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CHALLENGES AND OPPORTUNITIES AT UTILITY COMPANIES AMID PANDEMICS

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Abstract

The role of utility companies becomes critical during any natural or manmade disaster. Being a critical infrastructure provider, the utility sector is expected to remain prepared to respond to any foreseeable hazard including health emergencies. Widespread quarantines, workforce disruptions, and travel restrictions due COVID-19 outbreak have taught a new perspective to the utility management to handle challenges and explore opportunities within. Planning for a health emergency like COVID-19 however anticipates exceptional planning to ensure business continuity because it requires operating with a much smaller workforce, an endangered supply chain, and limited resourcefulness for an unknown period. The utility industry, government, and health authorities have to gather and share up-to-date information, best practices, and guidance to help employees stay safe and maintain operational integrity. Sharing practices and expertise enables different stakeholders to make better-informed independent and localized decisions to help reduce negative impacts to the region's electric power supply during pandemics. Consequent to the COVID-19 pandemic, several investor-owned electric and/or natural gas companies, public power utilities, and electric cooperatives have developed their business continuity and pandemic plans. Business continuity is a critical and commonly studied issue for both companies and academia. This paper reviews the business continuity and pandemic plans of few utility companies operating in American, Asian, and African continents. Findings are tabulated. The data points, stakeholders, and options to consider in making decisions about operational status at the same time protecting the health and safety of employees, customers, and communities are analyzed and discussed. Finally, the results are summarized. Limitations of the study and suggestions for future studies are made. The paper advances the scholarly discussion on the challenges and opportunities at the utility companies amid pandemics. It can help the utility management and policymakers in defining response strategies and actions during such challenges.

Introduction

Role of Utility

An electric utility is a corporation, agency, or other legal entity that owns and/or operates infrastructure for the generation, transmission, distribution, and sales of electricity primarily for use by all categories of customers in any geographical area. Electric utilities are mandated with the responsibility of providing reliable and affordable electricity to their customers. They own and maintain the lines, poles, pipes, meters, power outages, repairs, and other issues with how energy gets to customers' premises. Additionally, utility companies reads customers' meter and bills them on a periodical basis. They also handle emergency situations including but not limited to downed cables, blown equipment, leaking current, and power outages caused by inclement weather. When customers lose services, they immediately contact their local utility.

The role of electric utilities has however lately been changing. It is no longer enough to simply deliver electricity as a commodity. They are rather expected to deliver a wide range of energy-related services through a data-driven, customer-centric system operations platform capable of managing responsive loads, electric vehicles, storage devices and distributed generation. Utilities are further expected to deliver these services in a way that encourages environmental, social, and economic sustainability (CEA, 2015). For a long time, the utility company was the only option for electricity, regardless of where customer lived. However, that has changed significantly through the years. In today's deregulated energy markets in many developed countries, customers enjoy real energy choice beyond their local utility and can choose who supplies energy to their home or business (Direct Energy, 2017). The utilities sector in many developed and developing countries is also experiencing the emergence of digital energy 'prosumers' – businesses or people who are both consumers and producers. Customers generate their own energy and feed it back to the grid, which not only increases affordability but also creates operational complexity (Mclelland, 2021).

Challenges arose due to pandemic

Lockdown measures have reduced the operations of commercial and industrial sectors. Few sectors have been halted temporarily. Such situation has declined the power demand in several countries across the world. Compared to the same period in year 2019, the power demand in Europe declined by an average of 14% between March 28 and April 26 in the year 2020. As estimated by the Confederation of Indian Industry (CII), the lockdown until May 3, 2020 had a potential to reduce the electricity demand by approximately 33 billion to 36 billion units. This could have had a net revenue loss of 2500 to 3000 million Indian Rupees at the distribution level. Decline in revenues has added financial stress and created liquidity concerns for a utility (Global Data Energy, 2020). Due to loss of livelihood, many customers are still unable to pay their utility bills and seeking relief. The net impact on utility companies has been negative reducing their revenue.

The ongoing pandemic situation arisen due to COVID-19 has also significantly changed the lifestyle worldwide. Majority of the people are now staying home and working from home to the extent possible. Consequently, there has been a significant increase in residential load demand whereas the commercial and industrial loads have reduced considerably. Fig. 1 indicates electricity use in America before and during

the COVID-19 Pandemic (Mass, 2020). This changed load pattern has posed technical challenges (shift in demand) and financial challenges (projected revenue losses) in the utility sector (Madurai Elavarasan et al. 2020). The manpower risk has been another major challenge posed by the COVID-19 pandemic to continue smooth operations of utilities. As utility employees are necessary to ensure continuity in services, they are unable to shelter at their home thus putting themselves at a greater risk. If the virus had spread among utility workers, that would necessitate the use of quarantine and endanger utility operations due to absenteeism (Switzer et al. 2020). Hence, most of the utilities worldwide have initiated a disaster management and business continuity plan to tackle this ongoing challenges/threats.

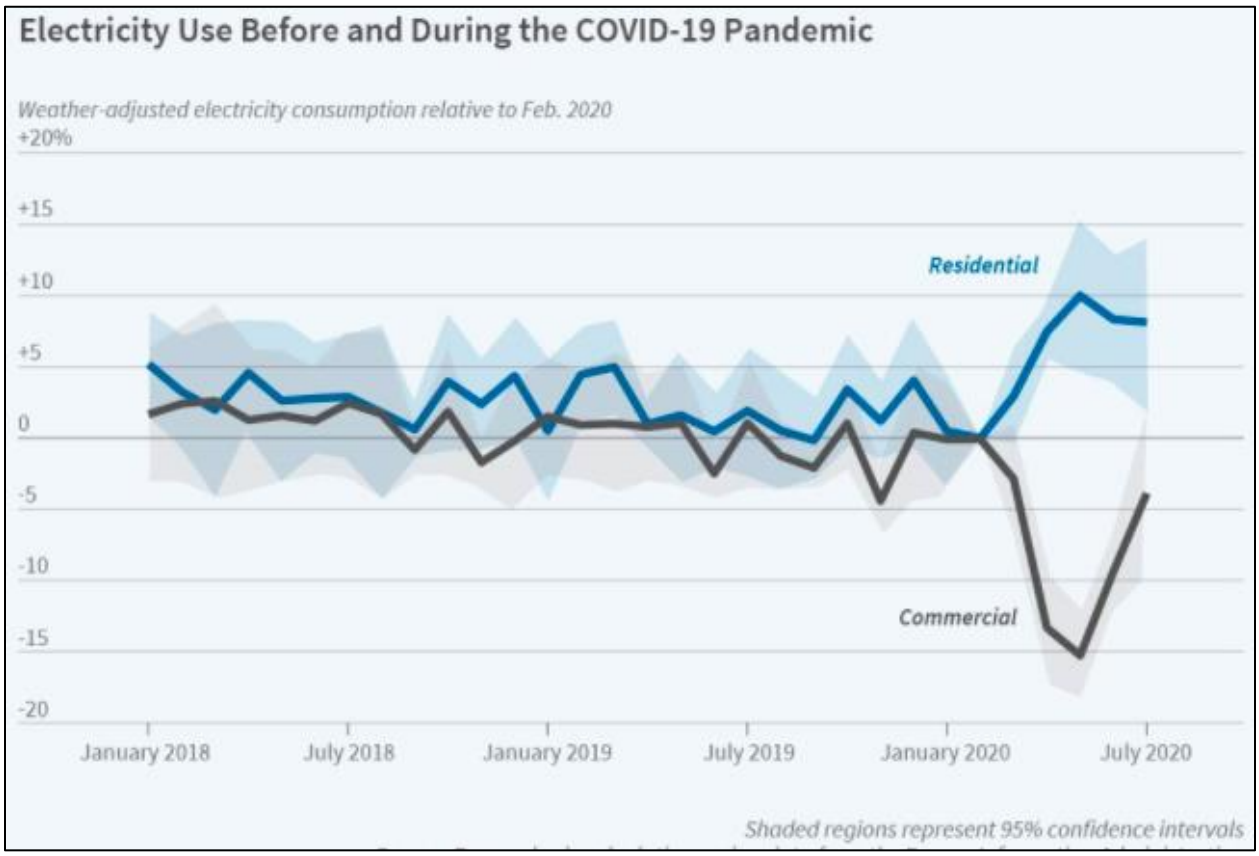

Fig. 1: Electricity use in America before and during the COVID-19 Pandemic (Mass, 2020)

Impact on Operations

COVID-19 has indeed impacted the operations at electric utility companies. While all stakeholders needs the products of utility industry, the economics and practical challenges of ensuring quality and reliable power supply during and aftermath of COVID-19 has put a significant burden on electric utility companies. Servicing different categories of customers especially hospital and other important establishments while abiding by social distancing norms

was a big challenge. It was equally challenging to continue smooth plant operations with a very limited staff. Maintaining the large transmission and distribution grid under the constraints of the epidemic was something unusual and that too with a constrained field workforce. Concerns over the health of the employees and their families have considerably reduced their attendance at work. These challenges have significantly impacted operational and maintenance obligations of the electric utility companies besides their inability to carry out important capital projects (Warrier, 2020). Utility companies have however managed to breeze the pandemic challenge and ensured operations somehow by instructing all employees and contractors to practice safe social distancing and to follow other health and safety best practices consistent with the local health authorities. COVID-19 has also made utilities more vulnerable to cyberattack. Home-based work has increased exposure to cyber-risks. Less-reliable internet connections, social engineering attacks against employees and their families, and honest mistakes made in unfamiliar workflows are all new potential risks in the ongoing scenario. Cyber attackers are trying to exploit new weak points in utility's infrastructure (Simonovich, 2020).

Impact on customer services

To ensure the safety of workers as well as residents, most of the electric utility companies worldwide took the decision of undertaking only most essential outdoor works. Most of the site works and new customer driven projects were put on hold. However, operations which can be done remotely without accessing customer homes and businesses went on with the same pace. Important and critical works where accessing a building or premises was necessary were also undertaken by advising all field employees to take appropriate precautionary measures including but not limited to wearing masks and/or gloves to perform their jobs safely.

Due to restrictions on the movement of people, many areas were completely cut off. As a result, the metering and billing process had faced huge challenges. It was difficult to take manual meter readings and generate consumption-based bills. On the other hand, maintenance and construction works were also severely impacted. At many electric utility companies, preventive maintenance works were indefinitely deferred to avoid the movement of field workers who inspect and maintain equipment. Capacity building and network expansion have also suffered, with delays causing cost overruns for utility companies. The cash collection, cash flow, and revenue generation has been adversely impacted. (Sarkar, 2021).

Impact on utility manpower

The pandemic situation demanding utility's employees to change the way they work overnight was indeed a big impact on the manpower. COVID has caused absenteeism and availability of employees at electric utility companies like many other industries. According to Edison Electric Institute, a large percentage of employees at electric companies, almost in the tune of 40% had fallen sick, quarantined, or might have stayed over at home to take care of family members during the pandemic. Such situation has significantly impacted operational and maintenance obligations besides the inability to carry out important capital projects (Warrier, 2020). As the COVID-19 pandemic has created new challenges in the ways utility manpower work and connect with others, this has a potential to raise feelings of stress, anxiety, and depression. Mental health is an

important part of utility workers and they should be able to cope with any stress.

Utility companies' Business continuity and pandemic plans in different regions

Example of PUC Distribution Inc., Canada

PUC Distribution Inc. is an electric utility company operating in the Ontario province of Canada, distributing electricity to residences and businesses within the boundaries of the City of Sault Ste. Marie, the Batchewana First Nation (Rankin Reserve), Prince Township and parts of Dennis Township. PUC had developed a comprehensive COVID pandemic response plan for implementation and updates as needed throughout the pandemic situation to ensure its customers receive safe, reliable and affordable electricity. Its plans were designed to ensure that operations and infrastructure are properly supported. Following the guidance of Ontario public health officials, PUC had taken proactive actions to both prevent the spread of illness and protect the safety and health of employees, including:

- Cancelling all business travel and training
- Practicing safe social distancing (using teleworking, rotating schedules, online meetings etc.)
- Practicing frequent handwashing and enhanced cleaning.
- Temporarily restricting physical access to all PUC buildings. PUC is asking any visitors, including customers, contractors and suppliers to interact via phone, e-mail or other online options on www.ssmpuc.com until further notice. We also encourage customers to sign-up for E-Billing for receiving and paying bills.
- PUC has put social distancing practices in place for the health and safety of its employees. It has asked the general public to stay 5 metres away from any crews or workers in the field.
- PUC is asking all external contractors and suppliers to complete and sign a check-list prior to entering any of its facilities.

Recognizing the uncertainty for businesses and residents, PUC had put several programs in place including financial assistance programs, flexibility in bill payments, as well as phone scam warning to help them get through these difficult times.

Example of Eskom in South Africa

Eskom is a 100% state-owned electricity utility operating in South Africa. This utility company extended assistance to its customers and employees during the COVID-19 lock down period. In order to improve customer service experience while keeping its employees safe, Eskom had reviewed some of its operational decisions to ensure compliance to the COVID-19 regulations. As an essential services company, Eskom provided a 24-hour service daily for network faults affecting significant areas and also supplied to critical installations, such as hospitals.

The relaxation of the national lockdown restrictions had increased the risk of COVID-19 exposure to its employees. As part of risk management protocols, Eskom decided not to dispatch technicians for single household fault calls after 4 pm, but attended that the next day. Only emergency calls were attended on the same day the fault has been reported. Eskom had prioritized what it deemed as critical services during the lockdown period due to limited resources. It had prioritized and responded to power failures, any emergencies posing a danger to the public e.g. low-hanging wires, essential

maintenance, prepaid token-related and meter reading enquiries

Eskom had implemented these contingency plans as an effort to keep the lights on while minimising the risk of infection of the COVID-19 coronavirus to its employees, their families, and customers who may physically interact with its staff. In addition, its employees were equipped with their regular personal protective equipment (PPE) and necessary preventative tools against the COVID – 19 coronavirus. The employees additionally applied the relevant hygiene protocols should they be required to perform duties inside a customer's home. The utility had closed its Customer Service Hubs during the duration of the lockdown, and customers were advised to contact the power utility through phone, text messages, or email. Despite Eskom's stringent measures to manage the impact of the 2nd wave of the Covid-19 pandemic on the operations, it experienced some impact on its operations, including its suppliers,

Example of HK Electric operating in Hong Kong, Asia

HK Electric is lighting up the homes and businesses of Hong Kong and Lamma islands since 1890. The utility undertakes power generation, transmission and distribution, supply and customer service. The utility company had prioritized support its stakeholders, the community and its own staff during the COVID-19. Throughout the year, HK Electric offered a package of five relief measures to SME customers. About 70,000 non-residential customers were granted six-month waivers from tariff increases and equipment subsidies were provided to help its customers save costs and become more energy efficient. Small catering establishments in its operational area were badly affected by the economic downturn. In response, HK Electric offered a two-month electricity payment deferral scheme to 180 SME caterers. It also provided needy customers with dining coupons worth HK$20 million and NGOs with food subsidies, in turn generating revenues for SME caterers.

To minimize the risk of COVID-19 infection, HK Electric had introduced work segregation, split team, and encouraged work-from-home arrangements for employees. The company advised all staff to strictly observe social distancing requirements and issued them with face masks and hand sanitizers. To maintain the business continuity, HK Electric encouraged customers to use its extensive range of online and remote channels for billing, payment and other routine matters. Despite tariff pressure caused by an increase in capital expenditure and a decline in electricity sales due to COVID-19, HK Electric froze the tariff across the board for 2021. The utility took all possible measures to keep its employees safe while running capital works and maintaining business-as-usual operations at power station and across the network. Sanitization facilities were set up across all sites, and PPE was supplied when needed. Drills were carried out at different workplaces to test the preparedness in the event of confirmed COVID-19 cases.

Comparative study of practices adopted in different regions

Based on the three examples quoted above and the information available in the public domain about many other electric utility companies operating in different regions including small island developing states, the practices adopted by electric utility companies were categorized in 10 categories included in Table 1. By and large it was found that the utility companies have

successfully managed to continue their most essential operations and extended services to the customers to the extent possible despite the ongoing pandemic situation.

Table 1: Practices adopted by different electric utility companies

Practices adopted by electric utility company	PUC Distribution Inc., Canada	Eskom, South Africa	HK Electric, Hong Kong
Pandemic response plan	Developed	Developed	Developed
System's operations	Most essential operations continued	Most essential operations continued	Most essential operations continued
Customer services	Most essential services continued	Most essential services continued	Most essential services continued
Safety to public	Ensured	Ensured	Ensured
Safety to employees	Ensured	Ensured	Ensured
Stakeholders communication	Continued	Continued	Continued
Support to customers	Extended	Extended	Extended
Support to employees	Extended	Extended	Extended
Local health regulations	Complied	Complied	Complied
Corporate Social Responsibility	Undertaken for people in need	Undertaken for people in need	Undertaken for people in need

Opportunities explored by utility companies

Utility companies are on their way to figure out how their manpower can adapt to rapidly changing conditions, and management have to learn how to match those workers to new roles and activities. Due to significant changes in energy demand, operation of the power system has become critical and to handle such crises situations, governments worldwide also need to offer an exigency or emergency plan for customers as well as for utility operators. The impacts due to the pandemic have no doubt posed various challenges but have also consequentially opened the doors for new opportunities and improvements in the power and energy sector. All international organizations and government agencies have acknowledged that the utilities had been challenged to overcome the new normal scenarios. Though no severe issues have been reported by utilities during the pandemic period, yet they have been preparing to combat against any unforeseen threats. Utilities are also investing now on improved system flexibilities to tackle the technical issues due to load reduction and shifting of daily peak demand (Madurai Elavarasan et al. 2020).

Lessons learned

The disruption caused by the coronavirus crisis has underlined how much modern societies rely on electricity. Electricity is critical for operating all medical equipment in the hospitals. It ensures the timely

communication of important information between authorities and residents. It allows millions of people if confined to their homes to telework to win their bread. It also facilitates shopping on e-commerce sites. As providers of essential services, utility companies now need to reinforce their protocols and contingency plans manage normal operation of their facilities and delivery of services event during such pandemic situations. Utilities have learned to take immediate actions to isolate and protect their workers in performing unavoidable critical functions to ensure security of power supply. They have now had an experience of ensuring mobility of key personnel for inspection, operation and maintenance of power plants and grid installations during crises (Euroelectric, 2020).

Reductions in workforce availability due to pandemic has equally hit the manufacturing industry. Pandemic has impacted production and logistics supply chains, leading to a scarcity of equipment, line material, and spare parts essential for electric utility's operations and maintenance. The utilities now need to give a special attention to order such supplies well in advance of any planned upgrade or new capital work to ensure manpower availability and material supply (Ozer, 2020). Another lesson learned from the COVID-19 pandemic is that not only electric utilities but also the municipalities, public works, and other utilities should develop their emergency response and crisis management plans, or review their existing plans to identify and close gaps that may be obvious since the onset of the pandemic. The effect of pandemic on utilities can be from three perspectives - decrease in electricity demand, safety of utility workers, and the need for digital transformation.

COVID-19 has sent an alarming note to all utility companies to focus on strategic planning, risk and asset management, and most importantly investing in people by establishing a balance between remote work and protective workplace measures that will allow staff to safety deliver essential utility operations. Not only electric utilities but also utility companies providing gas, water, or waste utilities must strive to develop intelligent solutions and energy efficiency in their own operations. They are expected to ensure a safe and secure infrastructure for the environment always. Utilities need to evolve. They need to become much more agile. Innovation is key for utilities companies. Innovating will help utility companies maintain stability during such challenging situations. To gain agility and efficiency, utility companies need to explore diverse delivery methods and business models and use advanced technology to switch their operations to the next phase (Mclelland, 2021).

Conclusions

Like many other sectors, COVID-19 has impacted electric utility sector also in an unprecedented way. Electric utilities had to handle supply chain disruptions, manage a remote workforce, minimize the risk of infection, and operate with a reduced field workforce. However, despite COVID-19 impacting industries across the board, the electric utility sector is likely to emerge with a better set of tools and updated techniques to drive extraordinary agility and nimbleness. There would be now an increased focus on managing operations, utilizing manpower, exploring energy transition, and promoting energy efficiency. Regulators and customers will expect higher levels of safety and reliability under natural and manmade challenging situations. COVID-19 is likely to drive new investments and accelerate digital

transformation, which will be focused on enterprise-wide resilience, adaptability, and cyber security.

The pandemic situation has prioritized the need for utility management to develop contingency plans for any such operational disruptions and create alternative sourcing options in addition to ensuring the safety and well-being of their employees. Bridging the digital world with the physical world needs to be included in their plans. Utilities need to join hands with the technologists from the digital world to understand the real issues in the age-old utility business processes and transform them to build successful, competitive, and future-proof utilities. Utility companies additionally need to consider establishing pandemic-specific policies, procedures, and capabilities for employee communications, telecommuting and personal/family leave to minimize disruptions in their operations. Cyber criminals may also target utility's computing environment in such pandemic situations. This is also a security aspect to be addressed. How the utilities companies evolve and meet their challenges in the forthcoming decades will have profound impact on the future generations.

Limitations and scope for future studies

The paper is based on the information available in public domain and the long professional experience of the authors. Authors have also consulted several utility sector professionals to share their opinion on the impact of pandemic on utility companies. In view of limitation of words and pages, examples of only three electric utility companies have been discussed. Adding more examples of utility companies operating in remote areas and small islands would have added to the quality. Since the pandemic challenges are still ongoing with the threat of different variants of coronavirus with their unique impacts, there is enough scope to further research on this topic. The paper advances the scholarly discussion on the challenges and opportunities at the utility companies amid pandemics.

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