

RESILIENCE IN EVERYTHING

COVID-19 compels the Utilities industry to extend resilience beyond grid infrastructure to the entire value chain

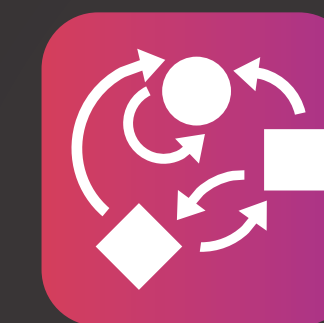
Utilities



PURPOSE-DRIVEN



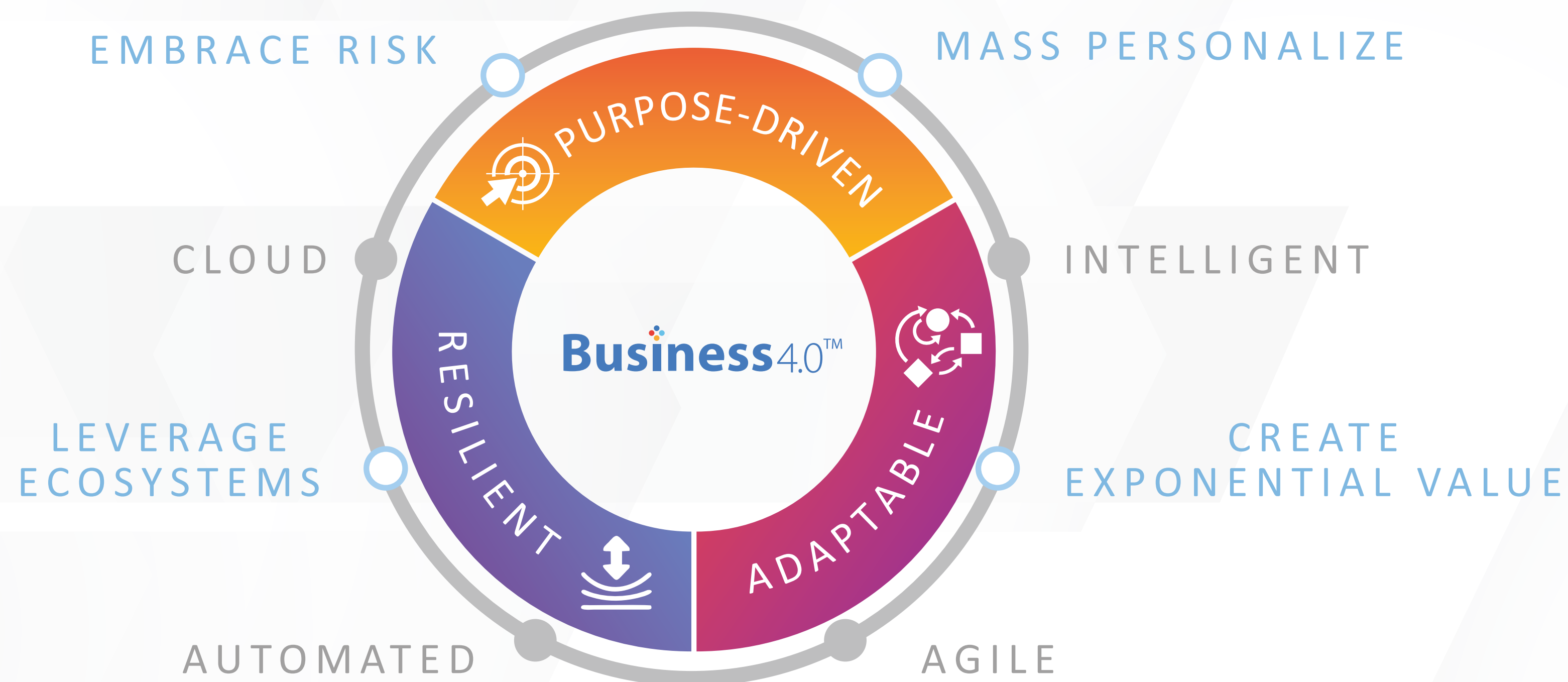
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Executive Summary

The Utilities sector has managed extreme weather events, emergency situations, and natural disasters for some time now. Firms have robust plans to manage and respond to such events. These plans have evolved and matured over a period of time, and the response has progressively strengthened by leveraging technology. The current pandemic, however, has stress-tested the most well-defined playbooks. Traditionally, Utilities have focused on developing their infrastructure to cope with

disasters, but Coronavirus has made the entire value chain vulnerable, pushing them to become resilient vis-à-vis its workforce, operations, supply chain, finance, cybersecurity, capital, and more.

This paper examines how the Utilities industry can reinvent itself in the face of this pandemic and chart its way forward to emerge stronger and more resilient.



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ADAPTABLE

Introduction

The COVID-19 pandemic has clearly divided everyone's needs into essentials and non-essentials. Utilities – electricity, gas, and water – fall firmly in the first category. The industry is a key part of a nation's economy, as other industries depend on it to serve the needs of every common man. Even during past recessions, Utilities remained largely stable because energy and water needs remained steady and the government entities regulated the rates for energy and water use. Revenue for Utilities has largely remained unchanged, and hence, the sector's stocks have traditionally been attractive. While everyone needs the products of this industry, the economics and practical challenges of 'keeping the lights on' in the aftermath of COVID-19 has put a significant burden on the sector.

The pandemic has impacted the sector across five dimensions and has highlighted the need for the complete value chain to become resilient:

- **Customer anxiety** – The increased inability of a large group of customers to pay bills would lead to reduced revenue. The responsibility of Utilities to keep the lights on and provide services to them remains unchanged. According to a survey released by the National Endowment for Financial Education (NEFE)¹, nearly nine in ten (88%) Americans say the COVID-19 crisis is causing them financial stress. Interestingly, paying Utilities is one of the top five factors causing customers the most anxiety.
- **Health and safety of the workforce** – Concerns over the health of the workforce and their families have considerably reduced their presence at work. This has significantly impacted operational and maintenance obligations besides the inability to carry out important capital projects. According to Edison Electric Institute (EEI)², a large percentage of employees at electric companies, up to 40%, could be sick, quarantined, or might stay at home to take care of family members during the pandemic.
- **Demand reduction** – While the consumption of energy and water in the residential sector has increased during the lockdown, the shutting of businesses significantly reduced commercial and industrial consumption. For Utilities, therefore, the net impact is negative and this in turn affects revenue. An analysis by energy research and consulting firm Wood Mackenzie³ shows that in the first week of the nation-wide quarantine in Italy, which was announced on March 13, 2020, where around 60 million people were ordered to stay at home and only supermarkets and pharmacies were allowed to remain open, demand fell by around 8% compared to the same week in 2019. Similarly, the US Energy Information Administration (EIA)⁴ said it expected power sales in the commercial sector to drop by 4.7% in 2020 as many businesses will close.

¹ National Endowment for Financial Education; Survey: Nearly 9 in 10 Say COVID-19 Crisis is Causing Financial Stress; April 16, 2020; <https://www.nefe.org/press-room/polls/2020/survey-covid-19-crisis-causing-financial-stress.aspx>

² Edison Electric Institute; Electric Companies & Pandemic Planning - What You Should Know; February 27, 2020; <https://www.eei.org/issuesandpolicy/Documents/Electric%20Companies%20and%20Pandemics%20-%20What%20You%20Should%20Know.pdf>

³ Wood Mackenzie; How Italy's lockdown is affecting power demand; March 18, 2020; <https://www.woodmac.com/news/opinion/how-italys-lockdown-is-affecting-power-demand/>

⁴ US Energy Information Administration; Short-Term Energy Outlook (STEO); April 2020; <https://www.eia.gov/outlooks/steo/archives/apr20.pdf>

- **Financial stress and regulatory filing** – Customer anxiety, unemployment, and hardship will force regulators to intervene. On one side, they will put a moratorium on bill payment, disallow disconnections, and scrutinize rate increases, while on the other side, they have to look at regulatory equity reconciliations and other provisions like stimulus packages to keep the industry going. Utility firms will negotiate with regulators and provide customers with hardship plans, striking a fine balance between debt and equity, and in turn, managing the immediate cash flow. Utilities in California have established programs like the California Alternate Rates for Energy (CARE), which reduces energy bills for eligible customers by about 30%, and the Family Electric Rate Assistance (FERA), which reduces electric bills for qualified households by 18%⁵.



- **Supply chain and capital projects** – The volatility in the market, non-availability of material, and dependency on the international market have impacted critical capital projects, including those required to improve grid resilience. Besides this, the supply chain associated with renewable generation and water treatment has witnessed disruption. Standard & Poor's has forecast that European Utilities could cut 2020 capital expenditure by up to 15% due to the aftereffects of the pandemic⁶.

⁵ Southern California Edison; CARE/FERA Program;
<https://www.sce.com/residential/assistance/care-fera>

⁶ S&P Global; COVID-19 Daily Update; March 25, 2020;
<https://www.spglobal.com/en/research-insights/articles/covid-19-daily-update-march-25-2020>

Unique Impact of COVID-19 on Utilities

COVID-19 will impact each Utility differently based on macro factors such as geography, policies and the recovery packages of countries, the state of the Utility industry, specific role of the Utility in the value chain, and the portfolio mix they have.

Value chain of Utilities: Firms operating in a regulation environment, like transmission and distribution companies, will be impacted less than those in generation and retail functions. For example, in the UK, where the average profit margin of large suppliers has already plummeted to a nine-year low of just 3%, gen-tailers have faced a higher impact due to COVID-19 when compared to transmission and distribution utilities.

Merchant generators, which have significant exposure to market pricing, are most vulnerable. For them, access to capital may slow down investments in renewable projects in the short term, while the lower marginal cost for generation may make it more of a sustainable strategy in the long term. Global supply chain, the changing fuel economics, and shift in the demand curve will make gen-tailers play differently.

Geography of the Utilities: The impact of the

pandemic has differed for Utility firms across regions and countries, as described below:

- Stock prices of Utilities in the Midwest of the US demonstrated higher resilience in the share market than those along the East and West coasts. This may be attributed to the course the epidemic has taken in the country.
- The UK has already surpassed its all-time peak solar generation in April 2020 and is well positioned to close its last coal plants by 2024. Besides this, industry bodies like the Department for Business, Energy and Industrial Strategy (BEIS) have offered interest-free loans to the Low Carbon Contracts Company so that they can make the contract for differences (CFD) payment to generators without increasing the cost to suppliers who are already stressed.
- The wholesale market prices of Utility firms have been affected, with instances of negative pricing more prevalent in the UK and Europe than in the US. For example, on April 5, 2020, power prices in the UK turned negative for four consecutive hours, falling to minus £66.25/MWH⁷.
- In Germany, the under-construction and planned conventional generations projects may face

challenges in getting project approvals. Further, supply chain constraints from China have delayed solar and wind expansion plans in the country.

Power consumption portfolio: Due to a drop in consumption, firms with a broad commercial and industrial consumer base are more vulnerable than those with a larger residential one.

Financial health: Utility firms with a high credit rating have more access to capital and are better equipped to tide over such difficult times. Utilities typically have access to short-term debts, but customer delinquency impacts their capability to refund these debts.

Power generation portfolio: Green Utilities in Europe are more resilient than conventional competitors primarily due to power purchase agreements and feed-in tariffs.

In certain cases, Utilities with a diverse power generating portfolio have much better control on costs and market exposure than small tier players.

Other factors that impact the business and operations of Utility firms are regulatory regimes (competitive versus regulated, rate case type, etc.), operating models, risk appetite, digital adoption, and service line of the firms.

⁷ Argus; European power market: Turning negatives into positives; April 7, 2020;
<https://www.argusmedia.com/en/blog/2020/april/7/european-power-market-turning-negatives-into-positives>

The Way Ahead for Utilities

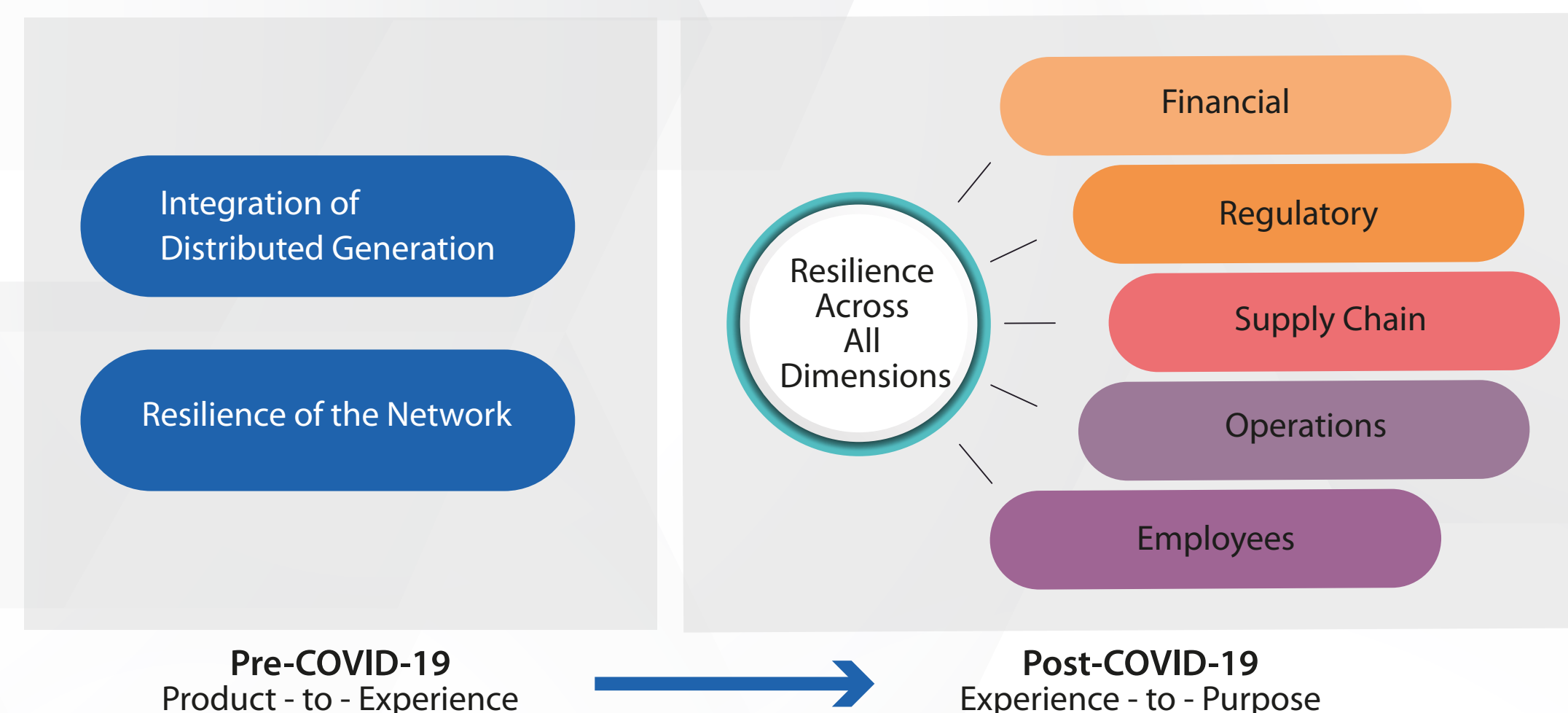


Figure 1: Resilience: The new purpose

As Utility firms have increased their investments into technology, they have moved from 'Product-to-Experience' to 'Experience-to-Purpose', with the empowered prosumer at the centre. Utilities, which were earlier concentrated on electricity, gas, and water, today focus on connected homes, smart energy, smart transportation, and connected health to mention a few.

Utilities have been deemed critical national infrastructure and their existence is based on providing energy safely and affordably. The need to reduce the carbon footprint across the globe by providing clean energy has pushed firms to add sustainability to their organizational objectives. However, keeping the lights on has always been the agenda for Utilities and they only come under the spotlight when the lights go off, so to speak.

Due to the consumerization of energy and the advent of digital technologies in the past few years, the entry barriers to this industry have blurred. Reliability and resilience have become increasingly complex to manage with the advent of distributed energy resources. The resilience of the grid continues to be the focus of the industry. Despite new developments like generation in the hands of the consumer, the possibility of grid-connected storage, and the entry of non-Utilities in the industry, the sector has continued to carry the responsibility of keeping the electrons flowing while also transforming themselves using digital technologies and global sourcing models. The pandemic has pushed the industry to redefine its purpose, which we believe is the need to build resilience into every aspect of business, making Utility firms partners in crisis for all stakeholders across the value chain.



Before COVID-19, Utilities built resilience around operations, but now firms have to make multiple aspects of the value chain resilient, including in areas such as financial, regulatory, operations, employee, and supply chain. For example, Utilities need to guard against cybersecurity risks in virtualized infrastructure. They also need to bridge an employee's skill gap, address absenteeism in the workforce, and significantly empower the workforce. The high costs of inputs in the supply chain and decrease in revenue are other aspects that Utilities need to be resilient to.

For water and wastewater utilities around the world, resiliency is a critical challenge for them, as their workforce is not able to physically monitor water and sewage networks on a regular basis.

The following table highlights the new emerging dimensions of resilience across the Utilities industry:

Areas	Impact	Actions for Resilience
Financial	<ul style="list-style-type: none"> • Immediate decrease in revenue • Deferment of payment • Higher cost of capital 	<ul style="list-style-type: none"> • Financial re-planning including short-term vs long-term debts • Data-driven approach to capital project portfolio planning and impact on base rates using strategic investment planning
Regulatory	<ul style="list-style-type: none"> • Customer friendly hardship plans • Industry recovery plans 	<ul style="list-style-type: none"> • Regulatory dialogues and revised rates • Compliance management
Operations	<ul style="list-style-type: none"> • Servicing customers while abiding by social distancing norms • Running plant operations with limited staff • Maintaining the grid under the constraints of the epidemic • Constrained field workforce 	<ul style="list-style-type: none"> • Redesign for adaptive processes and enable remote working, collaboration, more instrumentation, and autonomous infrastructure • AI/ML-driven monitoring and diagnostics of assets • Machine vision-driven inspection of assets • Digital twins • Autonomous operations • Situational awareness
Employee Welfare	<ul style="list-style-type: none"> • Absenteeism and availability of employees 	<ul style="list-style-type: none"> • Flexible roster management • Cross skilling • Development of contractors • Agility in planning • Connected workers • Remote worker assistance • Immersive training using AR/VR technologies
Supply Chain	<ul style="list-style-type: none"> • Delay in material supply due to limited movement • Impact on fuel and water treatment supply chains 	<ul style="list-style-type: none"> • AI-driven cognitive supply chain management • Risk-based inventory management (changing regulatory filings) • Machine-vision assisted inventory tracking

The Path to Resilience

To become resilient, Utilities need to be adaptable in three key areas, as detailed below:

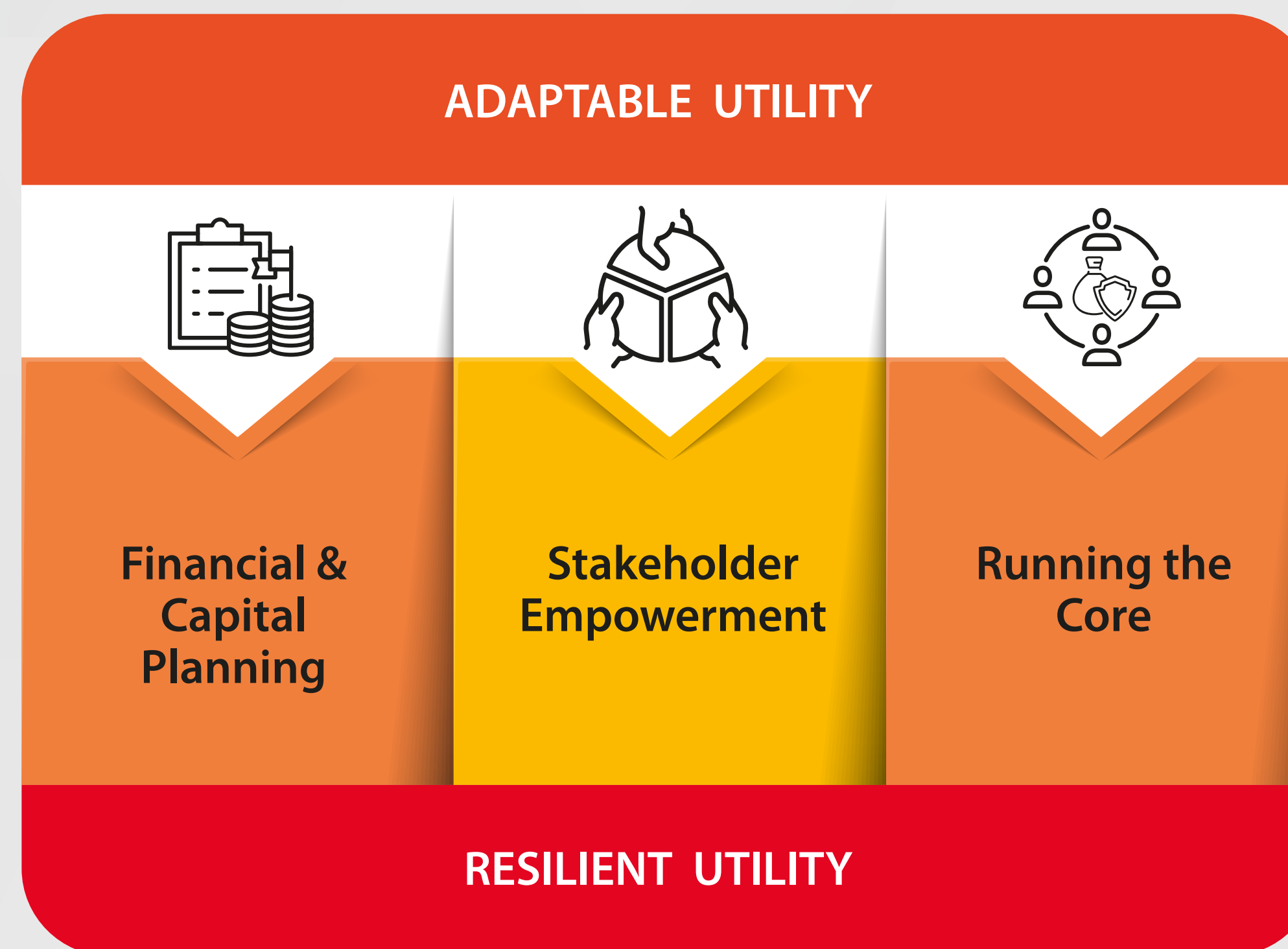


Figure 2: Adaptability: The key to resilience in Utilities



Financial and Capital Planning

Utilities are revisiting their capital expenditure programs to determine where they must direct costs – the must-have or good-to-have categories. Since the industry provides essential services and forms the backbone of critical services, Utilities are expected to increase their capex spend on the essential/must-have category.

At the same time, managing finance and capital while continuing to deliver on shareholder expectations are important undertakings for Utilities. Factors such as rate case timeline, the progress on various capital projects, and permissible rate increase from regulators will determine the financial and operational planning of Utility companies. Scenario planning tools with multiple scenarios modelling based on revenue projection, cost and cash flow, and employee availability will play very important roles here.

The pandemic has highlighted three key priorities for Utilities:

- **Revenue and cash flow management:** Managing finances is the need of the hour due to decreasing revenues, payment delinquencies, reduced tariffs,

and rising costs. Technology can simplify the collections process with an automated consumer contact strategy. By using predictive analytics, firms can identify risky consumers and offer customized incentives by mapping customer preferences, as illustrated below:

- A Utility retailer in Melbourne created new payment plans for its customers who face difficulty paying their bills by using risk modelling. It also collects payments through contactless processing keeping in mind social distancing norms.
- An electricity distribution company in New South Wales, Australia is looking to provide cash benefits to upstream and downstream industries, while taking a hit on capital expenditures. It is using cloud-based analytics to predict the distribution of cash and to validate returns in the future.

- **Capital investment management:** Due to safety and compliance considerations, Utility firms need to reprioritize capital projects and identify those that may be deferred:

- Utilities on the East coast of the US have various ways of managing natural disasters, such as by simulating scenarios around revenue fluctuations and cash flows. They are now customizing these simulations for the ongoing pandemic.

- **Supply chain impact:** Utility firms must critically review existing capital plans based on disruptions to the global and local supply chains. Historical data and forecasting models will not be accurate anymore and new analytical models will be needed to drive investment decisions. We are witnessing emerging trends such as:

- Asset-heavy Utilities in the UK and on the US West coast are creating supply chain management solutions driven by internet of things. This is in addition to procure-to-pay solutions. Predictive analytics and supply chain automation solutions will play key roles in this scenario.
- Due to volatile electricity prices, European Utilities are exploring power procurement optimization by using process automation tools. Predicting crude prices during the pandemic will be critical for the future.



Stakeholder Empowerment

Thanks to COVID-19, remote working is now the norm, with majority of the Utilities workforce working from home. This has increased the use of virtual collaboration tools, which are based on augmented and virtual reality (AR/VR) technologies. New use cases are also emerging towards empowering employees with digital tools that enhance safety and improve productivity.

- **Enhance workforce collaboration:** Knowledge management, remote assistance, and mutual aid are some initiatives for workers to better serve their customers during such times of crisis.
- Widespread adoption of employee engagement apps over collaboration tools to enable core utilities functions like trading and settlements has been observed in de-regulated markets like Sweden and New Zealand.
- A large American Utility has accelerated its work on AR/VR technologies to assist remote field workers.
- **Increase in digital equivalence:** The rise in the use of industrial IoT using digital twin in the grids, conventional power plants, renewable energy farms,

and distribution assets like water, gas, and electricity has seen a steep increase in adoption.

- A Utilities firm in the Midwest of the US has now invested heavily in creating digital twins for its gas pipelines so that it can proactively detect faults and determine maintenance schedules.
- A large Australian energy retailer has reimagined customer care experiences by using digital twin with significant operational benefits.
- A large UK water Utility is using IoT and artificial intelligence/machine learning-enabled analytics to proactively manage leakages, sewer blockages, and water quality incidents.
- **Ecosystem play:** By deepening their ties with partners in the ecosystem, Utility firms can better manage disruptions caused by such emergencies. Specifically, firms in competitive markets like Australia and the UK are providing their customers multi-product offerings for essential services for their smart homes, broadband, batteries, and electric vehicles:

- An integrated Utility firm in India is implementing cloud-based digital subscription services to promote energy and non-energy services. This will create new revenue streams by leveraging the telecom and media ecosystem.
- The UK's largest retailer has been leveraging the insurance ecosystem to build revenues in non-energy areas of its business.





Running the Core

In the post COVID-19 era, an adaptive core will be at the heart of a resilient and adaptable organization. Automating operations has led Utility firms to prioritize investments in core systems in the following areas:

- **Accelerating core processes:** Using robotic process automation (RPA) and machine first delivery models can help Utility firms identify hotspots and instigate actions including faster re-planning and rescheduling of work.
 - ❑ Globally, many Utility firms have adopted RPA to manage meters and customer exceptions, as there are few back office agents. Those firms that have not adopted RPA have seen a 30-45-day delay in processing exceptions and requests.
 - ❑ A Utility firm in Central America used industrial invoice and payment verification to reduce manual effort. Utility firms will increasingly adopt document verification using optical recognition platforms.

- **Remote working and increased cybersecurity:** This pandemic has accelerated the business case for remote working. As Utilities have increasingly begun using collaboration tools, they have also reassessed their information security setup to protect personal and enterprise data:
 - ❑ Utilities in North America and the UK have traditionally been cautious in adopting remote working and do not allow their employees to access systems using personal devices. But widespread remote working, enabled due to COVID-19, has pushed them to use new security technologies on traditional data centers and the cloud.
 - ❑ European Utilities that moved operations to the cloud before COVID-19 are now implementing secure access service edge solutions (SASE), which have evolved out of the current situation.

- ❑ North American Utilities are also upgrading the existing field area network infrastructure used for distribution grid control and commercial and industrial metering to encrypt and mitigate potential security risks on the network and supported applications.
- **Cost reduction:** With unmanned operations taking precedence to maintain the social distancing norms, Utility firms have seen an exponential rise in cloud adoption:
 - ❑ One of Australia's largest retailers has migrated all its applications and systems of records to the public cloud. It adopted DevOps to accelerate this journey.
 - ❑ A Utility firm in Canada is hosting its data centers using a combination of private and public cloud in order to reduce exposure of its IT assets.

To realize this new-found resilient transformation, the following four-step journey will help the industry respond suitably to such a crisis as the ongoing pandemic:

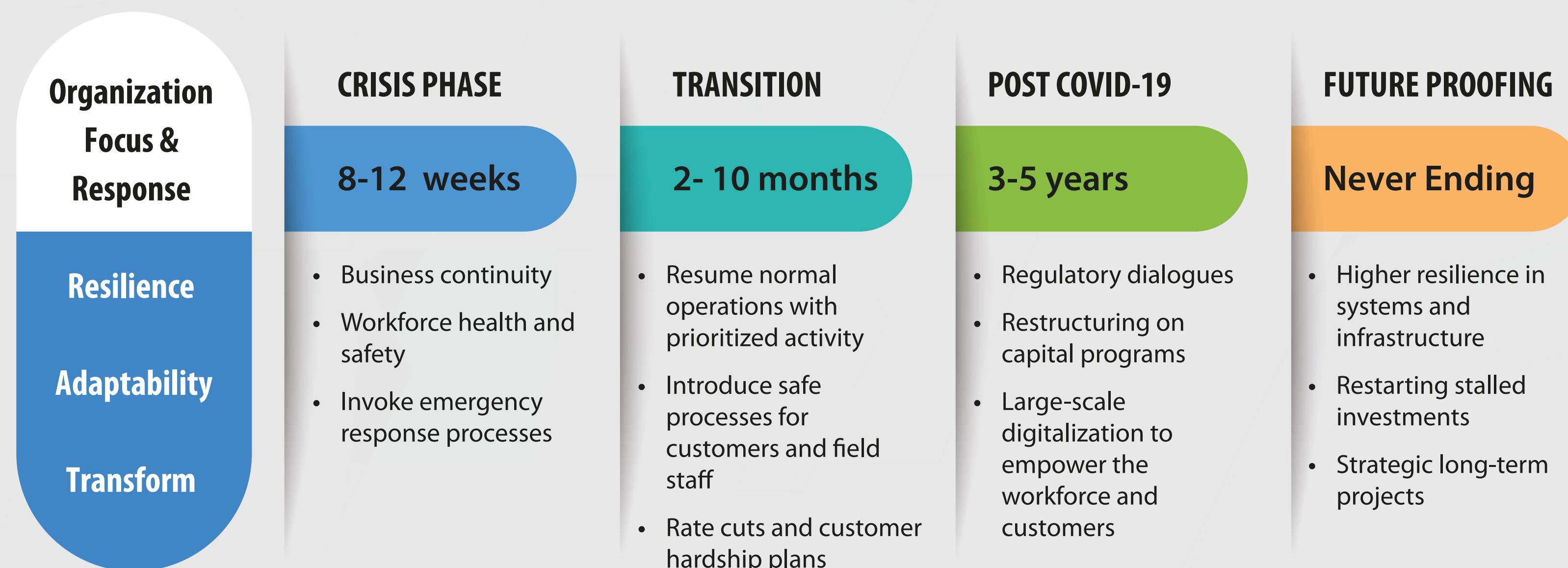


Figure 3: The response of Utility firms to COVID-19

Conclusion

While COVID-19 has impacted industries across the board, the Utilities sector will emerge with a better set of tools and updated playbooks to drive extraordinary agility and nimbleness. There will be increased focus on energy transition and energy efficiency. Regulators and customers will expect higher levels of safety and reliability that will drive new investments and accelerate digital transformation, which will be focused on enterprise-wide resilience, adaptability, and purpose.



About the Author



Sudheer Warriar

As the Global Head of the Utilities Business Unit at Tata Consultancy Services, Sudheer has been working with several Fortune 500 Utilities CXOs in formulating their strategy on Run, Transform, and Reimagine. Sudheer has been instrumental in achieving high growth rates for the business unit, and more importantly, establishing TCS as a formidable player in this industry. Sudheer considers his real success in being able to constantly challenge the status quo respecting the nuances of the industry and building a champion TCS Utilities team.

Sudheer has spent three decades with TCS. A veteran in the company, he started his career in the architecture group of a large transformation engagement in Europe. Since then, he has performed a wide range of roles from program management and account management to sales. He has also set up and run the Migration and Re-engineering service practice where he consolidated and built TCS' IP in this space. He has been heading the Utilities Business Unit for more than a decade now.

Sudheer is a Computer Science graduate and has deep interest in music, books, and connecting with people.

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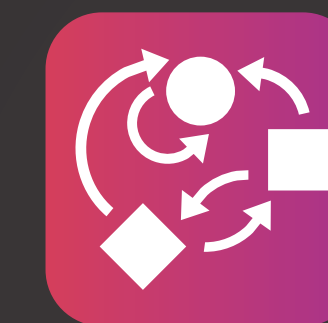
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