Energy and Utilities strategic vision 2026-2036

Navigating the dual challenge of decarbonization and resource adequacy

FUJITSU

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Introduction:
The fundamental collision

Moving beyond abstract forecasts to the lived reality of the C-suite

We are currently navigating an industrial landscape defined by a fundamental collision of opposing forces. On one side, the global imperative for decarbonization demands a radical overhaul of legacy infrastructure, driven by unpredictable energy policy and increasingly stringent regulatory compliance. On the other, the physical reality of an energy-hungry world is asserting itself with force. The exponential rise of AI data centers and population growth is creating a thirst for power that renewables alone cannot yet satisfy.

This report captures the palpable tension between the long-term vision of a global village grid and the immediate operational necessity of staying alive amidst rising costs, local infrastructure resistance, and supply chain fractures. It outlines the journey from 2026, representing immediate acute strain to 2036, the future architectural resilience required to survive.

Bridge the gap between immediate resource adequacy crises today and the automated, decentralized grid architecture of tomorrow.

Executive summary

Navigating the efficiency paradox and the crisis of adequacybridging the gap between immediate operational strain and future grid architecture

The strategic landscape for the next decade is divided into two distinct timelines. The immediate time of 2026 is characterized by acute operational strain, driven by geopolitical instability, surging digital power demands, and high capital costs. Looking towards 2036, the sector faces a fork in the road between a hyper-connected global grid or fragmented power nationalism. To survive, leaders need to execute strategic pivots.

The strategic roadmap

The era of disruption

The industry is in a crisis of adequacy, where surging demand acts as a hostile takeover of grid capacity while regulatory volatility and local resistance block infrastructure growth.

The outlook for energy and utilities 2036

True resilience requires designing a hybrid enterprise capable of navigating four distinct future scenarios, driven by the tension between global coordination and energy nationalism.

Four dimensions of transformation

Success requires overcoming deep-rooted structural disablers by pivoting towards smart transmission, customer-centric business models, holistic supply chain security, and cross-boundary talent cooperatives.

Transformation imperatives

Market supremacy requires executing a common denominator action plan; relentlessly optimizing existing assets using artificial intelligence today to fund the multi-technology generation portfolios of tomorrow.

Research methodology

A multi-dimensional foresight approach

This research was conducted on behalf of Fujitsu by The Business Advantage Group Limited. It is based on a rigorous, hybrid foresight methodology designed to identify, analyze, and prioritize future trends and their strategic implications for Energy and Utilities leaders. Our approach combines quantitative environmental scanning with qualitative expert validation to ensure insights are both visionary and actionable.

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Core methodology

Environmental scanning and weak signal analysis

A comprehensive scan identified nearly 60 trends and almost 30 weak signals. The approach specifically tracked weak signals, early indicators of potential disruption that could challenge current assumptions and herald future industrial revolutions.

PESTLE framework

All the identified phenomena were categorized using the PESTLE framework (political, economic, social, technological, legal, environmental) to ensure a holistic view of the external environment.

Uncertainty and impact analysis

Each trend was assessed on two C-level centric metrics: importance (strategic relevance) and outcome uncertainty (predictability of impact). High-uncertainty, high-importance trends formed the basis of our scenario planning.

Stakeholder and C-level validation

Insights were validated through focus group discussions (FGDs), review by industry experts and the core findings are derived from six in-depth interviews with C-level executives (CIO, CCO, VP, CISO) representing major organizations in the United Kingdom, United States, Canada, Germany, and Spain.

Foresight is not about guessing; it is about systematically filtering noise to find the structural forces that matter.

Section

1

The era of disruption

Navigating the collision of immediate demand shocks and policy paralysis.

The collision of ambition and reality

A fundamental tension between long-term decarbonization mandates and the immediate crisis of resource adequacy is reshaping the sector.

The energy and utilities sector has entered a period of unprecedented operational strain. Long-term goals for a global, interconnected grid are currently clashing with immediate, ground-level crises. organizations are battling a severe deficit in resource adequacy, driven by the exponential power demands of digital infrastructure and artificial intelligence.

Simultaneously, legacy physical networks are degrading, and the skilled workforce required to upgrade them is shrinking. This section maps the current fault lines across external policies, market shifts, and internal capabilities, demonstrating why survival today relies on extreme asset optimization rather than speculative expansion. The immediate priority is maintaining grid stability amidst rising costs and fractured supply chains.

Thinking broadly about your industry, how would you characterize the current pace of change?

> ***"The pace of change is significant; I would say it is a particular both: a steady evolution combined with sharp disruptions."***
> Senior VP / Chief Information Officer | Energy: Transmission | Germany

Acknowledge the current crises of surging demand and lagging infrastructure to build a grounded foundation for future resilience.

External forces:
The unpredictable policy landscape

Regulatory volatility and geopolitical fragmentation are stranding capital and delaying critical infrastructure investments.

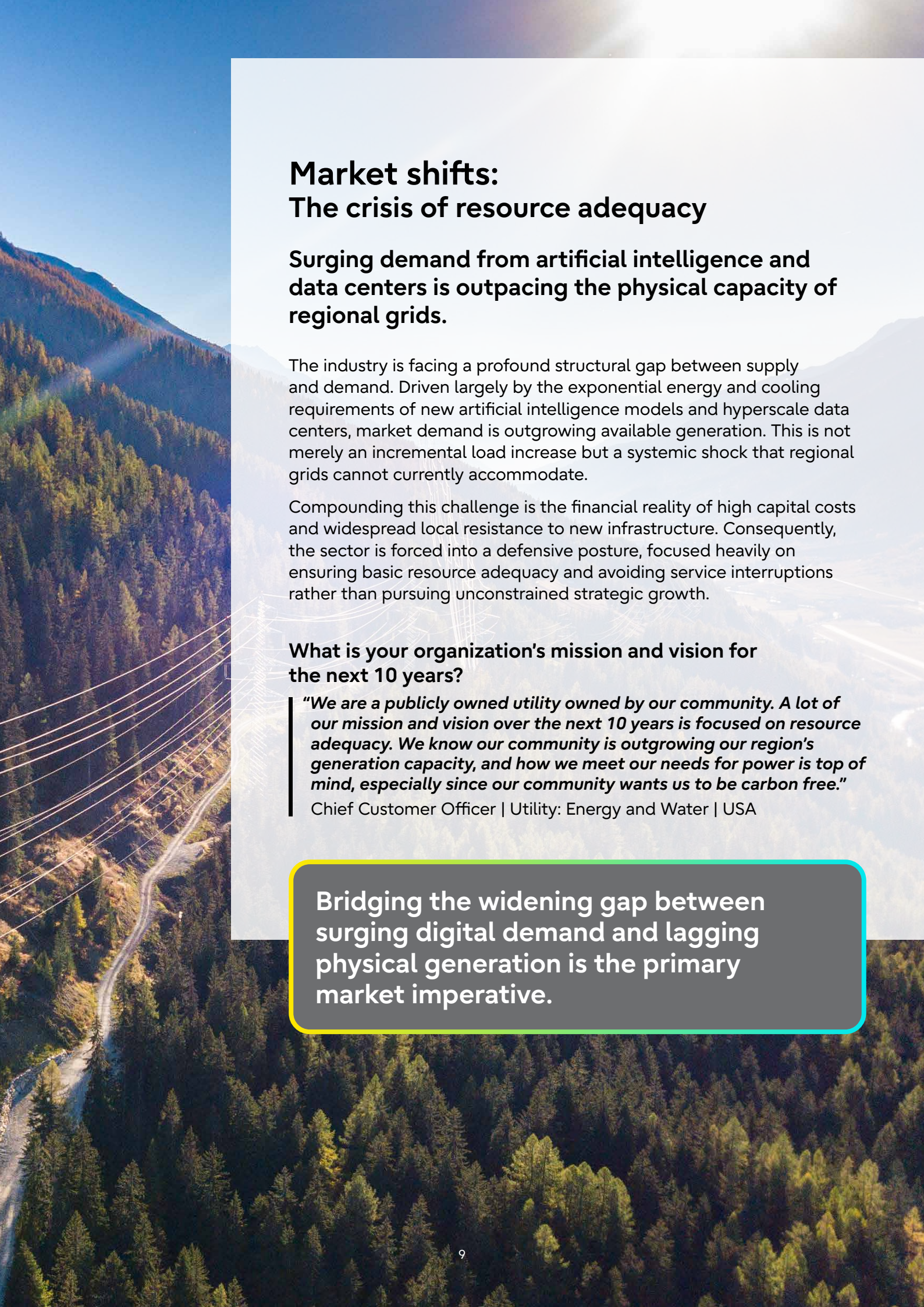
The sector is under unprecedented strain. Long-term grid ambitions are colliding with immediate ground-level crises. Driven by the exponential demands of artificial intelligence and digital infrastructure, organizations are battling a severe deficit in resource adequacy.

Furthermore, the rising geopolitical weaponization of energy supply chains is forcing organizations to prioritize national or regional security over pure economic efficiency. This unpredictability creates a cautious wait-and-see approach, stranding the investment capital desperately needed to modernize the grid.

How would you describe the impact of current policy and political dynamics on the industry?

> ***"Unpredictable energy policy is a very significant issue, especially in places like Germany, where the energy policy changes every four years with the government."***
> Senior VP / Chief Information Officer | Energy: Transmission | Germany

Strategic agility and domestic supply chain resilience need to replace rigid long-term forecasting to survive regulatory whiplash.



Market shifts:
The crisis of resource adequacy

Surging demand from artificial intelligence and data centers is outpacing the physical capacity of regional grids.

The industry is facing a profound structural gap between supply and demand. Driven largely by the exponential energy and cooling requirements of new artificial intelligence models and hyperscale data centers, market demand is outgrowing available generation. This is not merely an incremental load increase but a systemic shock that regional grids cannot currently accommodate.

Compounding this challenge is the financial reality of high capital costs and widespread local resistance to new infrastructure. Consequently, the sector is forced into a defensive posture, focused heavily on ensuring basic resource adequacy and avoiding service interruptions rather than pursuing unconstrained strategic growth.

What is your organization's mission and vision for the next 10 years?

> ***"We are a publicly owned utility owned by our community. A lot of our mission and vision over the next 10 years is focused on resource adequacy. We know our community is outgrowing our region's generation capacity, and how we meet our needs for power is top of mind, especially since our community wants us to be carbon free."***
> Chief Customer Officer | Utility: Energy and Water | USA

Bridging the widening gap between surging digital demand and lagging physical generation is the primary market imperative.

Competitive landscape:
The race for grid interconnection

A hostile competition for energy resources is emerging between technology hyperscalers and traditional utility consumers.

The competitive arena has expanded far beyond traditional utility peers. Today, energy organizations find themselves in direct competition with global technology giants for a finite pool of grid capacity and renewable energy sites. This tension is creating a rush for premium land that offers both reliable green power and immediate grid access.

Simultaneously, as large industrial consumers face severe grid bottlenecks, there is a rising threat of commercial grid defection. High-value customers are increasingly looking to generate their own power or establish independent microgrids to guarantee supply, forcing utilities to innovate their commercial models to prevent significant revenue loss.

What are the most significant risks currently facing your organization in the market?

> ***"The three trends that have the most potential to be negatively impactful is the use of energy as a security weapon, that would be pretty catastrophic. AI's thirst for power (or water, in our case) could also have a profound impact. Finally, the rising cost of carbon (and the cost of energy we consume) would have a pretty detrimental impact if it increased significantly."***
>
> Group Chief Information Officer | Utility: Water | UK

Utilities need to evolve into proactive infrastructure partners for technology hyperscalers to prevent commercial grid defection.

Internal challenges:
The boots on the ground deficit

A critical shortage of physical engineering talent and ingrained organizational complexity are stalling transition efforts.

While strategic visions often focus on digital transformation, the physical reality of the energy sector relies on a diminishing pool of skilled labor. Leaders cite a severe lack of engineering capability to execute complex capital projects, build treatment plants, and upgrade legacy networks. This talent shortage directly leads to severe cost overruns and timeline delays.

Internally, this friction is exacerbated by deep-rooted organizational complexity and a naturally risk-averse culture. Operating assets designed to last over 50 years breeds an environment resistant to rapid change, making it incredibly difficult to implement cohesive, agile transformation programs across siloed internal divisions.

What do you see as the biggest internal barrier to your organization's ability to adapt at the necessary pace?

> ***"There is so much uniqueness that it is hard to introduce change because many different things are run separately and in an inconsistent way."***
> Group Chief Information Officer | Utility: Water | UK

Digital solutions cannot replace physical labor; cross-boundary talent cooperatives are required to execute critical infrastructure projects.

Technological barriers:
Overcoming the legacy infrastructure trap

The integration of modern intelligence is being hindered by ageing networks and stringent demands for capital efficiency.

The path to an automated, intelligent grid is being physically blocked by infrastructure that is frequently decades old. The primary technological barrier is not a lack of modern software, but the immense capital required to renew physical transmission networks so they can handle bidirectional flows and intermittent renewable sources.

Furthermore, in a constrained financial environment, there is zero appetite for speculative technology investments. Advanced tools like quantum computing or blockchain are deprioritized in favor of solutions that offer immediate, proven returns. Any new technology needs to demonstrate a clear ability to reduce operating expenses or extend the life of existing assets.

What would be the biggest risks for your organization in responding to these trends?

> ***"Investing in quantum or blockchain requires a proven business case showing cost reduction, process enhancement, or reduction of negative externalities."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Investments should focus exclusively on proven digital technologies that optimize existing assets and deliver immediate cost reductions.

Summary and strategic outlook:
Pivoting to asset optimization

Survival in the current era requires squeezing maximum profitability from existing infrastructure while navigating policy paralysis.

The situation in 2026 is defined by a paradox: the energy and utilities industry must radically expand to meet unprecedented demand, yet it is blocked by local resistance, capital constraints, and workforce deficits. The strategic outlook for the near term therefore necessitates a defensive posture focused on extreme operational efficiency. Leaders should utilize artificial intelligence and data analytics to optimize current operations, reducing the energy cost of production and extending the lifespan of legacy assets.

This intense focus on capital efficiency will act as the financial engine for future growth. By mastering internal cost control and operational resilience today, organizations can generate the required capital and stability to fund the major structural transitions required for the next decade.

Thinking about 2026 what are the keywords or phrases that you are hearing about the industry?

> ***"Key phrases include asset optimization, which means extracting all the value from operating assets, something quite far from the old connect and forget model."***
>
> Chief Commercial Officer | Energy: Renewables | Spain

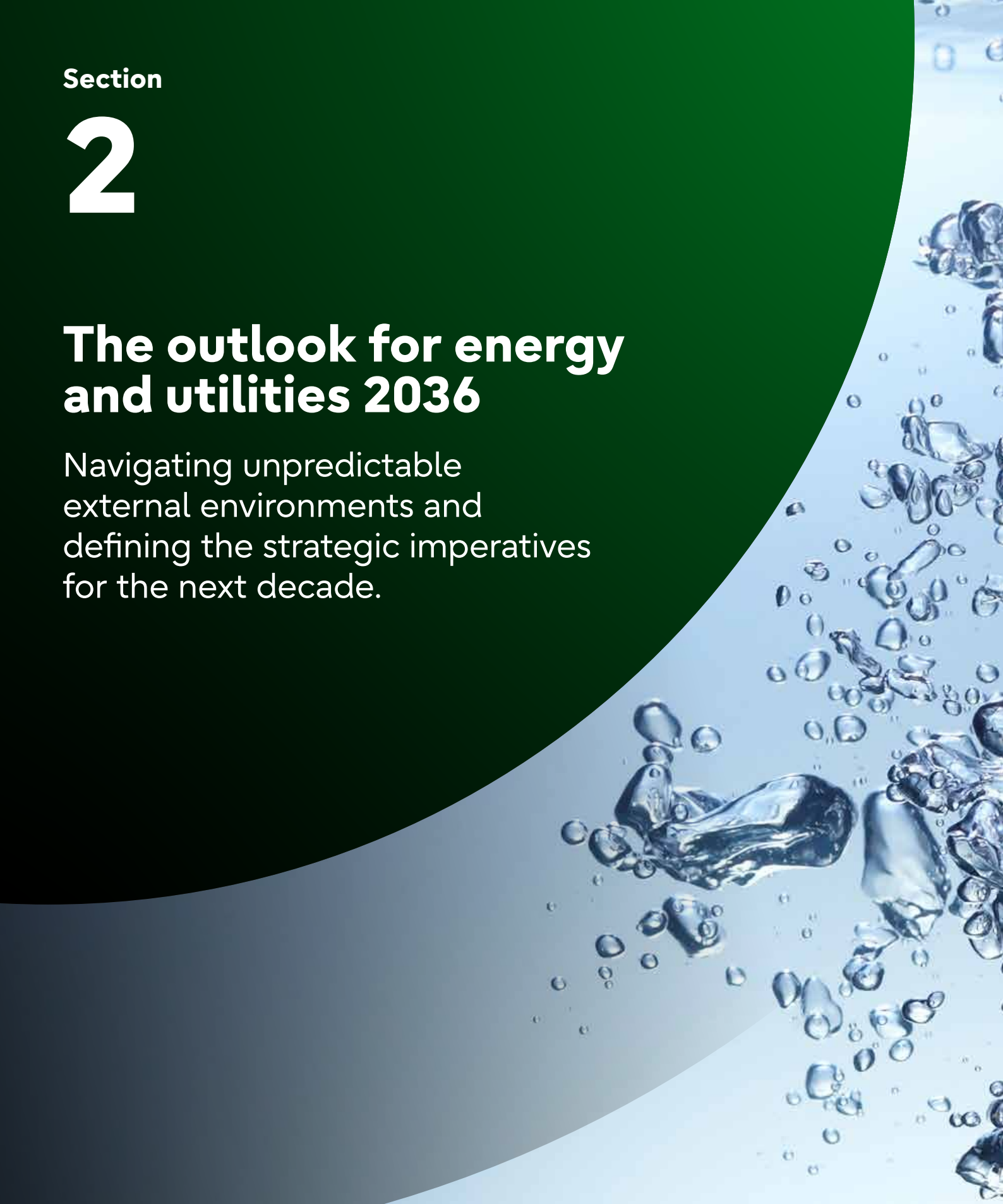
To survive the current operational strain and fund the transition towards 2036, leaders need to optimize existing physical assets, setting the foundation for the automated and intelligent grid architectures explored in the next section.

Section

2

The outlook for energy and utilities 2036

Navigating unpredictable external environments and defining the strategic imperatives for the next decade.



The long-term view:
Looking beyond the immediate crisis

Navigating the timeline from 2026 to 2036 to ensure operational survival and future structural resilience.

Leaders are managing two conflicting timelines: immediate capacity constraints and multi-decade infrastructure planning. Focusing solely on short-term survival risks creating stranded assets that fail to integrate into the decentralized grids of the future.

The strategic imperative is to design investments that solve today's resource adequacy crisis while possessing the architectural flexibility to adapt to an unpredictable regulatory landscape in 2036. Short-term survival is meaningless if the resulting infrastructure is incompatible with the long-term reality of the energy transition.

What is the risk of focusing only on immediate operational challenges?

> ***"If you are only focused on how it impacts your performance right now, you miss solving the long-term problems."***
>
> Group Chief Information Officer | Utility: Water | UK

Long-term strategic foresight is not an academic exercise but a structural requirement to prevent capital from becoming stranded in obsolete infrastructure.

Methodology:
From market signals to strategic scenarios

Translating macro-trends and weak signals into structural scenarios for the next decade.

To build a robust view of 2036, it is necessary to separate fleeting trends from structural shifts. This involves evaluating nearly 60 macro-trends across political, economic, social, technological, legal, and environmental dimensions. Each trend is assessed against two critical metrics: its overall importance to the core business and the uncertainty of its final outcome.

High-impact, highly certain trends become the driving forces of the baseline strategy. Conversely, the high-impact, highly uncertain trends form the critical axes of our scenario planning. This methodology prevents organizations from planning for a single predicted future, forcing them instead to build resilience against multiple plausible realities.

What digital technologies, besides AI would you need to focus on in the next 10 years?

> ***"I think we are working hard to figure out how to make the most of our data. Customers are expecting us to provide them with insights in terms of how they're using their power. Historically we have not been asked to provide this. How we are able to predictively model where power needs to be distributed... is key. The marketplace is changing so dramatically between AI enabled chat bots and AI enabled sentiment analysis. There's no way we're going to make it 10 years without... significant technology investments."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Strategy needs to be built on structural certainties while maintaining operational flexibility to navigate profound uncertainties.

Driving forces:
Explaining the structural trends

Decarbonization mandates and exploding digital power demands are the absolute realities of the next decade.

Regardless of which future scenario materializes, certain driving forces will structurally alter the industry. The demand for firm, clean power will escalate exponentially, driven by the electrification of transport and the unprecedented cooling and power requirements of artificial intelligence data centers.

Simultaneously, the financial architecture of the industry is shifting. Transition investment and capital costs are rising sharply, necessitating new models of transition finance. Furthermore, carbon pricing is transitioning from a simple environmental metric into a rigorous financial and trade policy tool, embedding carbon liability deeply into the corporate balance sheet.

Surging digital power demands and the financialization of carbon are inevitable constants that require immediate strategic alignment.

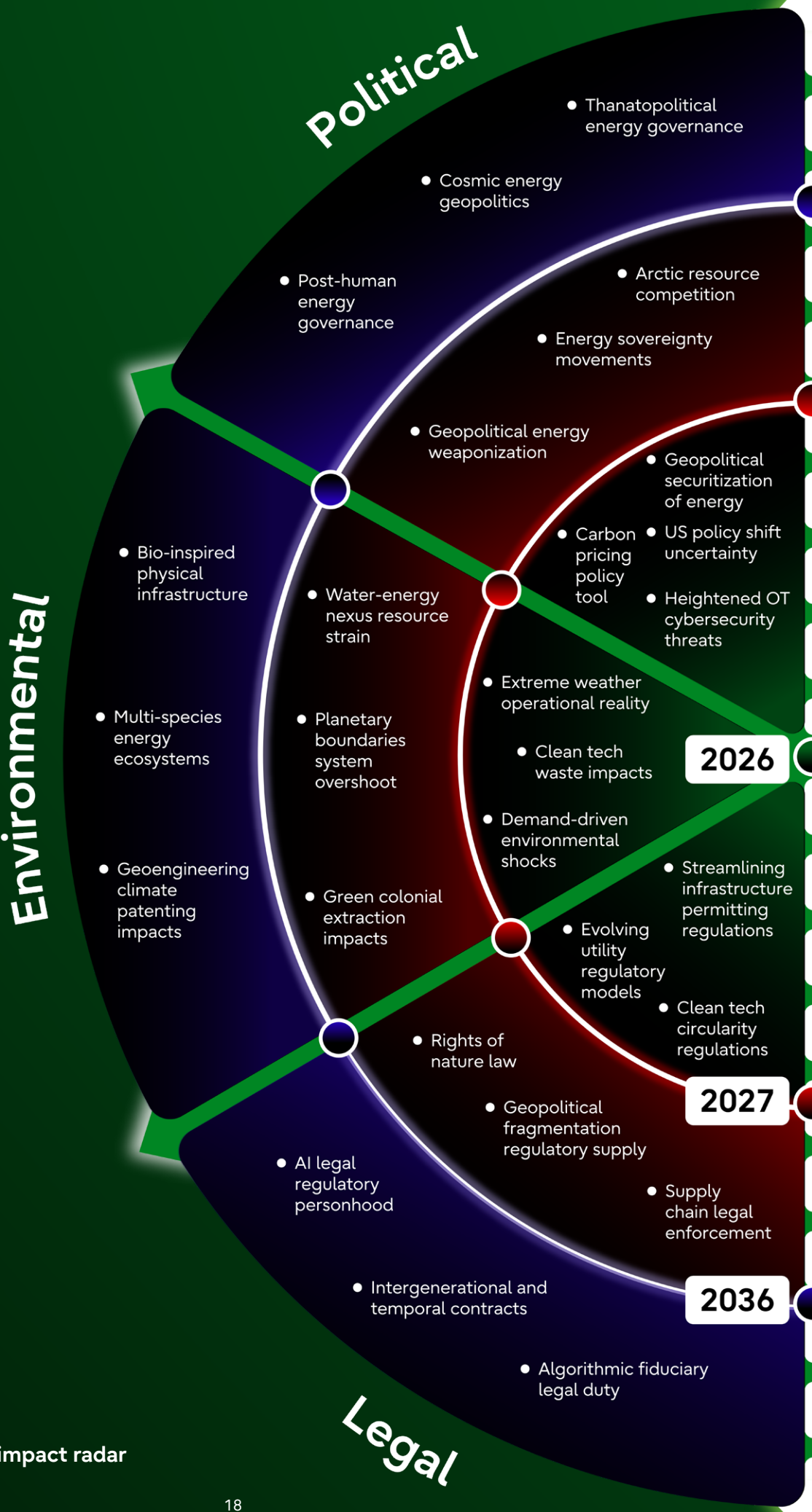
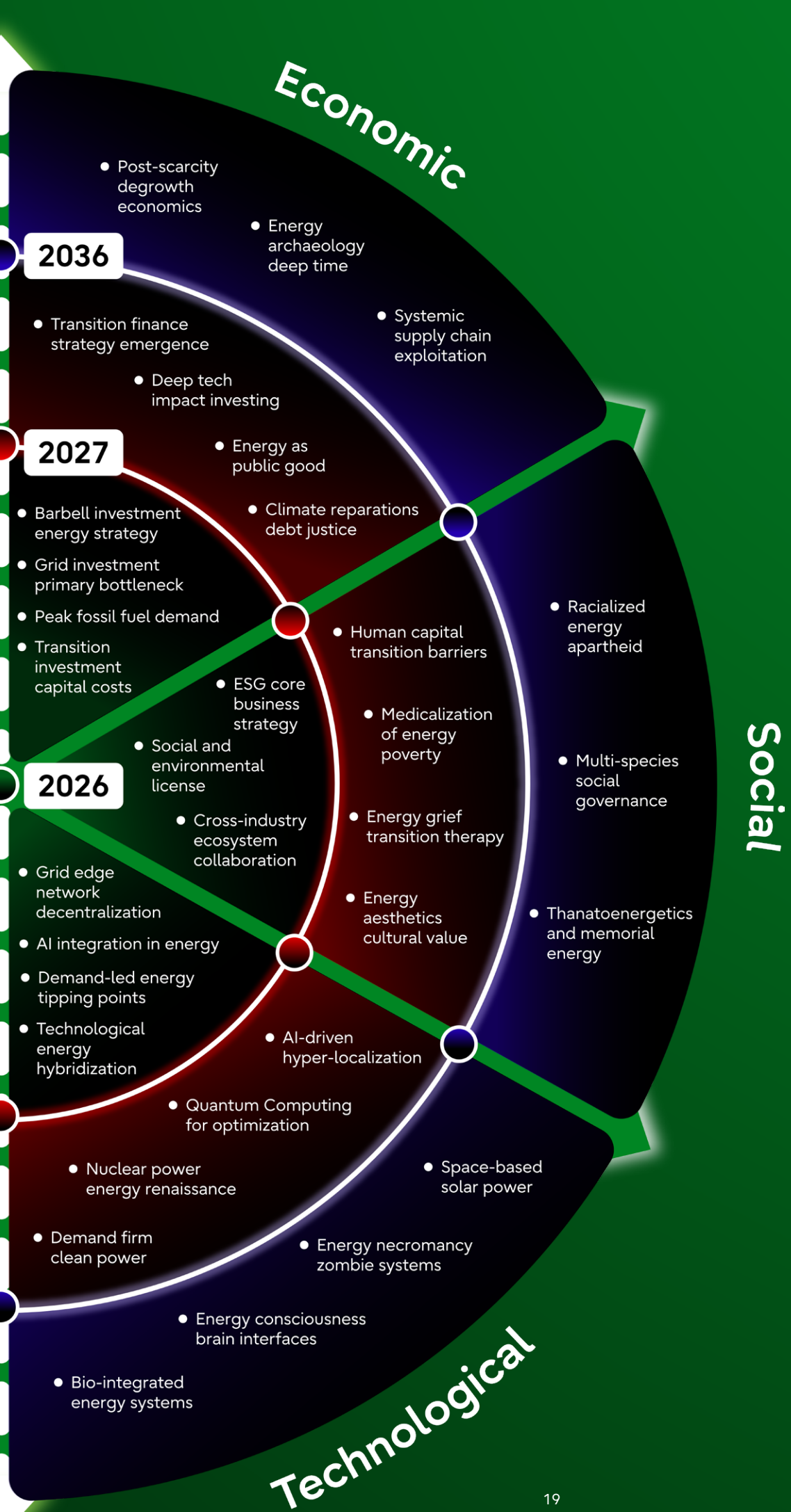


Figure 1: The macro-trend impact radar


Economic
Social
Technological
2036
2027
2026
Post-scarcity degrowth economics
Energy archaeology deep time
Systemic supply chain exploitation
Transition finance strategy emergence
Deep tech impact investing
Energy as public good
Climate reparations debt justice
Barbell investment energy strategy
Grid investment primary bottleneck
Peak fossil fuel demand
Transition investment capital costs
Racialized energy apartheid
Human capital transition barriers
Medicalization of energy poverty
ESG core business strategy
Social and environmental license
Cross-industry ecosystem collaboration
Multi-species social governance
Energy grief transition therapy
Energy aesthetics cultural value
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Grid edge network decentralization
AI integration in energy
Demand-led energy tipping points
Technological energy hybridization
AI-driven hyper-localization
Quantum Computing for optimization
Nuclear power energy renaissance
Space-based solar power
Demand firm clean power
Energy necromancy zombie systems
Energy consciousness brain interfaces
Bio-integrated energy systems

Defining the critical uncertainties

The future grid will be determined by the tension between centralization and global coordination.

While the driving forces set the general trajectory, the exact destination for 2036 is defined by two critical axes of uncertainty.

The first axis measures market structure, spanning from a highly centralized, incumbent-led power generation model to a highly decentralized, prosumer-driven grid edge.

The second axis measures transition dynamics, exploring whether the global energy transition will be coordinated and collaborative, or deeply fragmented and protectionist.

These intersecting axes create four distinct external environments. Leaders need to understand that these are not strategic options to choose from, but external realities that will dictate market survival.

Thinking broadly about your industry, what are the primary external forces driving uncertainty?

> ***"Geopolitics has a huge impact on oil prices, which drives investments."***
> VP Major Projects | Energy: Oil and Gas | Canada

The strategic roadmap needs to survive the extremes of both heavy state protectionism and radical grid decentralization.

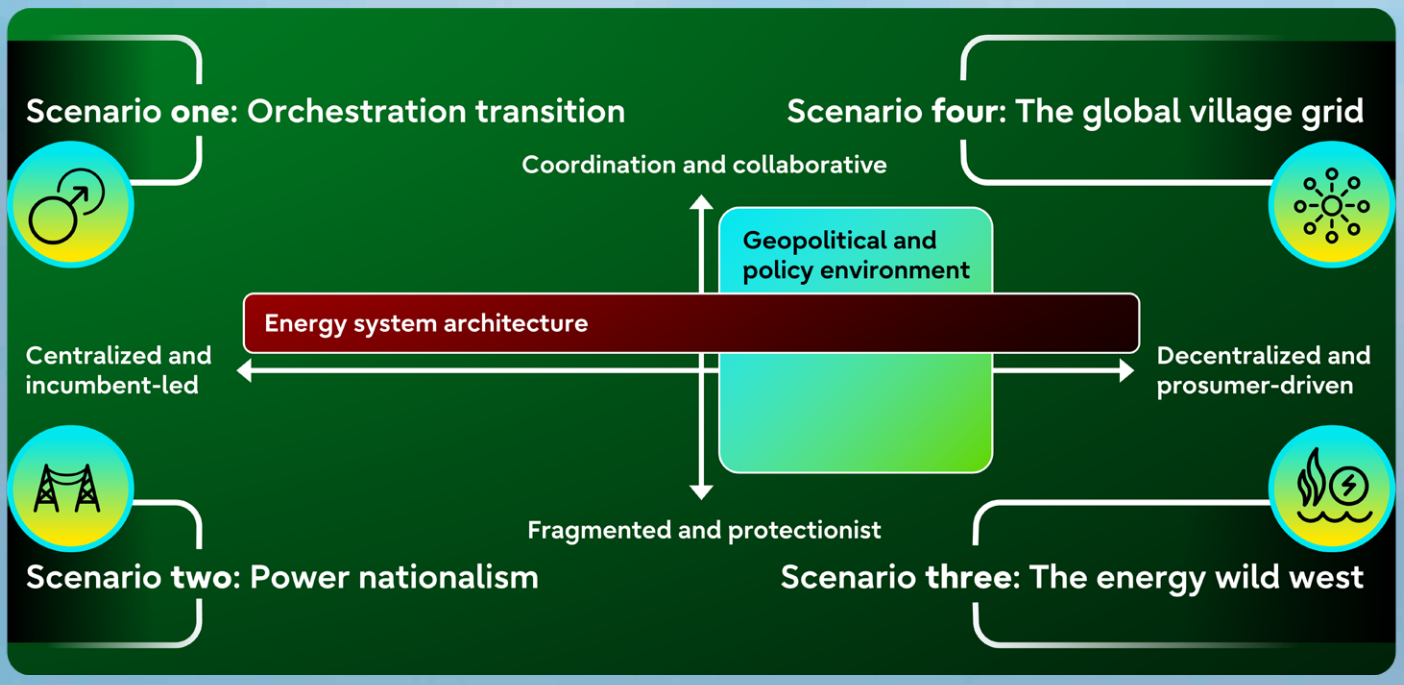
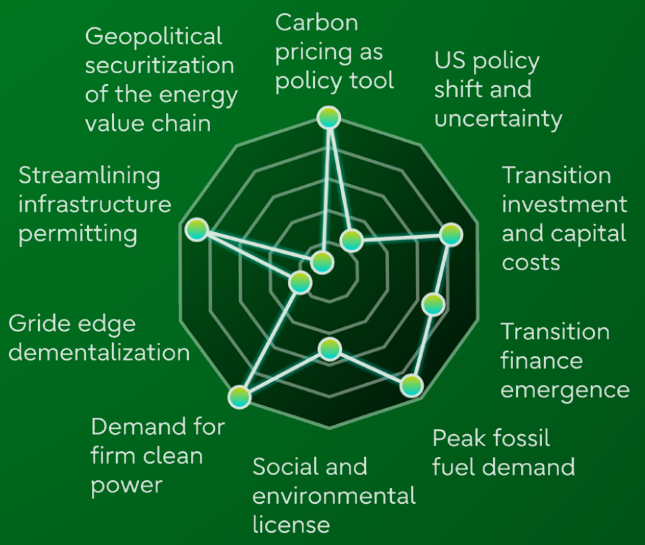


Figure 2: The Energy and Utility strategic scenario matrix

Scenario one: Orchestration transition

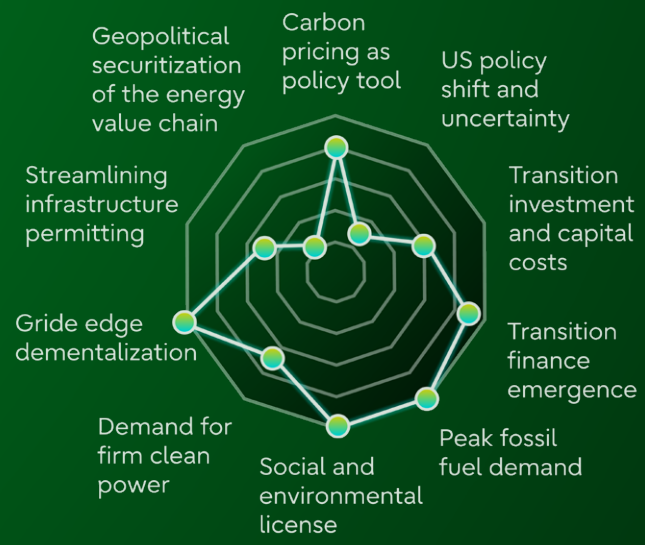
Coordination and collaborative

Go to scenario one



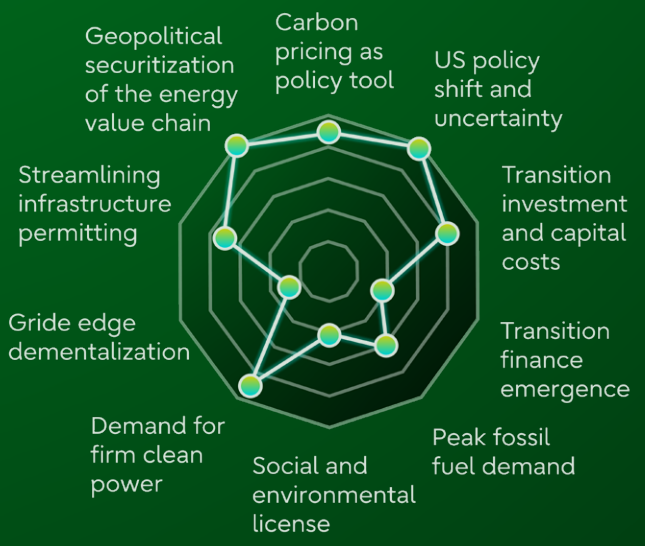
Scenario four: The global village grid

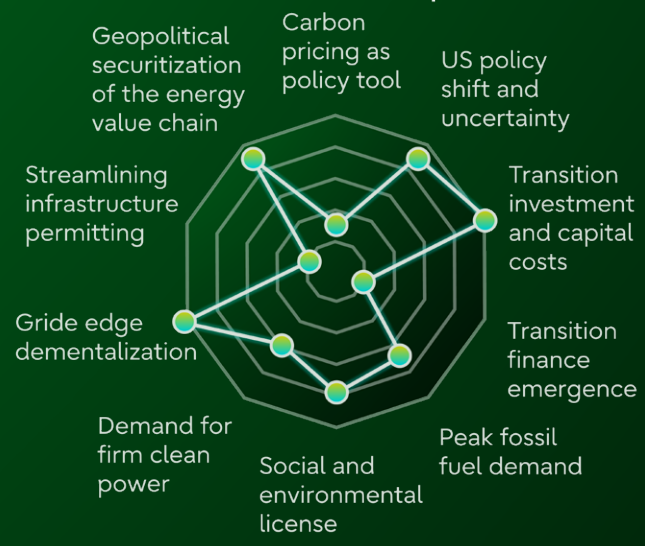
Go to scenario four



Centralized and incumbent-led

Decentralized and prosumer-driven





Go to scenario two

Go to scenario three

Fragmented and protectionist

Scenario two: Power nationalism

Scenario three: The energy wild west

Figure 3: Comparative trend impact analysis

Scenario one: Orchestrated transition

A coordinated, centralized future driven by strong state mandates and incumbent utilities.

In this environment, global governments coordinate heavily to drive the energy transition. Large-scale, centralized infrastructure projects, such as offshore wind and massive nuclear facilities, dominate the landscape. Incumbent utilities act as the primary orchestrators of the grid, supported by streamlined infrastructure permitting and heavy subsidies.

To read the trend radar for this scenario, observe high activity in coordinated carbon pricing and social license initiatives, with relatively low movement in grid edge decentralization. It is an orderly but slow transition heavily reliant on government competence.

Strategic playbook:

- **Focus on:** Securing long-term government subsidies for massive infrastructure projects.
- **Focus on:** Building deep partnerships with state-backed incumbent utilities.
- **Move away from:** Highly speculative, unregulated grid edge investments.
- **Move away from:** Short-term commercial models that ignore national compliance mandates.

Partner closely with state actors to secure long-term subsidies and execute massive, centralized capital projects.

What the radar diagram shows:

To detect the formation of an orchestrated transition, leaders need to monitor for a structural emphasis on carbon pricing as a policy tool and the streamlining of infrastructure permitting. The radar indicates that the emergence of this scenario is heavily driven by a surging demand for firm clean power to support large-scale, top-down grid operations. Conversely, if factors like grid edge decentralization and geopolitical securitization show a relatively low impact, it signals the formation of a stable, government-led global environment that favors incumbent utilities and large infrastructure projects over fragmented, local generation.

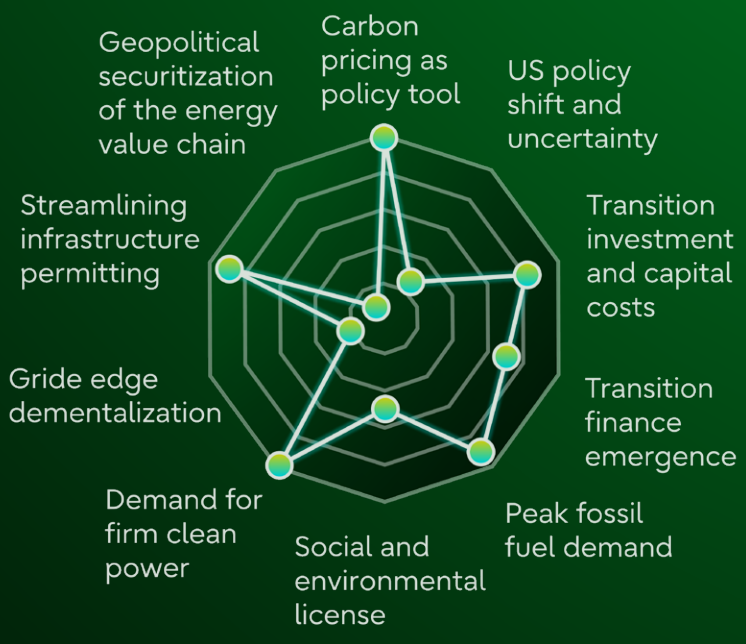


Figure 4: Scenario one

Scenario two: Power nationalism

A fragmented environment where energy security supersedes global decarbonization.

Driven by severe geopolitical securitization of the energy value chain, nations retreat from global cooperation. The transition becomes highly fragmented, with countries prioritizing domestic resource adequacy and supply chain resilience over pure emission targets.

centralized power generation remains critical, but it is heavily protected by nationalist policies. The trend radar here is dominated by high transition capital costs, shifting trade policies, and an intense focus on securing regional energy independence at the expense of global efficiency.

How are broader political shifts threatening to impact your regional strategic planning?

> ***"We buy most of our power from both Canada and the United States. We have historically treated the entire region as one power market. In USA we're starting to see this rise of nationalist rhetoric on maybe we need to not be a regional power market. If that were to happen, that would be a significant change for our region. This emerged during some of the tariff debates. I believe Canada was looking for some leverage."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Strategic playbook:

- **Focus on:** Developing highly localized, secure domestic supply chains.
- **Focus on:** Aligning corporate messaging with national energy security rather than global sustainability.
- **Move away from:** Over-reliance on international cross-border energy trade.
- **Move away from:** Globalized procurement strategies susceptible to geopolitical shocks.

Build highly resilient, localized supply chains and pivot corporate messaging from global sustainability to national security.

What the radar diagram shows:

The emergence of a power nationalism environment is signaled by a significant rise in the geopolitical securitization of the energy value chain. The radar shows that this scenario forms when the impacts of US policy shifts and high transition investment costs become highly elevated, while global cooperative metrics, such as harmonized carbon pricing, shrink. Tracking these specific trend impacts provides an early warning, helping leaders to prepare for a defensive, fragmented market where nations prioritize domestic energy security, state-backed projects, and robust supply chains over global decarbonization agreements.

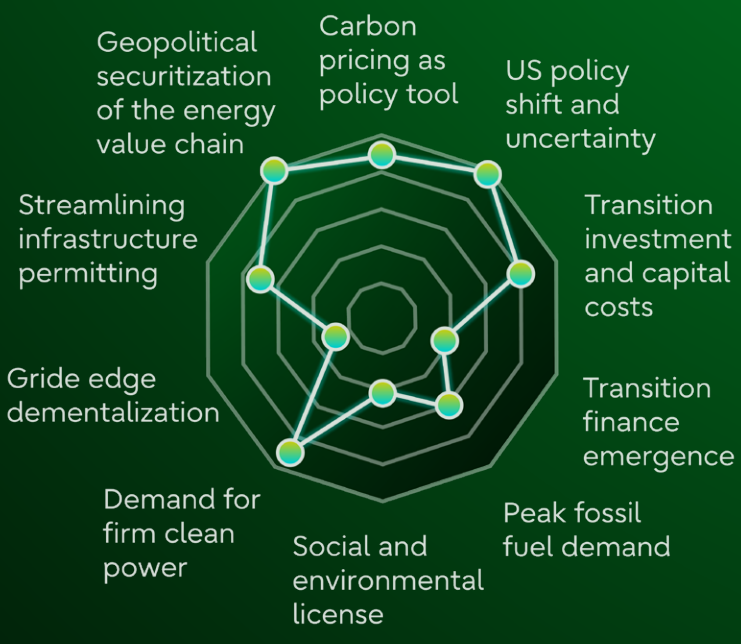


Figure 5: Scenario two

Scenario three: The energy wild west

A chaotic, decentralized market where local actors and prosumers dominate a fragmented grid.

In the absence of cohesive global policy, the transition fractures. Capital flows away from massive, delayed centralized projects and towards highly localized, behind-the-meter solutions. Corporations, hyper scalers, and communities build their own microgrids to guarantee supply, leading to severe grid edge decentralization.

The trend radar for this scenario spikes in prosumer technologies and private transition finance, while coordinated carbon pricing collapses. Traditional utilities face severe risks of commercial grid defection as large clients abandon the central network.

Strategic playbook:

- **Focus on:** Rapid deployment of bespoke behind-the-meter generation for high-value clients.
- **Focus on:** Agile energy-as-a-service commercial models to prevent commercial grid defection.
- **Move away from:** Assuming centralized multi-decade capital projects will be completed on time.
- **Move away from:** Rigid pricing models that cannot adapt to local microgrid competition.

Pivot aggressively to energy as a service models and provide bespoke, behind the meter generation for large industrial clients to prevent commercial defection.

What the radar diagram shows:

If the industry trajectory shifts towards the energy wild west, the primary indicators to watch are a sharp rise in grid edge decentralization and volatile US policy shifts. The trend impact analysis demonstrates that this scenario emerges when social and environmental license challenges become highly prominent alongside rising transition capital costs. In stark contrast, coordinated efforts like global carbon pricing and streamlined permitting contract to their minimum levels. Monitoring this specific radar pattern helps leaders prepare for a chaotic landscape where central grid reliability fails, forcing communities and businesses to adopt localized, behind-the-meter solutions.

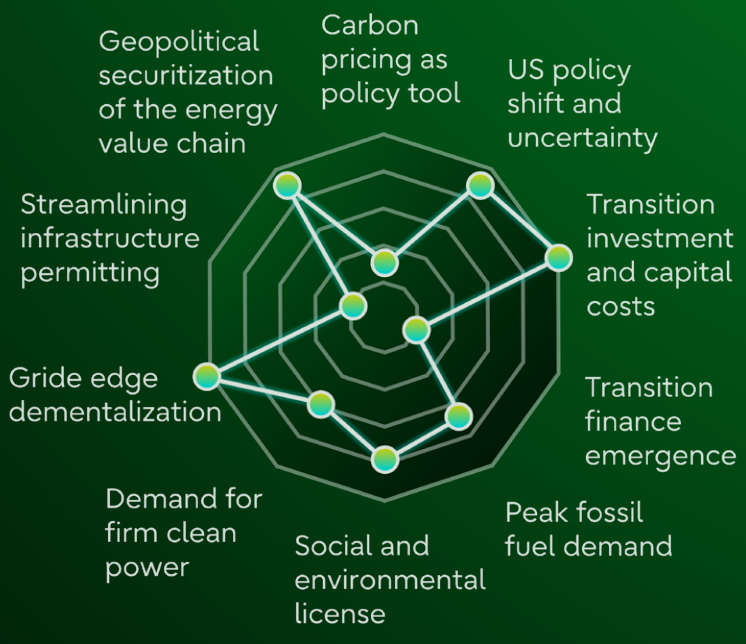


Figure 6: Scenario three

Scenario four: The global village grid

A hyper-connected, decentralized global market powered by advanced intelligence and peer-to-peer trading.

Global collaboration meets radical technological innovation. The grid evolves into a highly decentralized but fully integrated digital network. Energy is generated, stored, and traded dynamically at the grid edge by prosumers and connected assets.

Advanced data analytics and automated systems orchestrate this immense complexity seamlessly. The trend radar indicates high alignment on global carbon policies coupled with maximum grid edge decentralization, creating an incredibly efficient but fiercely competitive digital energy market.

How is your organization positioned to support a globally interconnected energy market?

"We have the right products for the right global market at the right time, delivering products such as high voltage connectors and isolators to approximately 100 countries worldwide."

Senior VP / Chief Information Officer | Energy: Transmission | Germany

Strategic playbook:

- **Focus on:** Advanced data analytics and algorithmic load balancing for dynamic peer-to-peer markets.
- **Focus on:** Seamless interoperability across highly decentralized, global grid-edge assets
- **Move away from:** Traditional, static baseload generation mentalities.
- **Move away from:** Closed-system proprietary technologies that cannot integrate into a global digital network.

Invest heavily in algorithmic orchestration, dynamic load balancing, and interoperable grid technologies to manage decentralized complexity.

What the radar diagram shows:

The formation of a global village grid can be anticipated by tracking a balanced but expansive radar shape, driven heavily by simultaneous rises in grid edge decentralization, peak fossil fuel demand, and the emergence of transition finance. In this scenario, carbon pricing as a policy tool returns as a strong, harmonized driver, while the geopolitical securitization of the energy value chain and policy uncertainty recede significantly. By observing these trend impacts, organizations can prepare for a highly cooperative global market that uses advanced digital orchestration to seamlessly integrate millions of decentralized, prosumer-driven energy assets.

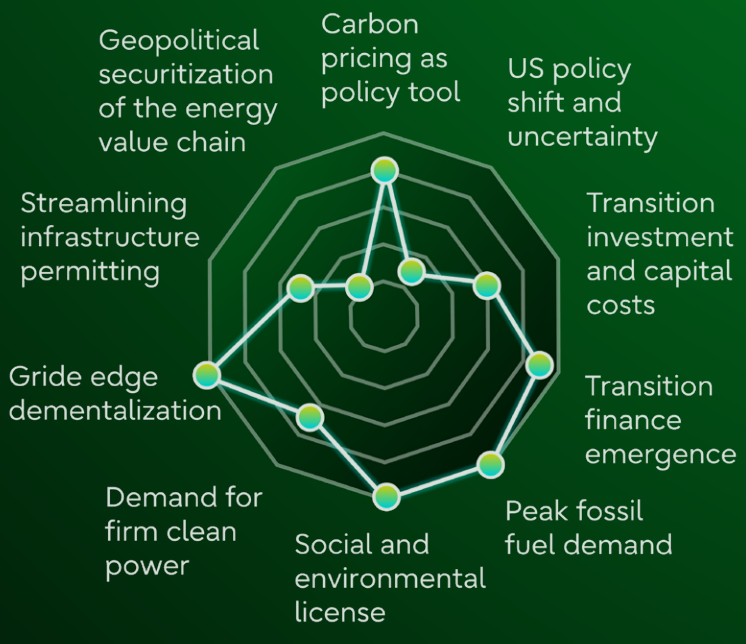


Figure 7: Scenario four

Monitoring the emerging signals

Early indicators of disruption such as acute water scarcity require constant vigilance.

Beyond dominant macro-trends, leaders need to monitor peripheral weak signals that could radically alter these scenarios. Traditional local resistance is morphing into complex demands for climate justice and energy sovereignty. Furthermore, the boundaries of governance and technology are expanding. Leaders need to look beyond standard policy debates to prepare for radical shifts, from multi-species energy ecosystems to the geopolitical race for space-based solar power.

Are there any critical trends or operational focus areas that are heavily influencing your strategic planning right now?

> ***"We innovate heavily and invest significantly in innovation including the use of artificial intelligence to reduce costs but also enhance processes to provide safe environmental usage and safe drinking water."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Expand environmental tracking beyond carbon emissions to include water resource adequacy and hyper-local community trust.

Emerging signals that could redefine the industry:

- **Energy sovereignty movements:** Local communities demanding total ownership and control over their own renewable generation.
- **Geopolitical energy weaponization:** State actors aggressively using supply chains and critical mineral exports as hostile foreign policy tools.
- **Thanatopolitical energy governance:** Political decisions that dictate which vulnerable communities receive life-saving power during extreme climate emergencies.
- **Cosmic energy geopolitics:** The emerging global space race to capture and beam solar power directly from orbit.
- **Deep tech impact investing:** Capital flowing into highly experimental, unproven technologies, such as nuclear fusion, that promise massive societal impact.
- **Energy as a public good:** A political push to de-privatize energy and treat basic power access as a fundamental human right.
- **Post-scarcity and degrowth economics:** Movements advocating for the intentional reduction of global energy and material consumption to respect planetary boundaries.
- **Climate reparations and debt justice:** Developing nations demanding financial compensation from historically high-emitting countries to fund their own transitions.
- **Green colonialism and extraction:** Backlash against developed nations exploiting the resources of the global south to build clean technologies.
- **Energy aesthetics and cultural value:** The growing demand for energy infrastructure to be visually and culturally integrated into local landscapes rather than built as industrial eyesores.

Designing the hybrid enterprise:
Preparing for all realities

Scenarios are unpredictable external environments, requiring a hybrid architecture capable of pivoting rapidly.

A common strategic failure is treating these four scenarios as choices on a corporate menu. They are not internal strategies; they are external realities dictated by macroeconomic and geopolitical forces outside the control of any single organization.

To survive in 2036, leaders cannot afford to build an enterprise suited for only one specific outcome. They need to design a hybrid enterprise. This requires investing in foundational enablers, such as robust cyber resilience, agile talent pools, and data orchestration, that provide competitive advantage whether the future grid is a fragmented nationalist structure or a global decentralized village.

Why is building long-term adaptive capacity uniquely challenging in this sector?

> ***"The planning time spans in the utilities sector are so much bigger than in other industries."***
>
> Group Chief Information Officer | Utility: Water | UK

Build a strategic core robust enough to withstand geopolitical shocks and agile enough to capitalize on rapid technological decentralization.

Section

3

Four dimensions of transformation

Executing the strategic pivots required to overcome operational disablers and build architectural resilience.

The transformation battlegrounds

Overcoming structural disablers to build a resilient and agile energy enterprise.

While the external scenarios for 2036 remain unpredictable, the internal changes required today are clear and urgent. Organizations cannot afford to wait for regulatory certainty before taking action. Instead, they should actively manage the structural disablers currently stalling progress, such as intense local infrastructure resistance, crippling physical labor shortages, and deep-rooted legacy debt.

Success requires shifting from passive observation to active transformation across four specific battlegrounds. The need to upgrade infrastructure, the need to change business models, to make the supply chain resilient and to manage or train skilled labor. By systematically neutralizing these internal and ecosystem disablers and aggressively leveraging digital enablers like AI and automation, leaders can build the foundational capabilities required to thrive in any of the four future scenarios.

What do you see as the biggest internal barrier to your organization's ability to adapt at the necessary pace?

> ***"I do think the biggest challenge is getting people on board with the idea that we are going to have to change to meet the new demands."***
> Chief Customer Officer | Utility: Energy and Water | USA

Transformation is not a single technology project; it is a coordinated, four-front campaign to build architectural agility.

Dimension one: The operational response

Shifting from legacy infrastructure to smart transmission and automated asset optimization.

The transformation response:

The immediate necessity is to upgrade physical networks while heavily sweating existing assets. Leaders need to pivot from reactive maintenance to predictive, algorithm-driven optimization, ensuring grid stability despite the massive influx of intermittent renewable energy and surging digital power demand.

Managing the disablers:

- **Disabler (legacy infrastructure decay):** Ageing physical grids are fundamentally unequipped to handle bidirectional energy flows or massive capacity spikes.
- **Response:** Prioritize targeted, capital-efficient grid upgrades and deploy vast sensor networks to monitor physical asset health in real time.

Leveraging the enablers:

- **Enabler (artificial intelligence):** Deploying machine learning algorithms to balance complex load dynamics and predict mechanical equipment failure before it causes downtime.
- **Enabler (dynamic grid orchestration):** Utilizing digital twin technology to precisely model grid stress and automate the optimal routing of energy.

Strategic agility and domestic supply chain resilience need to replace rigid long-term forecasting to survive regulatory whiplash.

What is the primary operational hurdle in meeting future energy demands?

> ***"We know our community is outgrowing our region's power generation. We have a lot of potential solutions, but whether they will pan out regionally is uncertain, because transmission is a challenge."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Dimension two: The commercial response

Pivoting from pure commodity sales to bespoke value propositions and behind-the-meter solutions.

The transformation response:

Traditional utilities can no longer rely on a passive, central-generation commercial model. To prevent a mass exodus of highly profitable industrial and technology clients, organizations should offer bespoke, energy as a service contracts and localized microgrid solutions tailored to individual commercial resilience needs.

Managing the disablers:

- **Disabler (commercial grid defection):** Large hyperscale consumers are building independent power generation to bypass congested and unreliable regional grids.
- **Response:** Transition from a pure commodity supplier to an integrated energy partner, co-investing in local generation and storage for major clients.

Leveraging the enablers:

- **Enabler (Energy-as-a-Service platforms):** Implementing highly flexible billing and service software that allows clients to proactively optimize their own energy consumption.
- **Enabler (prosumer integration software):** Creating automated digital marketplaces that allow commercial clients to seamlessly trade excess stored energy back to the central grid.

Commercial survival dictates a rapid shift from selling raw power to providing guaranteed, tailored energy resilience.

How must the organizational vision evolve to meet modern expectations?

> ***"We have had very little interest in small scale grid, but I do recognize over time that interest is going to grow. We're offering to data centers if they want to set up your own grid, we will transmit power to you'. Five years ago, that would have been unheard of."***
>
> Chief Customer Officer | Utility: Energy and Water | USA

Dimension three: The resilience response

Securing physical supply chains and digital operations against geopolitical and cyber threats.

The transformation response:

As energy infrastructure becomes a primary geopolitical target, resilience needs to evolve from basic compliance into a core strategy. This requires onshoring critical supply chains and embedding robust security directly into the operational technology network.

Managing the disablers:

- **Disabler (geopolitical weaponization):** Global supply chains for crucial transition minerals and hardware components are highly vulnerable to international trade disputes.
- **Response:** Systematically diversify vendor ecosystems and establish localized, redundant manufacturing partnerships for all essential grid hardware.

Leveraging the enablers:

- **Enabler (zero-trust operational technology):** Strictly segregating corporate information networks from physical grid controls and demanding continuous user authentication to prevent catastrophic system breaches.
- **Enabler (predictive supply chain analytics):** Using advanced data models to continuously map multi-tier supplier risks and predict logistical bottlenecks before they halt capital projects.

True resilience requires treating physical supply chain security and digital cyber defense as a single, unified operational mandate.

What strategic mindset is required to build true operational resilience?

> ***"When you want it to stay every time before the trend... your focus must have a long-term and not what is in six months."***
>
> Senior VP / Chief Information Officer | Energy: Transmission | Germany

Dimension four: The human response

Overcoming severe physical labor shortages through regional cooperatives and cross-boundary talent sharing.

The transformation response:

The energy transition ultimately requires physical execution; from building complex treatment plants to commissioning high-voltage cables. A severe deficit in engineering talent directly threatens to stall these projects. The solution lies in abandoning siloed hiring mentalities and forming strategic ecosystem cooperatives to share scarce technical resources across regions.

Managing the disablers:

- **Disabler (the boots on the ground deficit):** A critical lack of qualified field engineers and technicians is causing severe physical project delays and immense cost overruns.
- **Response:** Form cross-boundary alliances with non-competing regional peers to strategically pool and dispatch specialized labor to critical infrastructure sites.

Leveraging the enablers:

- **Enabler (augmented reality field support):** Implementing highly flexible billing and service software that allows clients to proactively optimize their own energy consumption.
- **Enabler (ecosystem talent platforms):** Developing shared digital deployment rosters that allow utility cooperatives to dynamically allocate human resources across major regional infrastructure projects.

Digital applications cannot replace physical labor; innovative, cross-organizational talent pooling is essential to execute the energy transition.

How would you describe the urgency of the capacity and execution gap?

> ***"On one hand, we are going faster in the speed of where renewable energy is being deployed... On the other hand, the increase in expected demand is growing much faster."***
>
> Chief Commercial Officer | Energy: Renewables | Spain

The partner for the hybrid journey

Executing the four dimensions of transformation requires an ecosystem orchestrator capable of bridging legacy assets and digital innovation.

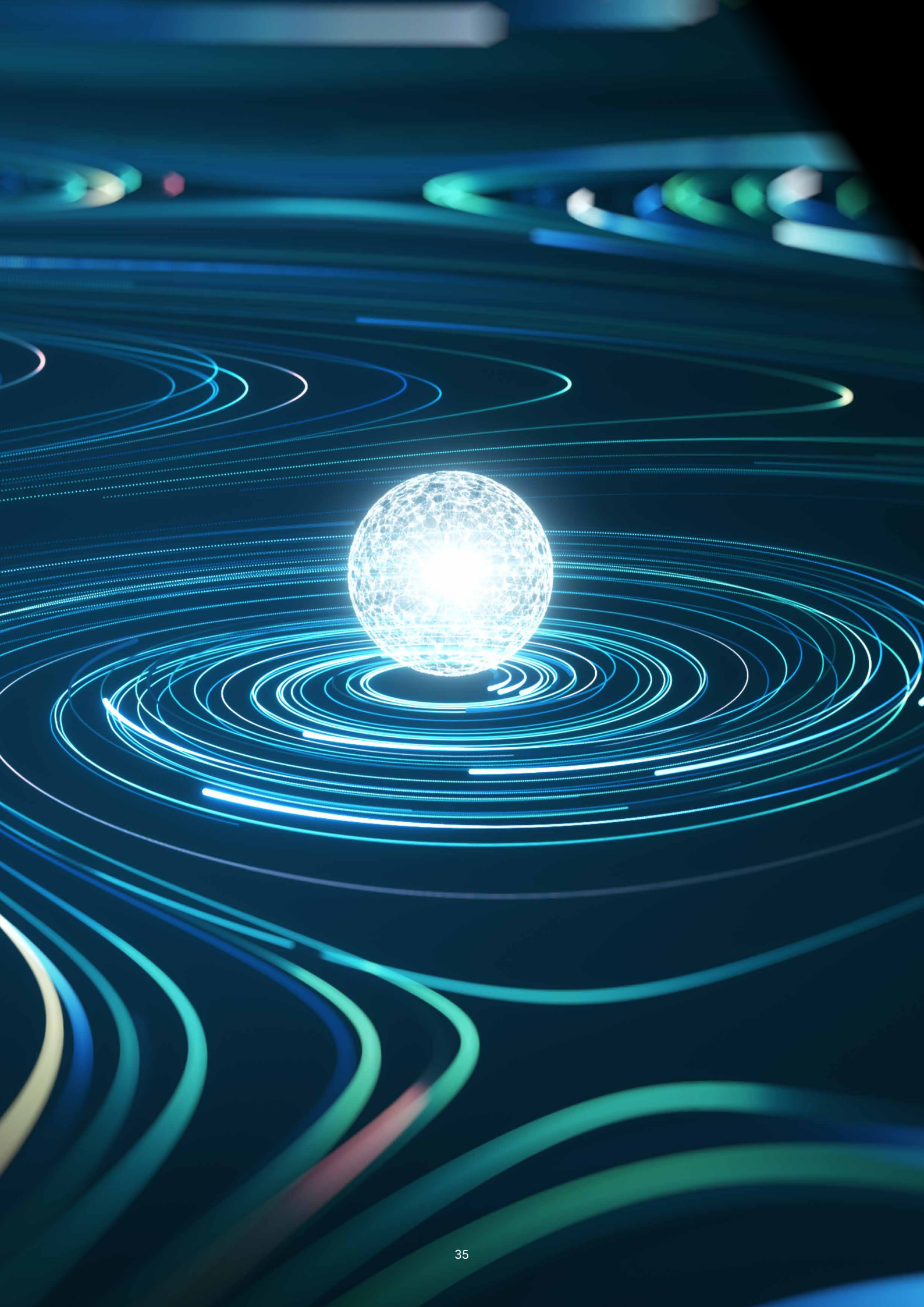
Mastering these battlegrounds is exceptionally complex for traditional utilities built for stability rather than rapid agility. Overcoming these structural disablers requires a technology partner who intimately understands the intersection of heavy industrial infrastructure and advanced digital orchestration.

Transforming legacy systems while keeping the lights on requires a measured, proven approach. By collaborating with partners who possess deep cross-industry expertise, energy leaders can confidently deploy the necessary automation, cyber resilience, and data analytics required to secure their operations for the next decade.

What makes insights from a technology firm feel truly actionable and ready for implementation?

> ***"It needs to feel collaborative and genuinely connected to where the business is trying to go, with a focus on value for others rather than value for them."***
>
> Group Chief Information Officer | Utility: Water | UK

Success in the next decade will not be achieved in isolation; it requires deep integration with trusted technological partners to scale intelligence across the entire energy value chain.



Section

4

Transformation imperatives

Defining the immediate, no-regret actions required to build long-term architectural supremacy.

Strategic recommendations:
From survival to supremacy

Shifting focus from reactive crisis management to proactive architectural dominance.

The energy and utilities sector is at a critical inflection point. Organizations that merely react to the immediate crises of resource adequacy and policy whiplash will find themselves perpetually on the defensive, struggling to maintain basic service levels. To transition from survival to market supremacy, leaders need to adopt a proactive, forward thinking mindset. This involves aggressively optimizing current legacy assets to fund the transition while simultaneously building a hybrid, multi-technology generation portfolio that flattens financial risk across any future scenario.

True market leaders will differentiate themselves by abandoning the rigid, asset-centric models of the past in favor of highly agile, customer-centric operations. By offering bespoke energy resilience to high-value consumers, utilities can secure long-term loyalty and prevent the rising threat of commercial grid defection.

What is the single boldest strategic move, partnership, or investment you believe leaders in your sector should seriously consider today to ensure they are resilient and relevant in the next 10 years?

> ***"Being able to optimize a multi technology renewable asset portfolio."***
> Chief Commercial Officer | Energy: Renewables | Spain

Supremacy requires abandoning single-technology reliance and building a multi-technology portfolio capable of weathering profound market shifts.

The common denominator action plan

Immediate strategic imperatives to build operational resilience for any of the four future scenarios.

The four external scenarios mapped for 2036 are outside the direct control of any single enterprise. However, the preparation for them is entirely internal and should begin immediately. The common denominator action plan focuses on no-regret strategic moves that yield immediate operational benefits today while laying the structural foundation for tomorrow, regardless of which future macro-environment materializes.

This approach requires a ruthless focus on capital efficiency, proactive cross-industry collaboration, and the deployment of proven digital intelligence rather than speculative technologies. Executing these foundational imperatives today builds the architectural flexibility required to pivot rapidly when geopolitical shocks disrupt the market tomorrow.

Are you most interested in a future vision when it is explicitly linked to solving today's operational challenges or do you appreciate this long-term future focus?

> ***"Long-term focus is key for sustainability, but we need immediate solutions to remain competitive and stay alive to reach that long-term vision."***
> VP Major Projects | Energy: Oil and Gas | Canada

Key playbook:

- **Do** relentlessly optimize existing assets using artificial intelligence to bridge the immediate resource adequacy gap.
- **Do** pivot to customer-centric models, offering behind-the-meter solutions to prevent commercial grid defection.
- **Do** form cross-boundary talent cooperatives to pool scarce engineering resources for physical infrastructure projects.
- **Do not** invest in speculative technologies like quantum or blockchain without a proven, immediate return on investment.
- **Do not** rely on single-technology generation; diversify portfolios to spread risk across wind, solar, battery, and hydro.

How Fujitsu can help:
The partner for the hybrid world

Uvance empowers energy leaders to optimize legacy assets and navigate the complexities of the future grid.

Transforming an established energy enterprise while maintaining continuous critical operations requires a partner who deeply understands the profound intersection of heavy industrial infrastructure and advanced digital orchestration. Through Uvance, we provide the strategic consulting expertise, agile software solutions, and advanced technologies necessary to execute the common denominator action plan.

From deploying artificial intelligence for predictive asset maintenance to implementing zero-trust cyber architectures for robust supply chain resilience, Fujitsu acts as a trusted ecosystem orchestrator. We enable Energy and Utility leaders to confidently bridge the gap between the operational crises of today and the automated, decentralized global village grid of 2036, ensuring that digital investments always deliver a proven return on investment.

What makes insights from a technology firm feel truly actionable and ready for implementation?

> ***"Show me what the actual ROI is on this. And how is this going to reduce my cost, enhance my process or reduce negative externalities."***
> Chief Information Security Officer | Utility: Water | UK

Partner with Fujitsu to deploy proven, return-on-investment-driven digital intelligence that secures operations today and builds architectural agility for tomorrow.

References

Fujitsu Technology and Service Vision

The evolving story of Fujitsu insights into the future, updated annually and covering the Fujitsu approach to the main issues raised in the CxO survey.

global.fujitsu/en-global/about/vision

Contributors:

Graeme Wright
CDO Manufacturing & Utilities UK&I

Shany Mizrahi Otero
Analyst Relations Manager

Lisa Adams
Customer Engagement Manager

Kayo Ribeiro
Head of Digital Intelligence

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Respondents:

A Diverse Cross-Section of Leadership Across Energy, Water, and Utilities

The insights in this report are not academic abstractions; they are derived from direct, in-depth engagement with the leaders shaping the industry. Our respondent pool represents a balanced cross-section of the sector, including Upstream Oil & Gas, Renewable Energy, Public Utilities, Water/Wastewater, and Energy Component Manufacturing. Geographically, these leaders span North America (USA, Canada) and Europe (UK, Germany, Spain), ensuring a global perspective on shared challenges like NIMBYism, regulation, and the AI demand shock.

Demographics Summary:

- VP Major Projects | Canada | Oil & Gas (Upstream) | <$1B Revenue
- Chief Commercial Officer | Spain | Renewable Energy | $1B-$5B Revenue
- Senior VP / CIO | Germany | Energy Components Manufacturing | $100M-$500M Revenue
- Chief Customer Officer | USA | Public Utility (Hydro) | $500M-$1B Revenue
- Chief Information Security Officer | USA | Water and Wastewater | $1B-$5B Revenue
- Chief Information Security Officer | UK | Water and Utilities | $5B-$10B Revenue