

IDC FutureScape

IDC FutureScape: Worldwide Utilities 2021 Predictions

Roberta Bigliani
John Villali

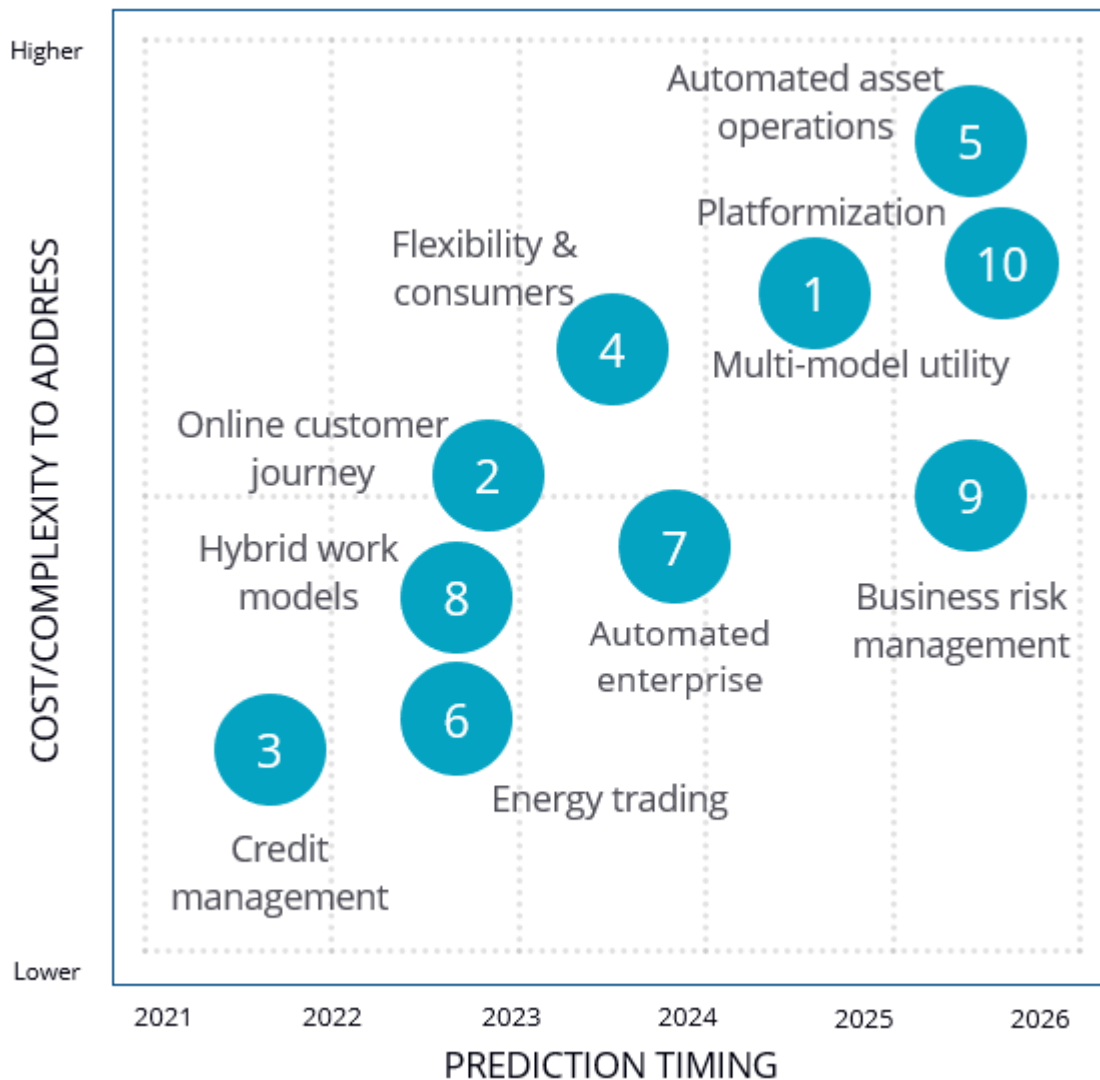
Jean-François Segalotto
Jayesh Verma

Gaia Gallotti
Phevos Skalidis

IDC FUTURESCAPE FIGURE

FIGURE 1

IDC FutureScape: Worldwide Utilities 2021 Top 10 Predictions



Source: IDC, 2020

Note: Marker number refers only to the order the prediction appears in the report and does not indicate rank or importance, unless otherwise noted in the Executive Summary.

EXECUTIVE SUMMARY

Around the world, 2020 was not an easy year for electricity, gas, and water companies. Declining energy consumption deriving from industrial and commercial slowdowns, deterioration of credit, commodities' price volatility, increasing competition, and lockdown in many countries impacted operations, not to mention an increase in extreme weather occurrences. Nevertheless, the industry has demonstrated good resilience and has not stopped its ongoing transformation journey. For the next five years, utilities will have to accelerate the reinvention of their core businesses while deploying new business models to get new revenue streams. In the next normal, hybrid working models, the shift from face-to-face to digital, and new business ecosystems will be the norm. Resilience is even more important in business and operating strategies. Leading utilities will not only adapt to shifting customer needs and market conditions, but also proactively shape the needs and the market to match their strengths, innovations, and business models.

In this context, IDC Energy Insights analysts have developed their top 10 predictions that make up, in their view, the framework for IT and line-of-business (LOB) decision makers and influencers' technology-related initiatives in the year ahead (Figure 1). IDC Energy Insights' top 10 predictions for worldwide utilities for 2021 are:

- **Prediction 1:** While recovery pace will vary across regions, by 2024, 80% of electric, gas, and water companies will have implemented sustainable business models by accelerating DX and rearchitecting the core business
- **Prediction 2:** By 2022, 35% of utilities retailers will have deployed an integrated digital storefront combining commodity and non-commodity businesses, thus increasing the online business by 40%
- **Prediction 3:** In 2021, 60% of utilities will grow investments in advanced analytics to detect increasing credit at risk and use targeted customer engagement programs, improving debt recovery rates by 30%
- **Prediction 4:** By 2023, because of the increasing role of residential consumers in distributed energy, 45% of grid operators will have deployed AI to enable resilient and flexible management of the grid
- **Prediction 5:** By 2025, over 50% of utilities will increase spend in automating operations with an emphasis on edge, AI and ML technologies, thus doubling the penetration of predictive and prescriptive maintenance
- **Prediction 6:** By 2022, 60% of energy utilities will have reassessed their ETRM capabilities and will better leverage algorithmic trading on intraday and day ahead energy markets.
- **Prediction 7:** By 2023, 75% of utilities will have combined IPA and low-code platforms to transform financial, legal and HR processes, accelerating applications delivery by 20 times
- **Prediction 8:** In deploying the hybrid working model, in 2021 40% of electricity, gas and water companies will prioritize wellbeing monitoring and enhanced personal safety thus improving employee experience by 30%
- **Prediction 9:** By 2026 50% of utilities will integrate IT and OT security unifying data governance to mitigate physical and cyber breaches which will create a holistic approach to secure overall business risk
- **Prediction 10:** By 2025, 35% of energy utilities will drive at least 30% of their business via digital platforms based on cloud native technologies, fulfilling the evolving needs of customers and infrastructures

This IDC FutureScape provides the outlook of IDC Energy Insights' analyst team for the worldwide utility industry for 2021, as well as the planning horizon for the next five years.

"Along the road to the next normal, utilities' executives will have to continue balancing resiliency and reinvention, keeping their hands in the present and eyes on the future," said Roberta Bigliani, group vice president, IDC Industry Insights. "This also implies a different approach to business and tech ecosystems to deliver one integrated experience to customers."

IDC FUTURESCAPE PREDICTIONS

Summary of External Drivers

- Accelerated Disruption – Crisis, Resilience, and Opportunity
- Strategic Innovation – Shaping the Future Enterprise Today
- Intelligence Everywhere – Data Drives Action
- Digital Platform – Ecosystems at Scale
- Customer Engagement Redefined – Safe, Secure, and Sustainable Digital Experience
- Work Transformation – Redefining Teams, Skills, and Leadership
- The Learning Organization – Asymmetrical Advantage

For more details, refer to the *External Drivers: Detail* section at the end of this document.

Predictions: Impact on Technology Buyers

Prediction 1: While recovery pace will vary across regions, by 2024 80% of electric, gas and water companies will have implemented sustainable business models by accelerating DX and rearchitecting the core business

Across the world, COVID-19 has helped accelerate the transition to more sustainable societies and economic models. From an electricity perspective, lower demand and favorable weather meant that renewables recorded their strongest contribution to the world's electricity generation mix, offering a glimpse into what could soon be achieved. In the U.S., for example, renewables far outpaced coal-fired generation during lockdown and produced more than 21% of all electricity in 1Q20. In India, the share of coal in the mix has consistently remained under 70% since the introduction of lockdown measures, with renewables generating a third of all electricity in mid-August. A similar pattern was observed in China, despite the gradual easing of lockdown measures starting in March. In the EU, renewables outstripped fossil fuel generation from February through the first week of July. This corresponded to the longest coal-free power stretch for the U.K. (over two months), and Germany produced 56% of its power output from renewables in 1H20.

While the road to recovery will vary across regions – and so will the mix of forces shaping individual energy and utilities markets – the trend of operating model transformation and strategic portfolio reshaping is likely to accelerate. Utilities will balance resiliency and reinvention, focusing on the speed and agility of their organizations while transforming their companies' culture and values to embrace sustainability on every level. On one hand, they will accelerate their move to full-fledged digital operations. Data-driven risk management, digital customer journeys, and prescriptive maintenance are a few of the key initiatives for an industry looking to attain operational excellence and a digital customer base. On the other, while rethinking their products and offerings, they will launch new purpose-driven brands around resource conservation and circularity, community energy, emobility, and energy as a service for large consumers, among others.

By 2024, IDC Energy Insights estimates that new utilities business models could grow to account for 4%-15% of the commodity business' EBITDA, with sustainable ones taking up most of the value.

Associated Drivers

- Accelerated Disruption – Crisis, Resilience, and Opportunity
- Strategic Innovation – Shaping the Future Enterprise Today
- Customer Engagement Redefined – Safe, Secure, and Sustainable Digital Experience

IT Impact

- IT will have to work with the business to source, manage, and protect data types that sit outside the traditional utilities value chain.
- IT will have to support data-driven innovation, agility, and speed of execution as organizations explore, test, and deploy new business and operating models.
- IT will be tasked with bringing to market new customer-facing features and functionalities continuously, helping the business become agile in the face of nimble competition from outside the industry.
- IT will play a critical role in advising on the best enabling technology capabilities and suppliers in the market as new requirements are added to the business perimeter.

Business Impact

- Utilities need to start reconsidering their business portfolio options considering the new market environment, from selling assets that no longer fit the strategy to developing new ecosystems of industrial, business, and technology partners.
- Customer-facing business units will have to perfect their advisory capabilities to help customers with their conservation, decarbonization, and electrification decisions, offering them insights into costs and benefits, along with personalized solutions.

Guidance

- Bring new data types into the wider data governance lap, balancing safety and privacy with the benefits of access for personalization and efficiency.
- Adopt agile techniques and develop an enterprise road map that is modular (i.e., breaks down effort into chunks delivering immediate business value), scalable (i.e., thinks through how the road map will evolve), and extendable (i.e., accommodates changes as they unfold).
- Fully deploy agile DevOps teams to manage the life cycle of new front-end applications and evolve IT assets.
- Engage the ecosystem (partners, new players, and start-ups) to inform and educate IT teams. Work with the business to map requirements and capabilities and influence what business outcomes can be achieved given available technology.

Prediction 2: By 2022, 35% of utilities retailers will have deployed an integrated digital storefront combining commodity and non-commodity businesses, thus increasing the online business by 40%

Delivering value along the customer journey is becoming increasingly important for utilities. This is not only true for those operating in competitive energy markets, but also utilities that are government owned and vertically integrated, that are shifting their focus to customers and their requirements. Utility customers are expecting greater visibility to monitor and control the energy they use and better understand their bills, and they are also increasingly looking for a broader relationship across home, energy, and other related services. Additionally, growing the top line and generating new revenue streams is another agenda for utilities, thus adopting new business

models that support the consumer's connected lifestyle and deliver value-added service and products. IDC's survey of utilities globally finds that 76% of utilities believe new energy product and services will contribute to up to 10% of their total revenue, and energy marketplaces will have a moderate to significant positive impact on their revenue going forward.

Online presence has become increasingly important to enable utilities to engage with their customers more broadly and at new points along their journey. IDC's survey of utilities' customer experience priorities found that 34% of utilities, led by the European market, have already deployed an energy marketplace and 36% are planning to deploy a digital energy marketplace in next two years.

Utilities (particularly in North America and Europe) are launching digital marketplaces that bring together their traditional utility services with new products and services for their customers. For example, on its marketplace, North American utility SDG&E offers the capability to search all major energy retailers at once and access products such as thermostats, pool pumps, gas water heaters, and EV chargers. These digital marketplaces offer the utilities investing in them the opportunity to drive better customer engagement, provide them with services beyond the commodity, and ultimately transform the relationship with the customer by creating more touch points on their customers' journey to enable the energy services they require. The unified digital storefront will enable customers to browse and compare a variety of products, access rebates, and get customized alerts and relevant energy offerings, ultimately improving customer experience and online business. Retailers, particularly in deregulated markets, must be able to understand their customers' energy requirements, advise, and build a trust that can influence broader consumer behaviour. Providing effortless experience, convenient engagement channels, and a digital marketplace enables a foundation to build this relationship.

Associated Drivers

- Strategic Innovation – Shaping the Future Enterprise Today
- Digital Platform – Ecosystems at Scale
- Customer Engagement Redefined – Safe, Secure, and Sustainable Digital Experience

IT Impact

- The digital marketplace business model is new for many utilities. It requires partners, integration into the backend, and a sleek front-end experience for the customer. IT will play an important role in working with key stakeholders to design the systems and capabilities required to enable the integrated online environment and to ensure that these systems work flawlessly.
- IT will play an important role in providing technical advice on the architecture required across the utilities customer engagement and procurement systems and those of their ecosystem partners to enable the marketplace to work. Integration will be critical.
- Ensuring customer data privacy and security will be crucial. Collaboration with the business to ensure a holistic understanding of customer and regulations and alignment with the systems strategy will be required to ensure the appropriate systems and procedures are set up to manage security requirements.

Business Impact

- A marketplace challenges a utility in several areas. One is building the capabilities to manage the sales cycle and fulfilment needs for delivery of a new sets of products to the customer. The other is collaboration and integration across an ecosystem of partners serving the marketplace.
- Decisions will need to be made regarding developing the marketplace inhouse, outsourcing its development, or leveraging the third-party platform as a service model.

- One of the major risks that the business needs to consider is that customers return to its marketplace. Organizations need to complement the marketplace with targeted marketing campaigns designed using trendy products, offerings, and promotions.

Guidance

- Collaborate with key stakeholders to ensure systems and processes are well defined and working smoothly with the backend to fulfil orders and deliver value by responding to customer engagement on the marketplace.
- Make sure there is a customer-centric approach at the center of the marketplace execution strategy and design. The platform will need to strategically integrate required business processes in the backend and people supporting customers, governance, and data.
- Work collaboratively with relevant LOBs (e.g., customer experience and legal) suppliers and partners to ensure that the systems and processes put in place will ensure privacy and security of customer data.

Prediction 3: In 2021, 60% of utilities will grow investments in advanced analytics to detect increasing credit at risk and use targeted customer engagement programs, improving debt recovery rates by 30%

Unemployment caused by the COVID-19 pandemic took a toll on some utility customers' ability to pay their bills. Additionally, many companies – specifically SMBs – that were unable to run their daily operations due to COVID-19 were completely put out of business or are currently struggling to pay their bills and outstanding loans. This threat to utilities' revenues becomes more urgent as elevated unemployment rates continue. It is likely that, similar to the fallout of the 2008 financial crisis, some customers will switch energy suppliers, leaving their bad debt behind. In efforts to contain customers from defaulting on their energy bills – past bills and future bills, as many countries have moratoriums on disconnections for nonpayment – utilities will leverage advanced analytics tools to seek customers in need of help. To manage their credit risk carefully, utilities must scope out customers that are temporarily in need of a little relief but have in the past proven to be financially worthwhile for the company, and separate them from bad debt customers. For instance, according to the American Public Power Association, many utilities report that 30%-40% of their customers currently have negative balances, and their aged accounts receivables had more than doubled in just eight weeks by June 2020. Utilities need to make sense of these customers by leveraging advanced analytics tools.

As the pandemic forced many previously non-digital customers to go digital, this opens these customers up to utilities' digital customer engagement programs that they were previously self-excluded from. This enables utilities to leverage less expensive digital channels for a much larger segment of their customer base, including customers that pose a risk to utilities' credit. Combining advanced analytics to discover customers in need with customer engagement programs that are targeted to the individual, utilities will be able to improve their debt recovery rates by 30% in the next 12 months.

As the fallout of the COVID-19 pandemic continues, some utility regulators around the world may choose to protect consumers by keeping prices low for the foreseeable future, which will further depress utilities' revenues. Hence, utilities need to be particularly proactive in collecting any existing credit, for instance by offering special support programs, new payment plans, tariff adjustments, or flexible payment plans.

Associated Drivers

- Accelerated Disruption – Crisis, Resilience, and Opportunity
- Intelligence Everywhere – Data Drives Action
- Customer Engagement Redefined – Safe, Secure, and Sustainable Digital Experience

IT Impact

- IT will need to swiftly enhance digital customer engagement capabilities, starting with digitizing all payment collection and communication channels. Customers will need to be able to sign up from start to finish digitally, including e-signing of necessary documentation.
- IT will need to work hand-in-hand with customer operations teams to develop analytical capabilities that will provide the necessary insights for immediate action and resolution assistance. Investments will be very limited, so it is crucial to focus on what will really deliver value fast.
- IT must be ready to handle massive data flows and manage customer data with utmost care. Data protection is a huge concern all around, but a customer data breach can have repercussions on the trust customers have toward their utilities (or lack thereof).

Business Impact

- Utilities' collections departments must have a clear understanding of which customers they should aim to recover their debt from, first and foremost for investments in advanced analytics to deliver the much-needed cash influx.
- Utilities will need strong collaboration tools to attract and retain necessary data scientists. Effective, cross-functional collaboration and communications will power faster time to market and greater performance.

Guidance

- Digitize the customer journey touchpoints that will drive the most value. Desperate times call for desperate measures – today, it is most pressing to reduce any outstanding debt. Keep the payment touchpoint as simple as possible, and cover as many payment methods as possible.
- Put in place a team to include skillsets from various departments that need to be involved in the development of advanced analytics tools. Include a senior member of IT, a collections department member, a customer experience (CX) department member, a data scientist, and reps from suppliers involved in the project.
- Ensure all data collection and payment processes (including third parties such as PayPal) are fully compliant with governing regulation. Leverage the expertise of your legal department, and have a mitigation plan in case you suffer from a customer data breach.

Prediction 4: By 2023, because of the increasing role of residential consumers in distributed energy, 45% of grid operators will have deployed AI to enable resilient and flexible management of the grid

Delivering power reliability, efficiently, and safely to residential customers is becoming increasingly difficult for power grid operators. Penetration of renewable sources, growth in electric vehicles, increasing investment in energy storage capabilities, and large-scale distributed energy investments are changing the complexity of the grid environment that needs to be managed. Many distributed resources are being connected to the grid; globally, solar photovoltaic (PV) capacity is forecast to grow 250% by 2024, and residential annual capacity additions are expected to triple by 2024 (IEA).

Distributed energy resources mitigate energy costs for residential consumers who can leverage the benefits of selling electricity back to the grid. It also can ensure security of supply in areas where peak demand challenges centralized power availability and satisfies many customers' preference for sustainability. But for utilities maintaining resiliency, reliability, efficiency, and safety particularly at peak demand, integrating many renewable resources to the grid is far more challenging. The intermittent nature of renewables poses a threat to the stability of the entire grid, very often resulting in increased costs for the grid operator. This new grid environment requires automation, real-time planning, and control systems to anticipate, manage, and ensure that demand and supply are balanced. Traditional approaches and systems are not sufficient to manage the complexity of this environment; artificial intelligence enables the computation of far more complex scenarios and predictive capabilities to support the complexity of the challenge that grid management faces. IDC expects that the artificial intelligence market for utilities globally will grow from \$1.09 billion to \$2.6 billion by 2024 (CAGR of 19.3%).

Associated Drivers

- Intelligence Everywhere – Data Drives Action
- Strategic Innovation – Shaping the Future Enterprise Today
- The Learning Organization – Asymmetrical Advantage

IT Impact

- IT will need to support data cleansing and integration capabilities. Resolving data issues in legacy systems will be a crucial part to enable insight and automation across the grid through AI.
- IT will need to focus on developing the road map to ensure data, people, and infrastructure capabilities are in place to support and scale AI capabilities across the enterprise.
- Clarity of AI use cases will be important, and IT will be crucial in bringing in technologies to solve businesses' problems. Defining the workflow and planning for the required capabilities to support different applications will entail joint efforts from IT and business owners.

Business Impact

- AI is transforming industrial operations with real-time data processing capabilities. Business will see the improvement in informed decision making and increased automation.
- New infrastructure capabilities will be required to enable connected intelligent devices, sensors, and users to enable an exchange of massive quantities of real-time data.
- Organizations need to evolve and redesign their existing business processes and workflows to support AI-led applications.

Guidance

- Implement an enterprise data governance model, and consider investing in master data management. This will be a critical requirement given the amount of data that is being generated and the requirement to scale capabilities.
- Consider having a road map in place that will help evaluate infrastructure requirements, and develop the strategies around governance frameworks and operating models to drive real-time value.
- Build capabilities within the organization that brings in consistent knowledge, and become educated on how AI can be leveraged to solve business problems and identify near-term use cases that are important for organizational goals.

Prediction 5: By 2025, over 50% of utilities will increase spend in automating operations with an emphasis on edge, AI and ML technologies, thus doubling the penetration of predictive and prescriptive maintenance

Low commodity prices, coupled with shifts in electric demand and the continued proliferation of distributed energy resources in power markets across the globe, has utilities and independent power producers focusing more on automated asset operations in efforts to gain efficiencies and lower costs in the daily operations of their physical assets.

The automation of operations will be enabled by edge computing, artificial intelligence, and machine learning, which will be essential technologies that will enable not only preventive and predictive maintenance, but will also enable prescriptive maintenance and recommendations on how to best optimize assets. Utilizing edge, AI, and ML can provide asset operators and owners actionable intelligence that can lead to better informed and quicker decisions regarding asset operations, which in turn will create better business and financial outcomes. A strategic approach to automated asset operations will benefit asset owners and operators in reducing maintenance costs, improving reliability and uptime, and extending the life cycles of their operational assets.

Associated Drivers

- Accelerated Disruption – Crisis, Resilience, and Opportunity
- Intelligence Everywhere – Data Drives Action
- The Learning Organization – Asymmetrical Advantage

IT Impact

- The use of edge computing, AI, and ML in operations will create a strategic approach to asset optimization, which will include preventive, predictive, and prescriptive maintenance, which will significantly lower maintenance cost while extending the life cycle of physical assets.
- Edge computing, AI, and ML can provide the ability to gather and analyze a vast amount of historical and real-time data asset data. In addition to asset data, external data such as load forecasting, grid congestion, and power pricing should be analyzed to best optimize assets.
- IT will have to work with the business lines to integrate and modernize applications to maximize asset performance across the entire life cycle.

Business Impact

- Automating operations can create long-term strategies to ensure the optimal use of your portfolio of assets. Moving to a condition-based from a schedule-based approach to maintenance will maximize asset performance and create better economic outcomes.
- In addition to operational efficiency gains, automated operations have several benefits such as improved asset availability, increased accuracy in spare inventory equipment needed for repairs, savings on maintenance labor cost, and quicker restoration times on asset failures.

Guidance

- Implement cognitive capabilities such as AI and ML in the asset performance management process that will enable models to learn from history and stay ahead of asset failures before they occur, thus minimizing unplanned outages and down time.
- Move beyond the monitoring and diagnostics in your asset performance strategy. Analyze the full optimization and life cycle of your organization's portfolio of assets with a focus on improving the entire portfolio's long-term financial performance to maximize revenues.

- Integrate all asset-related applications to maximize your asset's full potential. Leveraging applications such as outage management, field services, and distribution management systems can enhance time-sensitive operational decisions and improve profitability.

Prediction 6: By 2022, 60% of energy utilities will have reassessed their ETRM capabilities and will better leverage algorithmic trading on intraday and day ahead energy markets

Adapting to the ever-changing reality of energy trading is a daunting task for utilities. Volatility has increased with the growing uncertainty related to both the economic situation and energy demand variability. While modern ETRMs have facilitated faster decision-making and better operations, their human users cannot cope with the speed of information, affecting the prices of the traded commodities.

Algorithmic trading aids humans by taking part of their decisions out of their hands. Complex, advanced models collect and process market data, only to then place orders without the direct intervention of humans. These algorithms are searching for signals across different variables and their interdependencies at a pace that is unmatched by humans. Hence, they can evaluate opportunities and the corresponding risks faster, net of potential human errors and biases.

Algorithms will have an increasing impact on short-term arbitrage. Price inefficiencies are spotted and taken advantage of by algorithms at a frequency that humans cannot achieve. High-frequency trading will enable large traders to take advantage of energy prices' micro-variations. Algorithmic trading will enrich ETRMs' capabilities wherever high volumes of transactions based on short-term signals and objectives are to be carried out.

Associated Drivers

- Intelligence Everywhere – Data Drives Action
- Digital Platform – Ecosystems at Scale
- Work Transformation – Redefining Teams, Skills, and Leadership

IT Impact

- AI is the cornerstone of algorithmic trading evolution. IT will need to prove its capacity to address the challenges of this type of technology. A wealth of "clean" data at the disposal of the ETRM and sufficient training of the models are essential.
- Low latency is key for several algorithmic trading strategies. IT infrastructures need to secure adequate support.

Business Impact

- To secure the success of algorithmic trading implementations, compliance, IT, and risk management need to closely collaborate with the trading department.
- Risk professionals must contribute to making a successful shift toward algorithmic trading.
- Make sure that financial engineers and traders have the capabilities required to support the sophistication introduced by algo trading.

Guidance

- Strenuously back test the validity and the optimization of algorithms before going in production.
- Check that IT connectivity is sized to cope with the low-latency requirements. Consider physically locating servers in proximity of the power markets in which your organization trades in.

Prediction 7: By 2023, 75% of utilities will have combined IPA and low-code platforms to transform financial, legal and HR processes, accelerating applications delivery by 20 times

A multitude of applications developed by different vendors and covering different needs coexist within the same organization. Utilities are no exception to this rule, especially regarding the part of their IT architecture that is non-specific to the industry. Bringing together all necessary databases, cloud services, and desktop-based apps is cumbersome, let alone substituting them by deploying a new system. Low-code tools augment IT's ability to rapidly implement new functionality, including change in business-critical legacy systems. The case of EDP, a large and diversified utility based in Portugal, is exemplary. Its payment collection systems had to be modernized without affecting the millions of transactions processed yearly. A low-code platform was used to quickly develop a smart application that integrates with the business systems of the company's disparate business units. It now handles 80% of EDP's collections, connecting payment processes from these apps as well as external payment channels. Processes that used to be manual and batch are now automated and managed in real-time, reducing errors, enabling users to manage by exception, and granting EDP more control over its financial operations.

In a similar vein, intelligent process automation simplifies and automates processes, making use of already available data. Easy-to-configure applications support humans in the elaboration of vast amounts of data, providing predictive and prescriptive analytics or automating repetitive tasks and carrying them out in a fraction of the time needed by employees. Utilita (a British supplier of pay-as-you-go energy) makes extensive use of "robots" when transferring consumers from credit to prepayment agreements. The necessary steps are carried out by an IPA solution specifically trained to accomplish this task. When the same utility in 2019 became the supplier of last resort for 60,000 customers of two bankrupt energy suppliers, the same solution was used to handle the process of creating new accounts. Another U.K. utility, EDF Energy, started using IPA to have financial transactions in areas such as sales, purchases, and payments reviewed before a journal record was created in its ERP system.

As these examples demonstrate, the combination of IPA and low-code promises to address a number of issues facing utilities. One is the need to boost efficiency in the backend by integrating and automating processes across legacy enterprise systems, the other is multiplying the speed at which certain capabilities can be deployed while enabling citizen development.

Associated Drivers

- The Learning Organization – Asymmetrical Advantage
- Work Transformation – Redefining Teams, Skills, and Leadership
- Strategic Innovation – Shaping the Future Enterprise Today

IT Impact

- Low-code development tools, IPA, and citizen development can help free up precious IT capacity, enabling utilities to dedicate expert developer skills to the most critical transformation projects.
- Automation requires a thorough review of the impacted enterprise processes. A value assessment and extensive consultation of all involved parties is necessary prior to automation, and citizen developers need to be trained in the new technology.

Business Impact

- IPA and low-code applications are opportunities for utilities to combine their employees' creativity and expertise in making processes better, helping foster a culture of continuous development and improvement even among non-IT people.

- By enabling citizen development, low-code and IPA promise to speed up and enhance DX while reducing cost and helping attract talent.

Guidance

- Set clear governance rules and expectations regarding the possibility of using IPA and low-code tools to substitute traditional IT-led development. IT will be required to sanction tools and environments and provide input for the most sophisticated applications.
- Define a plan for skills development that aims to provide employees with the minimum amount of knowledge needed to understand and hence use a low-code environment.

Prediction 8: In deploying the hybrid working model, in 2021 40% of electricity, gas and water companies will prioritize wellbeing monitoring and enhanced personal safety thus improving employee experience by 30%

The shock of COVID-19 and the immediate need to protect employees left its mark on utilities and their day-to-day operations. Working from home was not unheard of prior to the pandemic, but it was far from the norm. In Europe, less than 15% of utility employees used to work from home prior to the pandemic – by August 2020, the percentage had tripled. Making a virtue out of necessity, utilities can now rightfully claim to have made a huge step toward deploying a hybrid working model, supporting a large share of their mission-critical operations remotely using digital tools.

While staggered returns to the office have been planned or are partially underway in certain geographies, there is room for a permanent change in the way utilities run certain operations and balance their onsite-remote workforce. Also reflecting an increased focus on employee experience, utility companies across the electricity, gas, and water sectors will put the wellbeing monitoring and personal safety of their employees at the center of this shift.

Concrete examples of how enhancing personal safety will take shape include providing flexible working hours during the day, rotational working from home, and ensuring time and space separation between staff and field teams. Spanish utility Iberdrola, for example, has championed these measures, with a staggered return to the office for most of its employees. Going beyond anti-COVID-19 measures, utilities will further embed the monitoring of their employees' wellbeing in the standard set of HR processes. U.S. utility Puget Sound Energy (PSE) is actively promoting workplace mental health by setting up an employee assistance program (EAP). Besides training and raising awareness concerning mental illness, employees are offered counseling for themselves and their family members. Despite this being a pre-COVID-19 example, it shows the way for other utilities that still have to take on the challenge of improving employee experience in light of recent events.

Associated Drivers

- Strategic Innovation – Shaping the Future Enterprise Today
- Work Transformation – Redefining Teams, Skills, and Leadership
- Accelerated Disruption – Crisis, Resilience, and Opportunity

IT Impact

- The mental and physical wellbeing of employees will need to become an integral part of utilities' employee engagement tools. IT's role is to facilitate the shift toward a broader scope for human capital management solutions.
- IT will be tasked with creating core applications and business and operations tools, as well as making data easy to access for a much-more distributed workforce.

Business Impact

- To achieve true wellbeing beyond health and safety, utilities need to cater to additional employee needs such as skill development, professional recognition, sustainability, and a future business vision that their people can relate to.
- The future of physical facilities greatly depends on the mix of remote vs. office time spent by employees. A permanent hybrid working model implies a thorough rethink of physical spaces and office real estate.

Guidance

- Ensure the new generation of applications used to manage human capital, skills, and employer relations are designed around the user and enable an employee experience feedback loop.
- Public cloud and advanced security are the cornerstones of the future utility enterprise infrastructure, enabling IT to provide maximum availability to its users and resilience for the enterprise.

Prediction 9: By 2026, 50% of utilities will integrate IT and OT security unifying data governance to mitigate physical and cyber breaches which will create a holistic approach to secure overall business risk

Utilities have experienced an increase in security threats in recent years, emphasizing the need for a stronger defensive posture on breaches. These breaches have caused concerns regarding security gaps on the networks of facilities, critical operational systems, and equipment on bulk power systems. If networks, systems, or equipment are compromised, this can cause asset failure, which could prove to be costly and potentially impact the reliability or operability of regional power systems, which can then cascade across organizational and geographic boundaries.

IT-OT convergence initiatives within utilities have largely been driven by the growing concern and instances of security threats and breaches in the energy sector. IT-OT integration as it relates to security is a good practice that requires having both physical and cybersecurity technology, measures, protocols, and a solid data governance model in place. Currently, many utility companies manage physical and cybersecurity as two separate systems. To date, utility companies commonly have created information-centric models for both operation technology and information technology. However, these information-centric models are often structured separately and comprise two separate data governance models. A unified data governance model – which includes both an IT and OT strategy around data management, standards, and protection of data and critical information – will create a more secure and holistic approach across the two environments.

Associated Drivers

- Accelerated Disruption – Crisis, Resilience, and Opportunity
- Strategic Innovation – Shaping the Future Enterprise Today
- Intelligence Everywhere – Data Drives Action

IT Impact

- The growth of IoT, devices, and connected assets has created a vast amount of operational data that needs a proper data governance model. An integrated IT-OT data governance model will require functional, tactical, and cultural change within an organization.
- Simplifying both IT and operational processes will be required when creating an integrated IT-OT data governance model. Also, removing organizational silos and increasing collaboration between IT and operations will be essential to solve complex data issues as a single unit.

Business Impact

- Integrated IT-OT data governance models not only create comprehensive security coverage for both IT and OT, but also support cost-effective operational performance and reliable service at the same or in some cases at a lower cost.
- Integrating IT and OT systems with a single data governance model can improve overall operational reliability, maximize employee productivity and safety, and assist in mitigating overall business risk.

Guidance

- Create an IT-OT integration strategy that can be applied across multiple lines of business. An IT-OT integration strategy with a focus on security and data governance can enhance security as well as improve operational performance and reduce cost.
- Make security a motivator and driver for IT-OT convergence, not a deterrent. Do not let security concerns impede IT-OT convergence. Security threats and breaches can be managed best from an integrated IT-OT approach with a unified data governance model.

Prediction 10: By 2025, 35% of energy utilities will drive at least 30% of their business via digital platforms based on cloud native technologies, fulfilling the evolving needs of customers and infrastructures

Leading international utilities are leveraging digital infrastructure to develop common information, intelligence, and process platforms to create efficiency and extensibility in their operations. Specifically, these global data and business platforms respond to one fundamental tenet – the centrality of the consumer and asset data in the system – and two key requirements of the transforming utility: the need to drive efficiency and customer experience in the core business through consistent and scalable processes and resources as well as a more flexible and accessible IT infrastructure, and the need to quickly deploy new services and business models (around sustainability, conservation, decarbonization, and electrification), supporting the resulting expansion of the customer base outside the commodity business

With its Enel X brand, for example, Enel is creating open platforms to enable consumers, prosumers, and cities (even assets) to actively participate in energy markets through technologies such as demand response, storage and vehicle-to-grid technology, among others. Another pillar of its platform-based model is the distribution network's digital twin, and so is the company's cloud-only strategy (which is providing savings and economies of scale) and is maximizing the impact of innovation. In a similar vein, U.K.-based utility Centrica has developed a vision of the industry transformation that builds on three platforms:

- New market platforms enabled by IoT and AI such as real-time flexibility, which sits at the core of the company's energy-as-a-service offering for C&I with Centrica Business Services
- Local, peer-to-peer energy markets unlocked by distributed transactional technologies such as blockchain, which Centrica has tested in Cornwall and competitors EDF Energy and OVO are demonstrating in Scotland
- Home energy management, orchestrating smart home devices, micro-renewables, energy storage, and electric vehicles to make it easier for consumers to understand and control their energy use, and possibly participate in markets where such control can be monetized

Associated Drivers

- Strategic Innovation – Shaping the Future Enterprise Today
- Intelligence Everywhere – Data Drives Action
- Digital Platform – Ecosystems at Scale

IT Impact

- IT, digital, and LOB will have to work together to redefine the architecture to support customer management, asset operations and maintenance (O&M), and resource allocation, considering new possibilities offered by technology.
- IT will have to procure and support a new set of solutions to manage new businesses, such as emobility, flexibility, smart homes, or the sale and management of generation and storage devices, integrating OT and IT processes.
- IT will be asked to create modernization investment plans for the core IT infrastructure to support more advanced technology and agile processes. These plans must prioritize initiatives based on business outcomes.

Business Impact

- The development of a digital platform-based business is a strategic investment requiring financial resources, but most importantly, a cultural and organizational transformation.
- The line of business will have to develop a culture of continuous development and improvement, sometimes in contrast with the values of stability and predictability that are part of utilities' DNA.

Guidance

- Use DevOps and agile as the standard organizational architecture and way of working to be able to integrate innovation and deliver projects with a three-to-four-month cycle.
- Consider whether to adapt what is already available and deployed for the traditional business or adopt new solutions. Cloud-native solutions and as-a-service procurement can quickly provide capabilities and facilitate scale.
- Use cloud to energize legacy infrastructure. Adopt a cloud-first approach for new applications and technologies. Promote the adoption of a platform-led modular architecture and prepare pathways for microservices and application programming interfaces (APIs).

ADVICE FOR TECHNOLOGY BUYERS

In summary, IDC Energy Insights has the following recommendations for utilities in their journey toward "next normal:"

- **Think "platform first."** Platform thinking is a fundamental shift in business strategy – moving beyond offering differentiation and pricing toward ecosystem-based value creation. It is also a long-term, sustainable response to new realities in the digital economy, one in which utilities transform themselves into digital-native enterprises.
- **Rebalance focus on customers and employee experience.** Both customers and worker/employee experiences need to be at the core of utilities' strategies. Talent must be considered as a source of competitive advantage. Customers are obviously vital to secure a company's future, but a disengaged workforce will not help support customer experience. Do not let *people* be the last item on the agenda in your management meetings.
- **Trust equals value.** Stakeholders now expect trust and reputation to go beyond securing data and assets to protecting employees, partners, and customers. Meeting expectations of trust and social responsibility becomes a new competitive advantage. While anticipating and protecting security and privacy, utilities need to reinforce trust as a foundation for resilience.

- **Handle the amplified imperative of connectivity.** Communication strategies and capabilities have always been a top item for utilities. COVID-19 has proven once more the importance of connectivity to grant business continuity. Utilities should refresh their approach, taking into consideration also new opportunities (for instance, 5G).

EXTERNAL DRIVERS: DETAIL

Accelerated Disruption – Crisis, Resilience, and Opportunity

- **Description.** The pandemic has redefined disruption. Survival of the fittest is linked not to size or strength, but to resilience and the ability to change – to move quickly, adapt, seize opportunities, and be ready for the next disruption. Uncertainty in economic norms, political stability, climate effects, and disruptive innovations can't be ignored, but these challenges have been overshadowed by the immediate impacts of the global pandemic. A sense of urgency pervades companies. Distressed businesses are having to make rapid pivots toward new models and viable markets or quickly adjust their supply chains. The immediate imperative is to manage costs, balanced with strategic investment. Now is not the time to sit back and wait, but rather to make bold strategic bets that increase the organization's resilience and to keep pace with business change by increasing the speed of business operations and innovation. Past economic crises have proven to be inflection points for organizations that later thrive during the next positive cycle.
- **Context.** In IDC's *Worldwide COVID-19 Impact Survey*, 73% of organizations reported that current transformation projects will be reevaluated to deliver more efficiency and ROI. 60% report that they will focus their organizations on new business and operating models. This year, worldwide IT spending is now expected to decline 5.1% in constant currency terms to \$2.25 trillion. Organizations are expecting the slowdown and recession phases to last into 2021. At the same time, "taking advantage of a downturn" was a winning strategy after the last economic crisis. Intel's profits soared in 2010 because it continued to invest and release its next-generation chips in 2009. Amazon experienced 28% sales growth, and Lego's profits increased 63%.

Strategic Innovation – Shaping the Future Enterprise Today

- **Description.** The COVID-19 crisis has accelerated the shift to digital and fundamentally changed the business landscape. Innovation is an urgent imperative for overcoming the disruptions both tactically and strategically, as enterprises with less mature transformations find it harder to adapt. Organizations are rethinking what the future will look like and what it will take to thrive in the new business landscape. With increased awareness, there is now a strong focus on applying digital technologies to address the future of work, engagement, intelligence, operations, and leadership. Organizations are pivoting to become digital innovation factories. But currently, innovating must come without incurring overall incremental costs. To compete, companies must balance digital and industrial competencies and master them at scale. However, these efforts will not succeed without leadership, talent, and the ability to affect change.
- **Context.** To sustain their businesses, many small and medium-sized enterprises have had to quickly pivot business models. Large organizations are having to reinvent themselves for growth and competitiveness before their competitors do. Now more than ever, organizations are looking for new ideas and emerging best practices to improve the effective use of resources and accelerate the ability to deliver digital services to customers, patients, and constituents. According to IDC's *Worldwide Digital Transformation Spending Guide*, global spending on digital transformation technologies and services is forecast to grow 10.4% in 2020 to \$1.3 trillion despite the challenges brought about by the COVID-19 pandemic.

Intelligence Everywhere – Data Drives Action

- **Description.** The real-time continuum of applications and data that stretches from edge to network and core from IoT, mobile devices, and more – combined with historical data, enterprise systems, and global information – continually "sense" an environment and put it into new contexts. AI and machine learning "compute" and spread intelligence to turn data into action, and action into value. Automation extends beyond autonomous operations, resilient decision making, and optimization into life-and-death dependencies. Generating actionable insight is increasingly dynamic and complex. But as automation and augmentation increase, so do the ethical issues and opportunities for misuse, surveillance, invasions of privacy, and more. Competitiveness is determined by the ethical governance of data and AI; how data is transformed into insight to create high-value differentiators for products, customers, and markets; and how effectively organizations deliver meaningful, value-added learning, predictions, and actions that improve engagement, processes, enterprise decision making, resilience, and much more.
- **Context.** In this world where data drives action, ensuring the veracity of the data and transforming data into insights become a strategic imperative. But it is not just having more data that matters. Based on IDC's Global DataSphere study, less than 3% of the data currently created is analyzed to affect enterprise intelligence. What becomes essential is putting data into context to provide meaning, understanding it in relation to other data and events to gain knowledge, and adding judgement and action to achieve insight and the full potential of value realization.

Digital Platform – Ecosystems at Scale

- **Description.** Understanding and provisioning the platforms that will sustain, advance, and scale business and operations, and exert strategic control are essential for businesses. A digital platform is the assembly of technologies, capabilities, and data upon which digitally enabled businesses run. The data exchanges, intelligence, and network effect within digital ecosystems generate new value beyond the platform itself. Leading organizations are harnessing the pervasive internet connectivity in the hand of billions of users, combined with massive data and unlimited processing, to power their digital platforms. For users and competitors, the value of digital platforms introduces high switching costs and barriers to entry that cannot be easily replicated through the introduction of new products and services alone.
- **Context.** The digital economy has spread rapidly throughout the world. Leading organizations are shifting to digital platform thinking to evolve their business models and manage their technology architecture. Platform thinking is a fundamental shift in business strategy – moving beyond product differentiation and pricing toward ecosystem-based value creation. It is also a long-term, sustainable response to new realities in the digital economy, one in which organizations transform themselves into digital-native enterprises.

Customer Engagement Redefined – Safe, Secure, and Sustainable Digital Experience

- **Description.** The COVID-19 pandemic has focused what customers care about and shifted how consumers and brands engage and interact. Companies with the best prices, coolest products, or most memorable marketing campaigns will not necessarily have an advantage over companies that provide safe, secured, and seamless experience. Customers also care about the safety and security of employees, how customer data is collected and used, and a company's environmental and social justice efforts. As a result, companies must understand the different contextual expectations of their customers – whether they are students, patients, consumers, or business – and shift how they engage and support their customers in this emerging reality to create experiences that are empathetic, personal, compelling, and relevant.

- **Context.** Customers have made the contextual experiences they receive from a brand a crucial aspect of any engagement across the customer journey. Complicating that are the shifting nature of customer expectations, the proliferation of interaction channels, and the adoption of more capable and ever more robust consumer technologies. New business, operational, and organizational models built on a foundation of technology are required to meet the evolving and dynamic nature of customer expectations. It's critical for organizations to create a contextual and empathetic relationship with their customers, focusing on understanding the customer, what they want, and how they want to be treated.

Work Transformation – Redefining Teams, Skills, and Leadership

- **Description.** Technologies are rapidly changing who, what, where, and how work is being done. The 21st-century economy requires workers to operate as agile, dynamic, and reconfigurable teams that can quickly adapt to business demands and new market requirements. The fallout of the pandemic will accelerate digital transformation and automation across a range of industries and sectors. Beside the shift to work from home, new models will emerge in fabrication/assembly, patient/citizen care, warehousing/transport, and elsewhere, changing the work experience, environments, and definition of digital work. Organizations need to rethink their relationships with workers as well as the creation and retention of skills to meet this demand. The key to turning talent limitations into talent as a competitive advantage lies in recognizing the fundamental shifts toward employee experience, new collaborative leadership styles, and employees as lifelong learners.
- **Context.** In IDC's recent *Future of Work Survey*, over 50% of respondents indicated that they found it very or extremely hard to recruit top talent with needed technical and critical skills. These "digital skills" include both short half-life technical skills and more difficult-to-master human skills including critical thinking, collaboration, creative thinking, and communication. According to the World Economic Forum, the challenge to find top talent is only going to become more pressing. The COVID-19 pandemic will undoubtedly have a dampening effect, but it will also accelerate the adoption of digital skills and the need for new leadership capabilities.

The Learning Organization – Asymmetrical Advantage

- **Description.** Enterprise economies and the nature of competition have changed. While still important, economies of scale have been augmented with economies of scope and mass customization, and now by economies of intelligence. Leading companies are becoming learning organizations, leveraging data and AI to improve understanding and innovation for the continuous improvement of operations, processes, products, and the changing needs for scale, scope, and engagement. This is heightening the competitive divide between data haves and have-nots as well as changing the nature of intellectual property – whose value has shifted to where it's created rather than where it's realized – contributing to an asymmetrical accumulation of capital and innovation, and in response, an increase in antitrust pressures. An organization's capacity for learning – not just about customers, but all aspects of business and operations – will drive its future competitiveness, resilience, adaptability, trust, value, and success.
- **Context.** The exponential growth of value in the economy of intelligence comes from four main components: maturity in the technical, human, and process capabilities and use of cognitive technologies; incremental development and reuse of analytical and predictive models with continuous feedback and enhancements to create and grow beyond the critical mass; scope in a wide variety of targets for analysis and associated data across the entire ecosystem and all aspects of the enterprise; and management commitment to being a learning organization.

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IDC Italy

Viale Monza, 14
20127 Milan, Italy
+39.02.28457.1
Twitter: @IDCitaly
idc-insights-community.com
www.idcitalia.com

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