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Integrated Planning for Electrical Utilities

How It Aligns Strategy, Capital, and Execution
Across the Grid

A new era in energy demands a new approach to planning

Utility leaders are under mounting pressure to digitize grid infrastructure, decarbonize operations, and deliver reliable, affordable energy amid rising complexity. Yet, many continue to struggle with fragmented planning processes, siloed data, and disconnected teams across finance, operations, and asset management. These challenges make it difficult to execute leadership priorities, slow digital transformation, reduce stakeholder trust and organizational resilience, result in poor capital allocation, create regulatory hurdles, and negatively impact customers through longer and more frequent outages and reduced service reliability.

Core industry challenges such as misaligned capital allocation, rate case risks, and distributed energy resource (DER) volatility put significant strain on firms as they look to align investment decisions with strategic initiatives and regulatory requirements, and to balance multiple competing priorities with profitability goals.

This report explores how integrated planning – a holistic approach and framework that unifies strategic, financial, and operational planning – enables utilities to navigate these challenges by transforming strategic needs and market demands into obtainable growth and innovation opportunities. It aligns long-term strategy with near-term execution across transmission, distribution, and generation, where relevant. By applying a value framework, scenario analysis, intelligent bundling, and continuous re-optimization, integrated planning enables organizations and leaders to create transparent, defensible, and executable plans.

Drawing on primary research, including interviews and survey data from utility leaders, the report outlines the drivers behind adoption, the tangible benefits realized, and key success factors for implementation.

Methodology

To gain insights into the importance of integrated planning for the utilities industry, IFS Copperleaf commissioned a study from independent research firm Verdantix. The study involved engaging and interviewing utilities from across North America, and using insights from a Verdantix global survey of 50 decision-makers across the utilities sector. Interviewees answered questions relating to priorities, barriers, and technology preferences related to managing, maintaining, and operating plant infrastructure.

This study draws insights from the following Verdantix reports:

- [Verdantix Global Corporate Survey 2025: Industrial Transformation Budgets, Priorities And Tech Preferences](#)
- [Verdantix Green Quadrant: Asset Investment Planning Software 2023](#)
- [Verdantix Strategic Focus: Leveraging AIP Software For Enterprise Investment Planning](#)
- [Verdantix Strategic Focus: Planning For ESG, Climate & Biodiversity Risks With AIP Software](#)



Evolving utility demands are outpacing traditional planning. Historic operations of grid infrastructure and utilities assets typically focused on large centralized production of energy from predictable and controllable energy sources such as coal, natural gas, and nuclear. However, the energy landscape has shifted dramatically, as firms now grapple with the challenges of decentralization, decarbonization, digitization, and rising customer expectations. These operational and strategic pressures are forcing firms to consider advanced solutions and data-driven approaches. Key market forces accelerating this need are:

- **Rapid growth of distributed energy resources (DERs)**

Uptake in DERs such as solar energy, wind, and local battery systems has been surging as industrial firms look to reduce energy costs and emissions, while improving operational resilience by decreasing reliance on centralized energy sources. Wood Mackenzie estimates the US DER market to double by 2027, with expenditure reaching \$68 billion per year. However, the rise in DERs also introduces significant complexity. These resources are highly decentralized, often unregistered, and interfacing with the grid in dynamic, unpredictable ways. This decentralization challenges traditional grid planning, monitoring, and control processes, which were built around centralized, predictable supply. To maintain grid stability, prevent congestion, and improve demand forecasting, utilities must move beyond manual processes and siloed systems to adopt integrated digital solutions and data-driven approaches.

- **Intensifying regulatory pressures**

Regulatory mandates across the US are changing rapidly, from federal initiatives such as the Inflation Reduction Act (IRA), which ties financial incentives to strict emission thresholds, to state-level legislation such as California's Renewable Portfolio Standard (RPS), which mandates the procurement of renewable energy, and the 2019 AB 1054 law, which offers a \$21 billion wildfire fund for utilities, while imposing stricter safety and accountability requirements on utilities to reduce wildfire risks. With so much uncertainty and complexity, it is essential for utilities to leverage digital solutions that enable a holistic, long-term approach to grid investment and optimization. In the Verdantix 2025 global survey, 62% of utilities executives stated that improving regulatory compliance was a significant factor driving the digital transformation of their plant operations.

- **Mounting decarbonization pressure**

The Verdantix 2025 global survey found that 88% of executives see corporate decarbonization targets as a significant factor driving the digital transformation of their utility operations. Grid modernization has significant potential to improve the reliability and resilience of electricity, reduce carbon emissions from the energy sector, and promote economic growth through job creation. However, to consistently deliver affordable, clean, reliable, and secure energy, while simultaneously managing high upfront costs, regulatory hurdles, technical complexities, and public resistance, utilities must use digital technologies to adopt more agile planning and investment approaches. By doing so, utilities will more effectively optimize existing assets, integrate renewables, and meet evolving stakeholder and market demands.

- **Aging infrastructure under rising reliability demands**

Despite the 2021 Infrastructure Investment and Jobs Act, North America continues to struggle with critical infrastructure challenges—from power outages and burst pipes to structural failures and inadequate resilience to extreme weather. Recent events such as the 2024 collapse of Baltimore's Francis Scott Key Bridge and the 2025 water treatment plant failure in Richmond, Virginia that caused severe flooding and left residents with no access to clean drinking water for days underscores the ongoing vulnerabilities in US infrastructure. This has been further emphasized in the American Society of Civil Engineers 2025 Report Card for America's Infrastructure, which gave the US a "C" grade, indicating clear signs of deterioration and an urgent need for attention. With digital transformation strategies focused on improving maintenance and grid resilience, utilities can better predict failures, optimize repairs, and enhance overall infrastructure reliability, helping to mitigate the risks of future crises.

- **Escalating climate-related disasters**

German multinational insurer Munich Re reported that weather disasters in the first half of 2025 have cost the US \$93 billion in weather disaster damage, with the wildfires in Southern California in January contributing \$53 billion in losses, more than 30 deaths, and over 425,000 customers in California temporarily without power. Increasingly frequent and severe weather events are placing unprecedented stress on utility infrastructure, energy generation, and service delivery, while also exposing utilities to greater regulatory, financial, and reputational risks. In response, utilities have already begun investing heavily in wildfire mitigation measures. For example, the Pacific Gas & Electric Company has invested in undergrounding power lines, while Edison International has deployed covered conductors to reduce the risk of fires caused by above-ground wire contact. However, physical infrastructure upgrades alone are not enough. Utilities must deploy digital solutions that enhance situational awareness, improve risk prediction, reduce climate-driven disruptions, and support long-term operational resilience.

- **Increasing availability and accessibility of new technologies**

The 2025 Verdantix global survey revealed that 82% of utilities executives credit the availability and increasing maturity of new digital technologies such as AI in driving the digital transformation of their plant operations (see Verdantix Global Corporate Survey 2025: Industrial Transformation Budgets, Priorities And Tech Preferences). Digital technologies are essential to build more resilient operations, improve efficiency, and meet growing customer and regulatory expectations. By using data tools that support the integration of information, operational, and engineering technology (IT, OT, ET) data, advanced analytics, and automation, utilities can modernize aging infrastructure, streamline complex processes, improve customer service, and better manage rising variability in energy supply and demand. This shift not only strengthens operational reliability, but also positions utilities to adapt to the rapidly evolving energy landscape. Verdantix also found that over a third of the executives have plans to increase spend on digital transformation of plant operations and maintenance activities over the next 12 months.



Integrated planning combines generation, transmission, distribution, and resource planning into a coordinated, holistic process

The pressures from the key trends outlined above expose—and can even be worsened by—the limitations of siloed planning approaches that often hinder agility and alignment.

As such, large organizations have turned to data-driven analytics to enrich decision-making and drive enterprise-wide collaboration (see [Verdantix Strategic Focus: Leveraging AIP Software For Enterprise Investment Planning](#)).

Integrated planning—particularly integrated grid planning in the utilities sector—provides a framework to evaluate and compare different investment scenarios and project options, providing greater optionality to ensure that every dollar spent maximizes value.

Verdantix defines integrated planning (IP) solutions as:

“

Digital solutions that enable a strategic and coordinated approach to resource planning across the utility value chain—from generation to transmission and distribution.”

Asset investment planning solutions accelerate the journey to integrated planning

Technology solutions are increasingly considered essential for utilities looking to integrate new, distributed, and variable forms of clean energy, while maintaining reliability and affordability. Tools ranging from spreadsheets to FP&A or asset management

software have all been used to provide input for investment decisions and reduce bias behind spending justifications.

While many applications exist, the growing complexity of investment decisions spanning multiple sites and enterprise-level priorities makes asset investment planning (AIP) solutions the only tool with the industrial expertise and decision-making framework capable of helping utilities scale effectively. AIP solutions underpin successful IP efforts by enabling more dynamic, data-driven, and collaborative planning processes across traditionally siloed utility functions (see [Verdantix Green Quadrant: Asset Investment Planning Software 2023](#)).

AIP solutions enable utilities to:

- **Proactively manage risk and uncertainty through a value framework**
Initially focused on using asset degradation data to drive investment decisions, AIP software has evolved to enable firms to easily ingest and quantify financial, non-financial, and operational data; it ranges from budgets to safety, performance, and decarbonization KPIs to produce enterprise-wide investment decisions. Through AIP value frameworks, utilities can not only consider a wide variety of objectives, but also evaluate trade-offs and prioritize investments that deliver the highest long-term benefit. By doing so, utilities can anticipate volatile market- and climate-related risks such as policy shifts and extreme weather events and proactively put mitigation strategies in place, reducing both operational and financial uncertainty.

- **Deliver greater regulatory transparency with defensible, auditable plans**

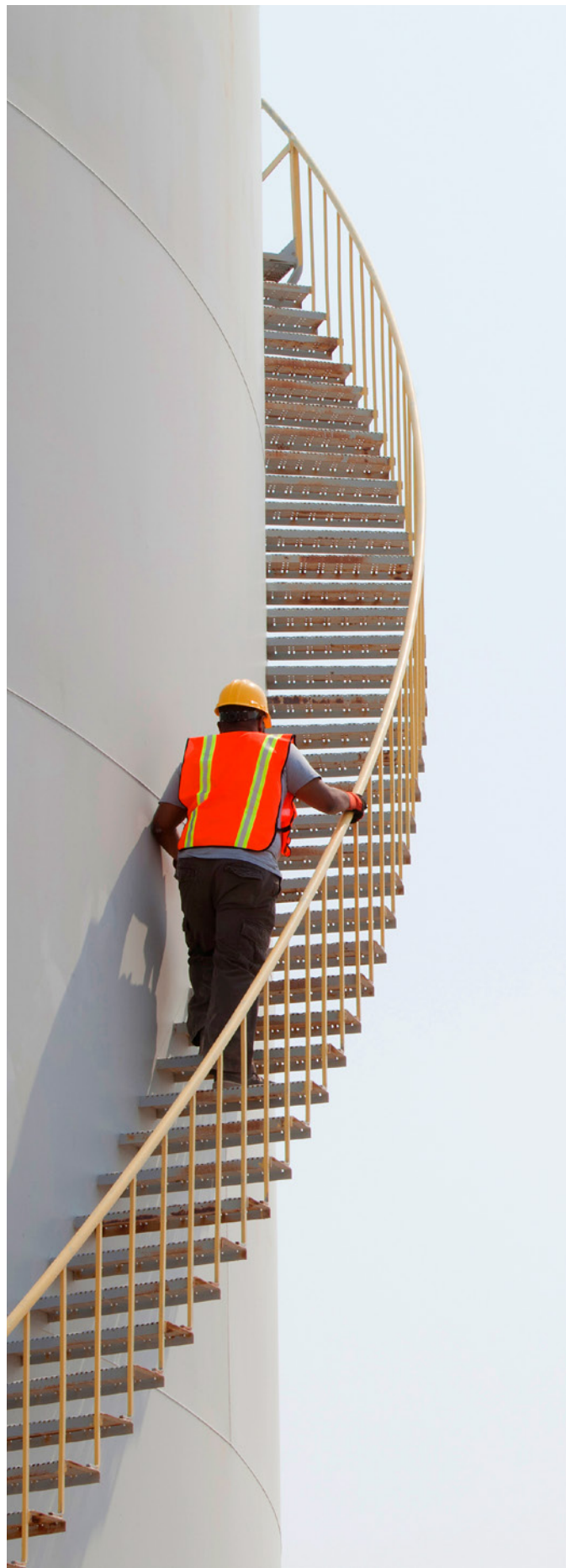
North American utilities must comply with state-based rate cases. Whether they are proactive or retrospective processes, rate filings must clearly outline a utility's capital plans for T&D systems, while also demonstrating measures to improve sustainability, safety, reliability, and climate resilience. These plans may involve upgrading and maintaining infrastructure, adding renewable generation, and deploying new technologies to support a clean energy transition. AIP solutions standardize the decision-making process and enable utilities to produce well-documented investment plans that withstand regulatory scrutiny. The auditable nature of AIP solutions not only streamlines rate case approval processes, but also drives trust with regulators, stakeholders, and the public.

- **Integrate workflows across operations, finance, and leadership**

Evolving grid requirements and complexities are forcing utilities leaders, regulators, and grid operators to coordinate more closely, share data, and respond faster to changing conditions. Tasks that historically were decided by single decision-makers may now require larger considerations. AIP software offers a collaborative and configurable environment tailored to the needs of technical, financial, and strategic teams, ensuring investment decisions are aligned across all stakeholders, while meeting operational realities, budget constraints, and strategic priorities.

- **Model scenarios to align long-term grid needs with strategic objectives**

Scenario modeling is vital as utilities face increasing complexities and require data-driven methods to explore possible outcomes and understand the impact of market, policy, and technology conditions on grid performance. With an AIP solution, utilities can conduct “what-if” scenarios and uncertainty analyses to evaluate how differing capital decisions, business constraints, and future events could impact performance. In the context of IGP, this foresight helps ensure that long-term grid investments and operational plans remain consistent with broader strategic goals such as decarbonization, resilience, and customer affordability.



Integrated planning delivers strategic, operational, and financial benefits

Using AIP software for IP provides a structured framework to align resource, transmission, and distribution planning to enhance grid infrastructure and better support diverse energy sources such as solar, wind, and storage (see Figure 2). IP solutions enable utilities to develop a clear roadmap for operational improvements and make informed decisions directly tied to strategic KPIs.

Utilities seeking out IP solutions can realize significant benefits, such as:

- **Optimized capital investment and returns**

Software that uses a holistic IP approach considers the entire energy system, including generation, transmission, and distribution in a single decision-making framework, rather than in silos. With a clear framework to weigh competing priorities across teams and time horizons, utilities can balance priorities against constraints and objectives (capital, operational, regulatory, ESG, etc.) to make optimized investment decisions. Advanced scenario modeling enables utilities to run thousands of “what-if” scenarios simultaneously, to quickly evaluate the costs, risks, and performance trade-offs of different asset intervention options. This empowers utilities to make the most efficient use of resources and confidently answer critical questions such as: How big should the budget be? What should it be spent on? When is the right time to spend it? How will my OPEX spend impact CAPEX planning?

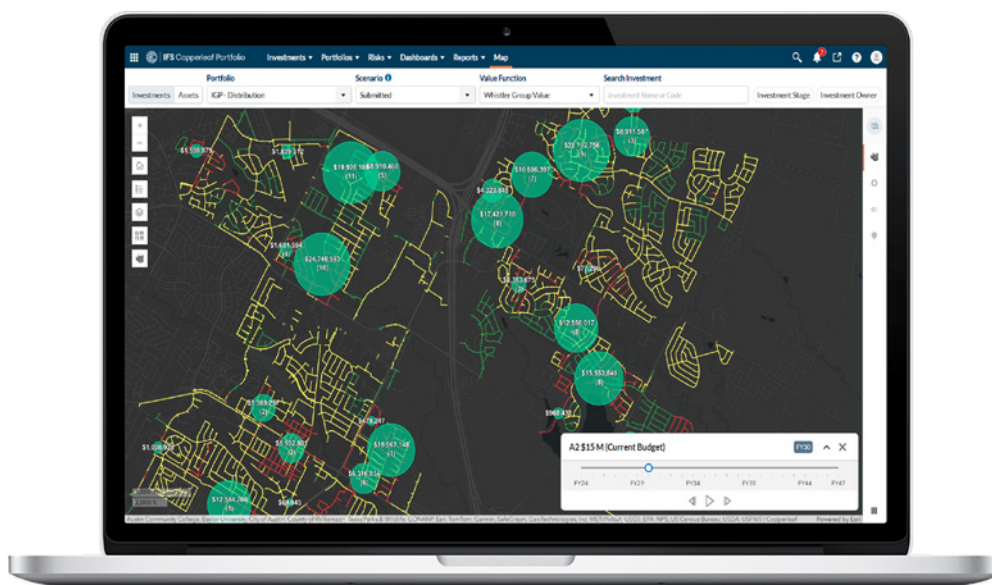
- **Stronger regulatory and stakeholder confidence**

S&P Global estimates that capital spending by North America’s electric, gas, and water utilities

will reach \$240 billion in 2025, growing at a CAGR of 10%. At the same time, federal, state, and regional regulations, including those from FERC, NERC, EPA, NRC, OSHA, and state public utility commissions, are adding operational complexity, resulting in audit failures and the rejection of capital investment plans. IP solutions deliver transparent, data-driven plans that directly link capital allocation to grid needs, policy objectives, and long-term sustainability targets. By turning compliance into a strategic asset, utilities can reduce audit failures, better manage disruption, secure more favorable regulatory outcomes, and build enduring trust with regulators, investors, and customers.

- **Enhanced agility and responsiveness in a dynamic environment**

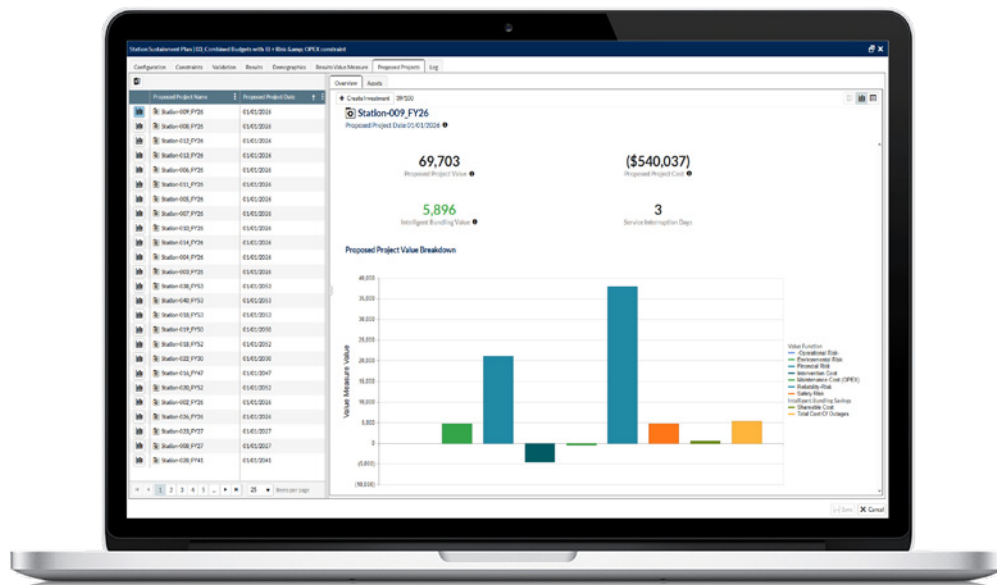
Utilities face mounting pressure from climate volatility, distributed resources, digitization, and decentralized operations. IP solutions provide a unified view of grid investments and their impacts on risk, reliability, ESG, and cost – enabling utilities to create defensible plans that meet changing demand patterns, policy, and system conditions. Through scenario modeling capabilities, utilities can investigate the impact of renewable integration, load growth, and policy changes on infrastructure investments or operational plans, ensuring evolving market conditions and decisions continuously align with strategic grid strategies, customer needs, and regulatory requirements. IP solutions help stabilize decision-making by reducing uncertainties and providing a structured framework to address unforeseen challenges, ensuring that even unplanned events can be proactively managed with confidence and clarity.



Optimized portfolio with bundled investments, as shown in IFS Copperleaf Portfolio

- **Executing strategy across planning horizons**
Utilities must ensure long-term objectives are consistently translated into near-term portfolios and in-year adjustments. Integrated Planning solutions use a value framework to align financial, risk, reliability, and sustainability KPIs on a common economic scale. They then apply multi-constraint optimization to balance CAPEX and OPEX priorities alongside resource and regulatory limits. By applying consistent decision criteria across the entire organization, planners can prioritize the most valuable projects, automatically bundle projects to reduce outages and cost, and clearly link strategy to funded initiatives. Scenario analysis and continuous planning capabilities can rapidly re-optimize portfolios, when budgets, policies, or system conditions change, all while maintaining alignment to long-term goals. The result is defensible, executable plans that maximize capital efficiency, enhance reliability, and increase regulatory confidence.

- **Smarter risk management**
The energy transition requires utilities to balance renewable integration with climate resilience, environmental stewardship, and reliable service. IP solutions embed geospatial data, sustainability, and climate risk into decision frameworks, enabling utilities to pinpoint risks, prioritize resilience investments, and quantify environmental and social value. IP also incorporates sustainability and climate-related models covering metrics such as GHG reductions, resilience improvements, renewable capacity, and societal benefit using industry frameworks such as resilience quantification methods developed by EPRI (Electric Power Research Institute) and IEEE (Institute of Electrical and Electronics Engineers). These methods assess how well utility systems can anticipate, withstand, adapt to, and recover from disruptions, helping utilities create defensible cost-benefit analyses for investment decisions that strengthen both regulatory cases and stakeholder confidence (see [Verdantix Strategic Focus: Planning For ESG, Climate & Biodiversity Risks With AIP Software](#)).



Proposed project with intelligently bundled assets

Conclusion

As utilities continue to prioritize developing a decarbonized and resilient grid, it is increasingly clear that traditional capital planning approaches are no longer sufficient. Fragmented planning models and siloed decision-making make it difficult for utilities to prioritize investments that truly advance strategic objectives.

IP frameworks embedded into an AIP solution will ensure that long-term vision is consistently translated into short-term actions, ensuring that all investment decisions support grid reliability, affordability, sustainability, and resilience.

IFS Copperleaf offers an IP solution for electrical utilities, one that uses a proven value framework that enables utilities to run multiple scenarios against regulatory shifts and budget constraints, and to understand their impact on asset performance and costs. Its continuous planning capability allows capital plans to be rapidly reforecast and re-optimized as conditions evolve. By adopting IP with a solution such as IFS Copperleaf's, utilities can strengthen the alignment between strategy and execution, improving agility, transparency, and confidence in investment decisions.

Case study: PG&E's integrated planning journey

Pacific Gas and Electric Company (PG&E) is demonstrating how IP can transform the way utilities plan and invest in critical infrastructure.

Faced with challenges such as wildfire risk, capacity growth, public safety, and aging assets, the firm implemented IFS Copperleaf's AIP value framework and Palantir Foundry to move from siloed planning to a unified, data-driven approach.

By consolidating more than 80 data sets across 20 systems into a single source of truth and creating over 17,000 bundled investment decisions, PG&E established a transparent, scalable model for investment planning. Scenario modeling and continuous re-optimization enable PG&E to assess asset risk, generate investment plans, and optimize portfolios in alignment with strategic objectives, regulatory requirements, and resource constraints.

Following a successful pilot, PG&E identified millions of customer minutes of outage avoided, measurable cost savings, improved customer reliability, and a clear pathway to long-term system resilience.



About IFS

IFS is the world's leading provider of Industrial AI and enterprise software for hardcore businesses that service, power, and protect our planet. Our technology enables businesses which manufacture goods, maintain complex assets, and manage service-focused operations to unlock the transformative power of Industrial AI™ to enhance productivity, efficiency, and sustainability.

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 7,000 employees every day live our values of agility, trustworthiness, grit and collaboration in how we support thousands of customers.

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