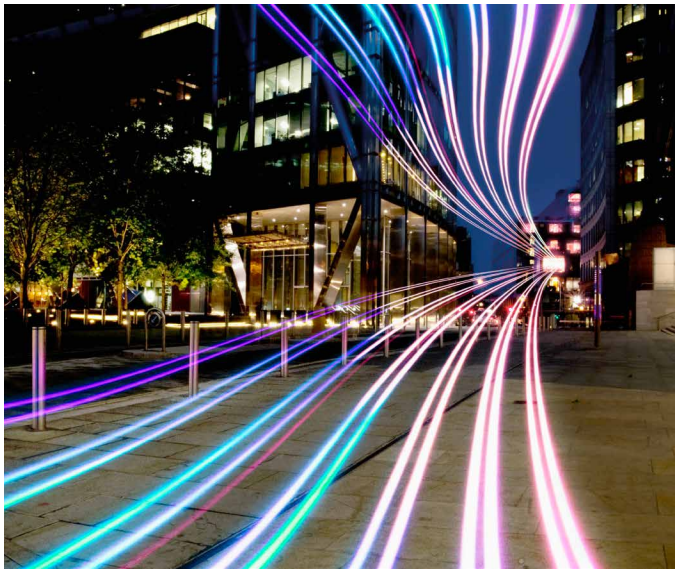
Re-architecting the grid

how new thinking and technology must shape a viable utility ecosystem

accenture

The traditional business models for generation, transmission, and distribution – predicated on ensuring reliable, secure, predictable power for all – are over.

Unprecedented global changes and new power demand trends – some not even imagined just a year ago – are forcing utilities to completely re-architect operations and assets across an ageing, increasingly costly, grid. This whitepaper, informed by industry thought leaders at IFS and Accenture, explores the key drivers for change, examines the strategic and technology choices, and suggests some actionable insights to begin transformative change.



Bidirectional interconnection: transforming for renewables and microgeneration

The power grid was originally designed for linear transmission of power from source to consumer. Now, with the advent of renewables such as solar and wind, the grid must accommodate diverse interconnections at the transmission and distribution levels, both from microgeneration prosumers and large-scale corporate generators of renewable energy. As consumers and governments see the impact of global climate change, they want to access, and create greener energy. But this shift to a two-way energy flow is extremely challenging. It reduces control over how much energy is being provided, and means consumption becomes volatile.

Post-Covid, societal shifts and new behavioral patterns (for instance working from home, the need to charge private electric vehicles and commercial heavy goods fleets) are also creating different spike loads. This demand, often in decentralized locations, is far harder for energy providers and utilities to predict.

As solar and wind technology has matured, the cost of generation has dramatically fallen. In contrast, however, the cost of connecting generation to the transmission network is rising. It is inevitable that utilities will ultimately have to begin passing these overheads on to consumers

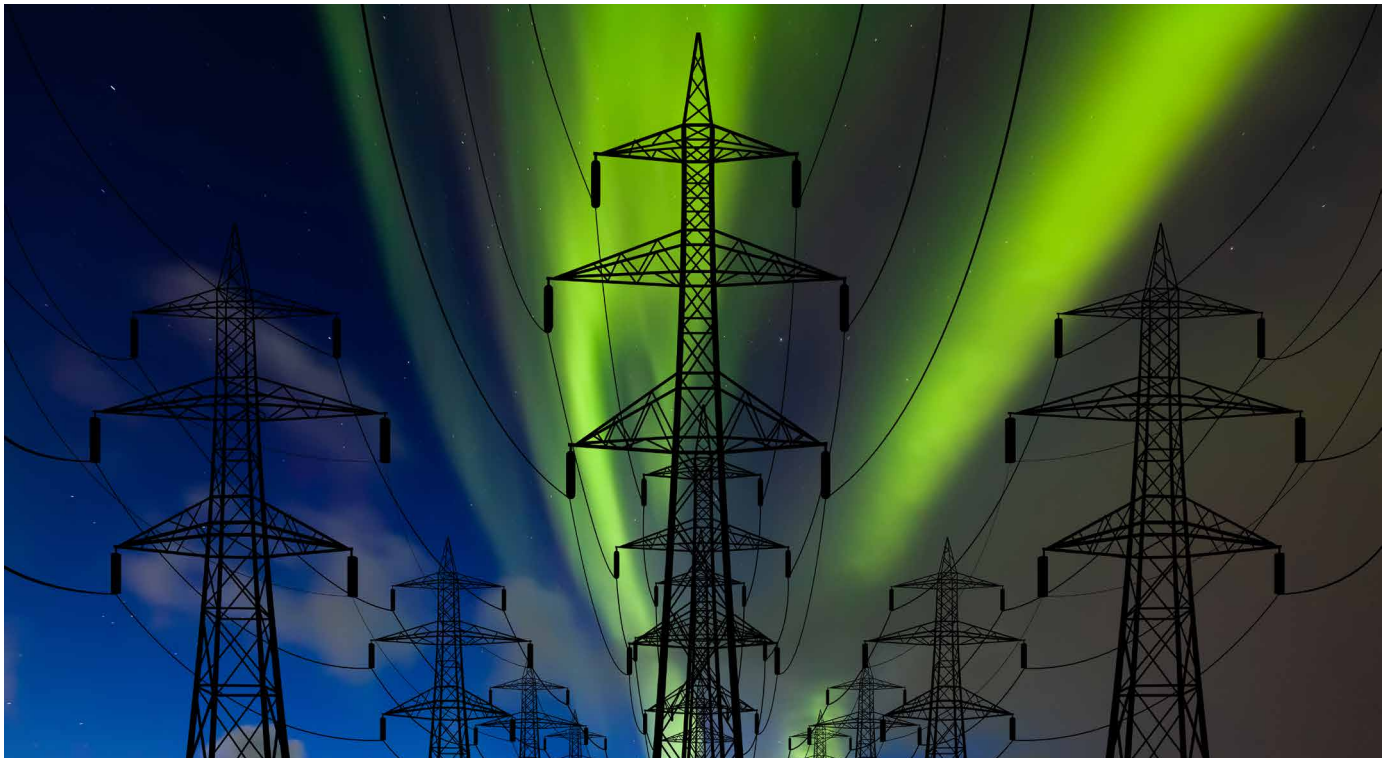
Data centers and Artificial Intelligence: more power-hungry processing

Over the last year, the increased demand for energy required by datacenters has come under scrutiny. In the US, data center investment is encouraged by federal tax incentives in several states. However, the power load of a data center can exceed that of a typical town. According to recent Goldman Sachs Research reports,[1] US data centers will use 8% of all US power by 2030, compared with 3% in 2022.

The research suggests data center power demand will grow 160% by 2030, largely driven by AI request processing: a ChatGPT query requires nearly 10 times more energy to than a Google search. Between 2023 and 2030, Goldman Sachs analysts predict AI will drive an overall increase in data center power consumption of 200 terawatt-hours per year, accounting for almost one-fifth (19%) of data center power demand by 2028.[1]

The consequences for utilities are sobering. Just to support data centers, US utilities will need to invest around $50 billion in new generation capacity over the next decade. In Europe, where grid infrastructure is older, analysts predict nearly €800 billion ($861 billion) in spending on transmission and distribution, plus some €850 billion on renewable energy assets.[1]

At the same time, the drive for electrification poses difficult questions around funding for infrastructure. For example, moving to electric vehicles for intercity and interstate transport requires significant investment which, without state or government assistance, is currently cost-prohibitive for utilities.



How can transformative digital technology help?

Demand planning and grid management: AI

Providers need to be able to understand and forecast demand to plan what, and where, to scale new infrastructure investment. AI is already providing vital data insights to analyze supply and demand curves, modelling complex variables such as population growth, data center growth, EV load and more to inform infrastructure decisions and adjustments.

Similarly, AI automation can help to balance supply in the face of demand volatility, predicting conditions and balancing grid performance to reduce the risk of sudden blackouts or brownouts. Demand response technology in the form of smart home devices such as smart thermostats, charging stations and other appliances can help to fine-tune the grid, whilst also generating further revenues.

Planning and controlling projects: integrated enterprise toolsets

With an understanding of new grid requirements, power generators, transmission and distribution companies need integrated enterprise tools to plan and control multiple capital projects on a hitherto unprecedented scale.

This means efficiently planning managing and executing across myriad facets: the supply chain, the inventory, and the workforce, alongside the financial controls needed for potential joint venture partnerships, land leasing and revenue sharing.

Scaling effectively: improved, data-driven decision-making

To scale sufficiently, utilities can no longer rely on inefficient manual or legacy processes and technology. Business processes need to be controllable end-to-end, and in a truly intuitive way. Intelligent, data-driven analytics and real-time reporting from integrated Enterprise Resource Planning, Enterprise Asset Management and predictive Field Service Management software ensure good decision-making, backed by the ability to allocate resources, both people and capital, in the most effective manner.

Embedding Cyber resilience: Cloud-based protection from Bad Actor threats

Utilities, like other critical national infrastructure, must protect their network operations. Current geopolitical events see ever increasing threat levels from both state and criminal Bad Actors.

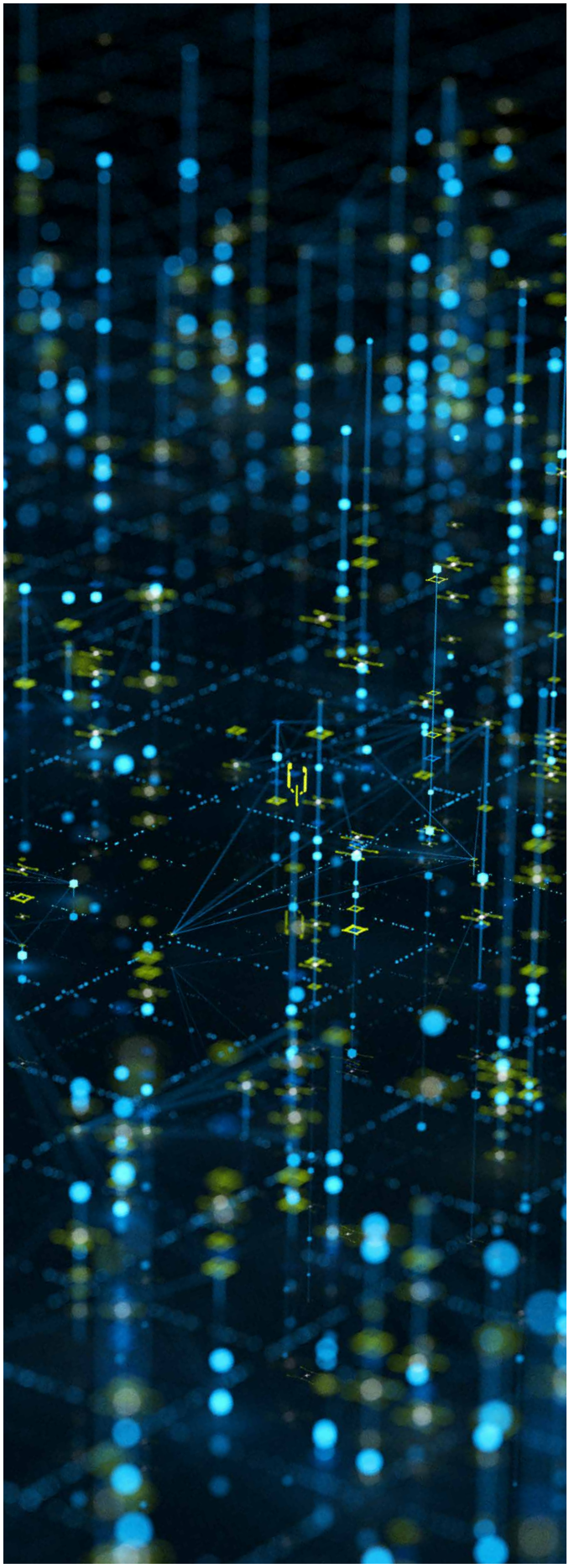
Historic sector reluctance (loss of control and expense of retiring existing server and database team investments) has been replaced by a realization that the risk landscape has changed. Moving to cloud-based computing, such as the IFS Cloud platform, provides utilities far greater control, monitoring and security than physical on-premise server deployments. It also provides the ability to instantly scale based on need and ensure always up to date (evergreen) software with regular, selectable, automated updates.

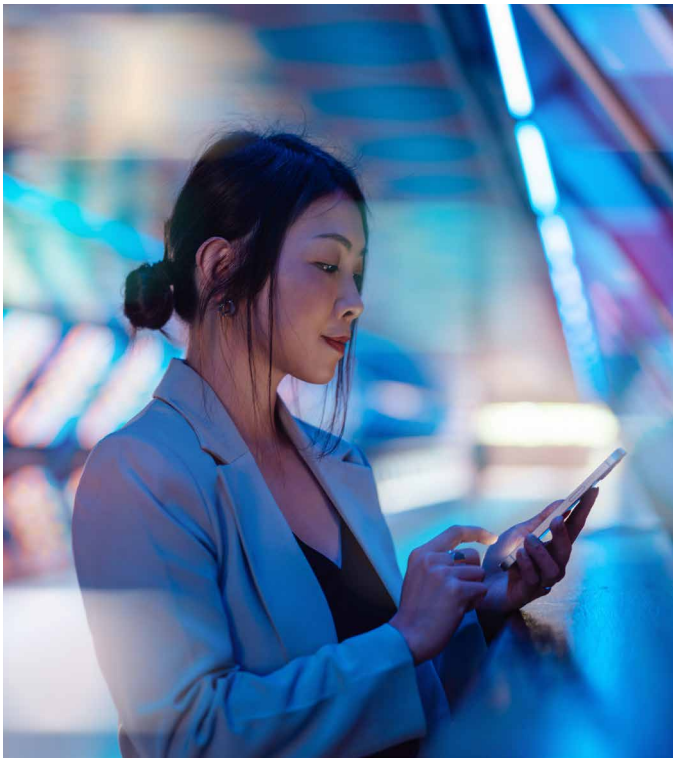
Understanding sustainability: accurate ESG reporting

Facing increasing accusations of 'greenwashing', many utility companies are now struggling to accurately capture, interpret and report the true carbon footprint and performance of their operations. In the EU, the CSRD policy means reporting is mandatory, and the SEC has adopted climate-related disclosure rules that impact US businesses. Having technology that can collect data, analyze it and report back to regulator stakeholders in a consistent framework and report is critical. In the case of the IFS Cloud platform, for instance, a Sustainability Management module pulls information from within the business to accurately track performance against goals.

Ensuring affordability: reducing operational costs

One element a utility can directly control is making themselves more operationally efficient and reducing costs. Technology enables a move away from costly, potentially wasteful, scheduled and reactive asset maintenance, to lean predictive, performance and condition-based maintenance where problems are likely or already present.





Five recommendations for Utility IT and business teams

1. Create a clear big picture for transformation – then choose the quick wins first

You're not alone: systems integrators and analysts like Accenture alongside software vendors like IFS are already creating a framework of what successful digital transformation should look like for a utility, both from an operational and a technology perspective.

Composable software, for example IFS Cloud, offers a flexible, agile, composable tool set that has the capability to evolve as needs change over time. Identify where quick wins are, and implement with a modular roll-out, quickly and easily realizing early business value, and avoiding the delay and risk of a 'Big Bang' implementation. It's also important to use feedback to refine, and if necessary adjust or revise the priorities on that roadmap.

2. Look beyond utilities industries – apply best practice from other sectors

Sectors undergoing parallel transformation journeys such as oil, gas, transportation and others provide valuable learning opportunities and best-practice models. IFS, for example, regularly shares learnings between sectors to optimize opportunities and develop new business models.

3. Look for process inconsistences – standardize where possible

Examining business processes and looking for inconsistencies across operating companies surfaces opportunities to standardize, streamline and automate to improve efficiency. This approach helps to start framing not only what the digital needs are, but also where you should start to ensure end-to-end technology that can support the process goal.

4. Recognize technology now enables business – so IT responsibilities must change

New technologies such as AI are removing technical barriers. Low and no-code solutions mean business experts, not just IT professionals, now have the power to develop and refine applications and solutions in-house. With the business value and efficiency visions defined, IT teams can focus on delivery, enabling the business to transform in the most efficient way.

5. Change is inevitable - prepare to engage

The scale of the infrastructure rebuild, and investment required by utilities over the next few decades, will be unprecedented. The sector will be subject to regulatory scrutiny around charging and grid funding for communities, with conversations shaping legislature and policy at federal and government levels. Organizations who delay embarking on a transformation will soon simply not remain viable in the sector.

Watch Webinar

Achieving a Unified Cloud Enabled Approach to Utility Operations.

[1] Goldman Sachs Research

About IFS

IFS develops and delivers cloud enterprise software for companies around the world who manufacture and distribute goods, build and maintain assets, and manage service-focused operations. Within our single platform, our industry specific products are innately connected to a single data model and use embedded digital innovation so that our customers can be their best when it really matters to their customers – at the Moment of Service™.

The industry expertise of our people and of our growing ecosystem, together with a commitment to deliver value at every single step, has made IFS a recognized leader and the most recommended supplier in our sector. Our global team of over 5,500 employees every day live our values of agility, trustworthiness and collaboration in how we support thousands of customers.

Learn more about how our enterprise software solutions can help your business today at ifs.com.

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About Accenture

Accenture is a leading global professional services company that helps the world's leading businesses, governments and other organizations build their digital core, optimize their operations, accelerate revenue growth and enhance citizen services–creating tangible value at speed and scale. We are a talent – and innovation – led company with approximately 733,000 people serving clients in more than 120 countries.

Technology is at the core of change today, and we are one of the world's leaders in helping drive that change, with strong ecosystem relationships. We combine our strength in technology and leadership in cloud, data and AI with unmatched industry experience, functional expertise and global delivery capability. We are uniquely able to deliver tangible outcomes because of our broad range of services, solutions and assets across Strategy & Consulting, Technology, Operations, Industry X and Song. These capabilities, together with our culture of shared success and commitment to creating 360° value, enable us to help our clients reinvent and build trusted, lasting relationships. We measure our success by the 360° value we create for our clients, each other, our shareholders, partners and communities.

Visit us at www.accenture.com.

Production: IFS, June 2024.