving technicians reliable connectivity, even in remote areas.

## AI at the edge

TOUGHBOOK devices feature AI edge processing, powered by the Intel® Core™ processors, with Intel vPro® technology, enhancing operational efficiency and automation by analysing data on the device in real-time at the edge.

## Adaptability and productivity

TOUGHBOOK offers serial port connectivity and customisable configurations to enable direct interface with legacy infrastructure and equipment commonly found in the utilities sector, while long-lasting HotSwap batteries enable teams to work around the clock.

## Rugged reliability

TOUGHBOOK devices withstand temperatures ranging from -29°C to +63°C, have IP-rated dust and water resistance, and MIL-STD-810H vibration, shock, and drop resistance, making them ideal for the rigours of sustained outdoor usage.

## Security

TOUGHBOOK includes the latest stable chipset from Intel vPro and Secured Core PC technologies to keep your devices, IT systems, and the wider utilities network protected in the face of an ever-expanding attack surface.

**Power up your utilities  
field capabilities with  
TOUGHBOOK**

Visit our dedicated Utilities page to learn more about how TOUGHBOOK can empower your field workers, and to speak to our industry specialists.