Edge computing and IoT solutions

Intelligence in energy

What's fueling today's energy transformation?

DEMAND FOR RENEWABLES IS GROWING

One third of power

Renewables now deliver 33% of global energy[1].

100% growth

The power capacity of renewables is set to double between 2019-2024[2].

$107.2 billion invested

In 2017 wind power became one of the world's fastest growing energy sectors[3].

20,000 workers

The wind power industry in Central Texas is now a major employer[4].

CLIMATE CONCERNS AND CONSUMER CHOICES

Net Zero

The 2015 Paris Agreement is driving energy choices to reduce global carbon emissions[5].

66% of the world

Wind and solar are among the cheapest energy sources for two-thirds of the world[6].

14.5 million homes

77.7 GW of solar PV capacity is now installed in the U.S.[7].

Smart grids

Smart grid technology is creating new generation and supply[8] relationships between customers and utilities.

$39.10 billion growth

The demand for reliable and secure power will grow the smart microgrid market significantly by 2023[9].

$13.1 billion

Increasing investment in industrial battery storage and power utility[10] to balance peak demand and favor cleaner fuel.

THE SHIFT FROM FOSSIL FUELS

546 power plants

U.S. coal-fired plants retired between 2010 Q1 2019[11].

2026 peak

Coal is predicted to peak globally[12].

THE SWITCH TO ELECTRICITY

72% increase

Global electricity consumed between 2010 and 2018[13].

By 2030

Sales of new electric battery vehicles forecast at 21 million[14].

The challenge to meet today's changes

Doubled risk of disruption

Weather-related power outages have affected millions of customers since 2003[15].

285% increase in grid volatility

Complexity in energy supply is affecting power reliability[16].

$27 billion lost

Power disruption impacts business and the U.S. economy every year[17].

200,000 miles

High-voltage transmission lines, underground and overhead, create a huge network[18].

100 years old

Grid operations are built around hardware architecture from a generation ago[19].

30-50 fatalities[20]

Workers die every year while carrying out essential maintenance.

155 attack groups[21]

Malicious cyberattacks on the energy sector are growing more frequent and severe.

THE OPPORTUNITY TO

re-energize

- Integrate existing substations and legacy architecture into the modern digital worlds
- Improve stability and resilience with intelligent, self-monitoring grid operations
- Rationalize equipment and control with a virtualized, standard substation platform
- Modernize infrastructure quickly and cost-effectively
- Decrease manual maintenance, construction and deployment costs
- Increase safety for workers and the public
- Secure against cyber attacks across the entire grid
- Gain grid and consumer insights powered by data

reduce

- Ageing equipment
- Construction costs
- Deployment and maintenance
- Complex substation modifications
- Barriers to changes and upgrades
- Redundant devices
- Control rooms' footprint
- Dangers to the workforce
- Cybersecurity threats
- Carbon Footprint

Empowering the future of energy through technology

Grid modernization and optimization

A virtual environment connects devices across the grid, analyzing data to optimize supply and demand

Allows substation and grid management in a secure software environment

Delivers intelligent distribution automation

Upgrades infrastructure to meet today's energy demands

Creates a standard substation platform for straightforward scalability

Many utilities are focusing on distribution automation as a priority

– See Forrester report

Digitalization of distribution infrastructure

Measure, monitor and manage energy at a higher level of detail with intelligent Edge and IOT devices

Smart devices collect data from diverse sources

Advanced analytics are performed at the point of data collection

Insights inform automated decisions to ensure grid stability and safety

Only the most relevant data is transferred for fast, real-time insight to action

Solves bandwidth limitations in distribution automation

Answers issues with network latency and limited analysis of harvested data

Intelligence at the Edge delivers

Distributed analytics to empower your data

Predicts and prevents potential problems

Cost-efficient use of resources and personnel

Improved reliability

New revenue opportunities

Smart solutions for today's energy

Build on the value of the smart grid

Real-time demand forecasting reduces costs and drives affordable service

Manages demand and supply

Makes intelligent switches to cleaner energy sources

Monitors all energy transactions

Smart grids could result in nearly $600 in direct bill savings for the average household per year.

– Smart Grid Consumer Collaborative

Protect and manage energy security

Cybersecurity at the Edge protects against cyberattacks and malware

Scans and maps the network, identifying all connected Edge and IoT devices

Distributed analytics detect unwanted actions, report anomalies and trigger responses to immediately isolate unauthorized activity

Resolves vulnerabilities to prevent future attacks

IT security standards at the Edge

Improve safety and reliability with computer vision

Inspect assets remotely and instantly identify threats and dangers

Computer vision cameras (fixed in strategic positions or on drones) capture real-time video insights

Built-in analytics feed back reliable information, communicating safety hazards and alerts

Machine learning capabilities support condition-based maintenance programs, workforce deployment decisions and security

Virtual site tours prioritize risk areas such as vegetation encroachment on power lines

Keeps facilities, employees and the public safer

Improves operations and asset restoration, increasing customer satisfaction

Proactively reduces outages and lowers maintenance costs

Connect with customers through smart meters

Works with the smart grid to deliver valuable knowledge of domestic and commercial energy use

Customers can see their energy use in real time, creating awareness of usage and waste

Ability to optimize energy use through Demand Response (DR) and Energy Efficiency (EE) programs

Allows large scale analysis of electricity consumption in the drive to reduce energy costs

Smart Meters' sensors can perceive peak load problems and utilize automatic switching to divert or reduce power in strategic places.

– Department of Energy

Delivering business impact

Reduce annual utility downtime by

70%

Reduce unplanned costs to

22%

of total expenditures compared to 50% currently

Cut production costs by around

3–5%

per month

Use cases

- Renewables/clean energy
- Microgrid management and control
- Virtual site tours and remote operations monitoring
- Predictive maintenance (PdM)
- Cybersecurity
- Energy theft and loss prevention
- Customer and operations analysis
- Business continuity policy

Dell Technologies Edge computing and IoT solutions

Making digitalization faster and simpler for organizations

Scalable technology

Interoperability – not tied-down to proprietary systems

'Pick up and plug in' solutions

Industrial hardened equipment

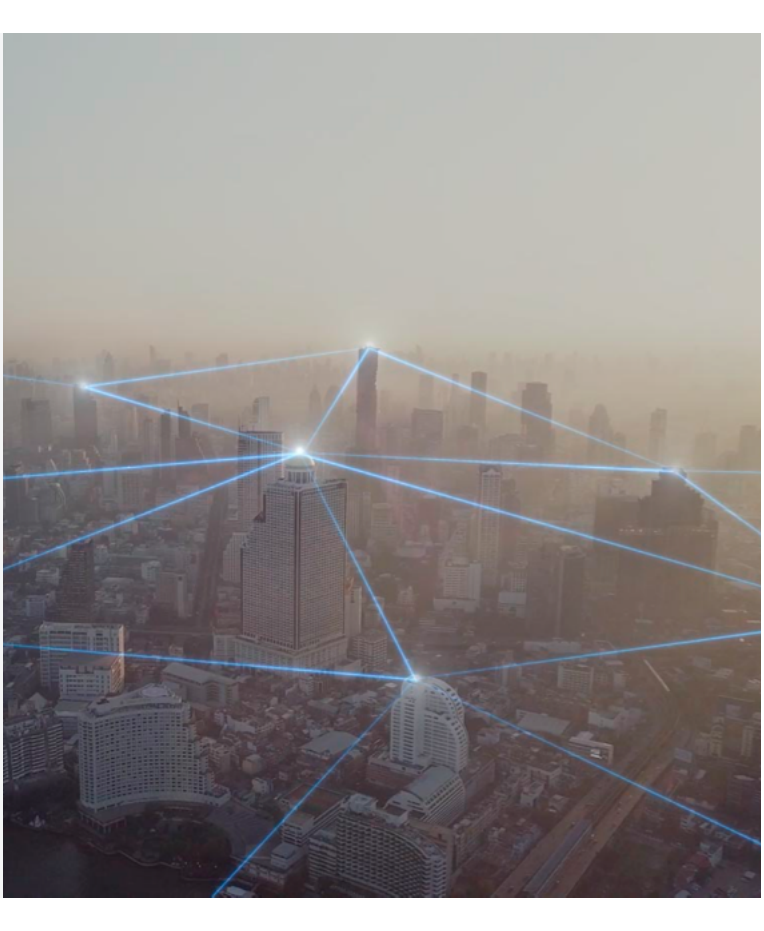
55%

By 2022 the majority of energy utilities will use a digital platform to automate, optimize and manage asset and operation performance[22].

$15 billion

By 2024 energy utilities will invest substantially in Edge, IoT and Robotics Technologies[23].

Dell Technologies is ensuring energy utilities can meet today's challenges and changing energy demands through grid infrastructure modernization and optimization.



The future of intelligent energy is here.
Are you ready?

Ask us how Edge and IoT solutions, computer vision and machine virtualization could help to transform your organization.

DellTechnologies.com/Edge

Dell Technologies

intel

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22 https://www.microfocus.com/en-us/assets/security/idc-futurescape-ww-digital-transformation?version=latest

23 By 2024 energy utilities will invest substantially in Edge, IoT and Robotics Technologies. Source taken from Page 8 Dell Tech Energy Electricity Renewables Sept 2019