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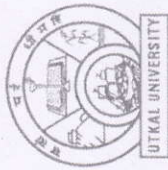
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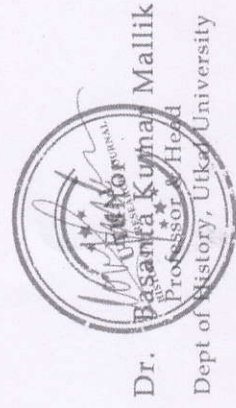
IMPACT OF COVID - 19 ON THE POWER SECTOR IN GUJARAT

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Accounts

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IMPACT OF COVID - 19 ON THE POWER SECTOR IN GUJARAT

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ABSTRACT:

This paper examines the impact of COVID-19 on the power sector in the Gujarat. The Indian power sector is one of the most diversified in the world. India is the fifth largest power producing in the world. Gujarat is situated in western zone in India. It is the 6th largest state in terms of areas and 9th most population state. Gujarat is the one of the prosperous and efficiency state in India. Power means energy and energy is the primary need of all human beings and it is important to the building block of economic development. In Gujarat the significant growth in power sector are increased in past years. Over the last few months' lockdown measure have significantly reduced electricity demand in the commercial and industrial sector. The significant increase in residential power demand and while power demand decrease commercial and industrial areas. This ongoing situation due to COVID 19 changed people lifestyle and create new challenges and technical issues faced by the utilities. Therefore, this study aims to investigate the global scenarios of power system during COVID 19 along with the socio-economic and technical issues faced by the utilities in state of Gujarat. This paper examines scrutinized the Gujarat power sector as case study and explored scenario, issues and challenges currently being faced to manage consumer demand. Finally a set of recommendations are presented to support the government policymakers and utilities in the Gujarat not only to overcome the current crisis but also to overcome future unforeseeable pandemic alike scenario.

KEYWORD: COVID 19, power systems, load demand, Gujarat power system, recommendations for sustainable power system.

INTRODUCTION

The driving force of the economy is energy. Energy, economy, business, development and growth all are primarily dependent on public demand, capacity and affordability. Public health and safety are the primary variances to maintain the demand as well as growth. The first quarter of the year 2020 is inexplicable to observe global lockdown due to a new virus outbreak. WHO (World Health Organization) declared it as pandemic on March 12th, 2020. This disease is spreading throughout the world and the most affected countries include mainland China, Iran, Italy, Spain, France, Germany, the UK and the United States. The United States of America (USA) alone experienced 68,797 deaths as of 4th May 2020 due to COVID-19.

As there is no medicine yet, therefore maintaining the social distancing is the best approach to minimize the spreading and most of the countries imposed nation/state wise strict lockdown. The lockdown, social restriction, travel ban, unemployment and working from home policy forced most of the people to stay inside the house, which affected the normal business operation and reduced energy demand from the national grid. Industries moved to the minimum manual operation or limited their operation. Business reduced their operation; travel ban almost collapse the aviation industry, small business almost stopped, schools, universities moved to online mode and most other sectors adopted working from home policy. The global economy is affected by this pandemic unemployment and poverty are increased.

Power sector consists of generation, transmission and distribution. Traditionally, power was generated by burning of fossil fuels and hydrocarbon. At present time power was generated from renewable such as wind and solar has grown. Generated electricity moves through transmission line are as extensive as highway, power crosses international borders and it is traded on global markets. The transmission lines reach users in industrial, commercial, agricultural and residential areas, the distribution network takes over and delivers electricity to the end consumers. Power sector is the engine of the global economy, supplying electricity to all sectors. Gujarat power sector provide electricity for the agriculture, infrastructure, commercial and industrial areas. In recent times of crisis of COVID - 19 pandemic reliable electricity supply has become critical under lockdown condition. Slower demand growth resulting from falling economic activity promoted COVID-19 will probably keep oil prices down. The proposed study aims to analyze the impact on energy and power sector with the prospective recommendations.

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POWER SECTOR IN GUJARAT

Gujarat has recorded significant economic growth over the last years. In India Gujarat is the lead in per capital consumption of electricity. The energy sector is primarily divided into oil, gas and power. The power sector includes generation, transmission and distribution of power. A major contribution of oil and gas in areas of exploration, production, pipeline networks and city gas distribution. GEB focused mostly on rural electrification, providing new connections and maintenance activities. The energy units are required by 2020 would be nearly two & half times the existing generation. Gujarat will need to secure its fuel requirement as most of it is imported. Gujarat urja vikas nigam limited is a holding company in energy sector. Gujarat Urja Vikas Nigam Ltd. is an electrical services umbrella company in the state of Gujarat. The company was created by the Gujarat Electricity Board (GEB) as it's wholly owned subsidiary in the context of liberalization and as a part of efforts towards restructuring of the power sector with an aim of improving efficiency in management and delivery of services to consumers. 1 April 2005 they have become subsidiary companies of GUVNL as per the provisions of the companies act, 1956. The GUVNL is engaged in the business of bulk purchase and sale of electricity, supervision, co-ordination and facilitation of the activities of its six subsidiary companies. GSEL is engaged in the business of generation of electricity. The GETCO is engaged in the business of transmission of electricity. The UGVCL, MGVL, PGVCL, DGVCL are engaged in the business of distribution of electricity in the business of distribution of electricity in the Northern, Central, Western and Southern areas of Gujarat respectively.

OBJECTIVES

- To study the issues of power sector in Gujarat due to impact of COVID19.
- To study the challenges of power sector in Gujarat due to impact of COVID19.
- To study the social, economic and technical problems of power sector in Gujarat due to COVID 19.
- To study the future outcomes and post period of COVID 19 in power sector in Gujarat.

Figure :1 Structural framework of power sector in Gujarat.

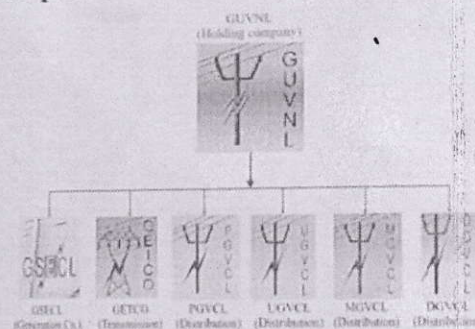
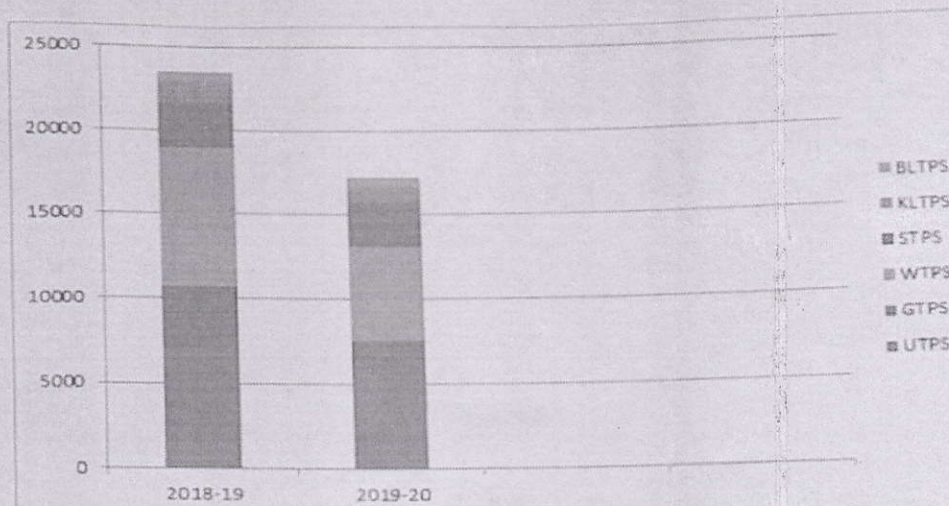


TABLE- 1

Name	Type of Fuel	Capacity (2018-19)	Capacity(2019-20)
Ukai Thermal Power station	Coal	6937	5780
Gandhinagar Thermal Power Station	Coal	3704	1709
Wanakbori Thermal Power Station	Coal	8343	5581
Sikka Thermal Power Station	Coal	2726	2711
Kutch Lignite Thermal Power Station	Lignite	1205	883
Bhavangar Lignite Thermal Power Station	Gas	589	611

CHART - 1



Above diagram prove that all the power station in Gujarat in 2018-19 power generating capacity are reduced to compare 2019-20 remains the bhavanagar lignite thermal power station.

SOCIAL & ECONOMIC CHALLENGES IN POWER SECTOR IN GUJARAT

Reduction in electric bill payment capability by a section of society

Due to closures of industries and businesses, people are not able to go out for work; this will impact on their salary. In such a scenario, a large section of the society is struggling and focusing on basic amenities and hence, incapable of paying the electricity bill. This directly affects the revenue and bad debt of the power sector company. Any shortfall in revenue may increase electricity tariffs in the future or a burden on the power sector company/government.

Financial liquidity crunch and delay in the sourcing of materials

Due to delay and less revenue from the DISCOMs, the under-construction projects will face financial liquidity crunch and delay in the sourcing of materials and construction activities. Due to lockdown, it is estimated that Gujarat DISCOMs will suffer a revenue loss.

Delay in manufacturing and installation of renewable project

Even post COVID-19, due to the non-availability of labor due to their movement to native places and disturbance in the supply chain, there will be execution delay in the functioning of the solar manufacturing sector. For many other planned and undergoing renewable energy projects, several materials/parts are imported from the USA, China, and other parts of Asia. Because of disturbance in the manufacturing and supply chain in many of these countries, there will be a delay in the renewable energy project in India and Gujarat.

Reduction in subsidy and investment on renewable energy by the government

Due to the health and economic crisis caused by COVID-19, the government will have priority and focus on reviving the Indian economy at earliest. Thereby, there is a possibility of a reduction in subsidy on renewable energy-related researches and projects.

Illness among power sector workforce

The electric power sector is the Organization that works 24×7 all around the year. To make it operational skilled people associated with the power industry have to come out of their home even during the lockdown and hence, there is a possibility of illness among the workforce. This directly affects the health of co-workers and the performance of the power sector industry.

TECHNICAL ISSUES AND CHALLENGES

Due to lockdown, there are many technical issues observed in the Indian power networks, including voltage and frequency unbalance, overloading of a substation, modification of duck curve, etc. To tackle these issues to ensure the smooth operation of the power systems, the responsible agencies, for example, POSOCO has initiated disaster management planning, including many measures and initiatives.

• **High-cost generator is put into stand by condition**

One of the major actions taken by utilities due to reduced energy demand is to place the high-cost thermal power plant in standby or shut-down conditions. The optimization measures have been taken based on the demand requirement allowing the low-cost generators to run in its full load while others are on a fractional level.

Protection aspects

The most effective defense mechanism, such as under frequency relays and differential relays are adopted in the national grid for protection of generator, transmission lines safety, and system stability purpose with the help of mock exercise.

Interruption of power connections

The state authorities instructed the subordinate department not to interrupt the power connection in the state for non-payment of electricity bills until further notice for all categories of consumers. This amendment also indicated to postpone the recovery of fixed / demand charge towards power consumption. This consequence poses an additional financial burden to the power companies.

Cybersecurity

Due to the pandemic situation, the utility employees are working remotely i.e. work from home which acts as the number one priority for utilities to continue their operations effectively. But, this activity also leads the utilities to new cyber-risk that might be from inside and outside the walls of its cybersecurity mechanism. This new approach of accessing the plant production and grid networks from homes raises the risk of outages and safety events as attackers can easily access the remote systems through the insecure network connection.

ISSUES TO LOOK AT PRESENT : DURING COVID-19

Logically, every utility has enabled its disaster management plan to combat with the current scenario. However, an event like the COVID-19 pandemic situation is something no one could ever imagine of. Even a robust management plan struggles to handle the current energy scenario, which in other predicted disaster cases could have worked efficiently. To run the power sector safely and securely, we cannot afford the luxury to overlook the following issues.

Ensuring maximum safety of employees: To keep the power plant and control centre safer, the use of disinfectants around the place is a must. Where a 24-hour service is required, staffs would be assigned roster duties in shifts so that if a team gets affected, the whole team can be kept in quarantine and other teams can take over the charge. The engineers and workers working at power supply facilities must be motivated through a declaration of proper financial and risk packages.

Technical operational strategies: As soon as the demand plunges, electric utilities should take immediate measures to operate the grid in an optimum way yet ensuring maximum system stability and reliability. Utilities should utilize the low-cost generators utterly and de-commit the high-cost generators gradually without losing the grid stability. The power sector should immediately compute the availability extent of sources such as coal, gas, diesel, nuclear fuel, and water resources. The utility should consider an economic trade-off between operating the thermal generators below its optimum operating point with low efficiency and operating few generators at higher efficiency while shutting down other generators.

• **Consumer interaction:** During the crisis period people need to stay at home and thus it is must that utility ensure "people have access to reliable, affordable electricity to stay connected and continue to communicate with public services and one another remotely. During this time, consumers may not be able to pay for the unpaid bills and recharge their pre-paid accounts due to the immobility condition. Hence, utilities should adopt a measure not to cut off the consumer due to a late payment issue or insufficient funds in his account. The utility should work on economic plans to adjust the dues in his future billing cycles, gradually considering the late payment fees are exempted.

Financial plan: In due course, utilities must develop a model to assess the possible revenue loss and thus need to hold conversations among the regulatory and policymakers regarding the financial support from the government. The utilities do not have other businesses except providing electricity to the consumers. Though the generation cost to produce electricity has fallen due to the low demand, the transmission and distribution cost remains almost unchanged as the wire costs are almost fixed. Utilities would try to recover the energy costs using various tariffs. Hence, utilities need to keep an eye in the future to increase the energy rate to recover the losses.

Supporting the state-owned generation: It is likely that the maximum of the power generating units are far from the nearest load centre. Generation companies should take appropriate measures now to allocate a proper amount of fuel to ensure

the robustness of the supply stream for the next few months. As the demand decreases, a frequency fluctuation situation must be managed very carefully so that it does not go out of control. As previous load forecasting studies could not anticipate this unlikely situation, a new naïve method can be employed. Otherwise, a small mistake may lead to cascading tripping effects, which may lead to a nationwide blackout.

Power system maintenance: Looking at the nationwide daily demand pattern, it is seen that most of the industries and commercial setups are shut down. It is the right time for the utility to intelligently schedule the generation to allow the spare units to carry out much-needed refurbishing and maintenance. The utilities can take this opportunity to inspect the impacts of shutting down a few power plants alternately in a programmed manner. In this way, a utility may identify the efficacy of the emergency power plants.

RECOMMENDATIONS FOR THE FUTURE

Severe unlikely events like COVID-19 may occur in the near future to any country. Hence, responsibilities need to be realized, and steps need to be taken promptly, which would proffer a progressive impact. Until today many utilities and operators have been operating the sector incorporating the conventional mechanisms and styles of management. As the pandemic situation has exposed the severe weaknesses, it is high time policymakers, experts and all stakeholders recognize the integration of modern technologies, mechanisms and managerial styles to be incorporated with the power and energy sector. Some of the recommendations for doing so are as follows:

Gradual increase of load: As the COVID-19 lockdown will be withdrawn, utilities should plan to allow the relaxation of the load to increase step by step to ensure grid stability. Otherwise, tripping may occur due to severe power quality issues. If it is not controlled properly, a weak grid may fall to cascading effects, which would, in turn, create a system-wide blackout.

Post-COVID fuel security and supply: In the post-COVID case, economy would be more inward-looking and de-globalization would occur due to the security of energy and depending on others for all commodities. So, it is the time for policymakers to understand the necessity of fully exploiting their fuel potential before committing to other friendly nations for fuel import/export. An unforeseen regional and global crisis may occur at any time in the near future.

Support to the renewable sector: Even though there is a drastic price fall occurred for the crude oil, it would not be justified to withdraw the support to the renewable energy sector. Once the situation overcomes, the oil market would get back to its feet soon. For example, the Indian government has drafted a bill to amend the electricity act to protect renewable energy developers and grow the sector. So, for the time being, it would not be wise not to incentivize the renewable energy sector due to cheaper fuel availability.

Investment in renewable energy resource manufacturing: The renewable energy sector is experiencing slow growth due to the unconsolidated supply chain. Solar PV and wind industries are already seeing logistical delays. The government regulators, policy and decision-makers should carefully evaluate this situation so that development does not get hampered as well as the interest of all parties served properly in an ethical manner. Due to the travel ban, it is not possible to get raw materials for renewable energy installations soon and this situation can be considered as a motivation to invest in local manufacturing companies to reinforce supply security.

- **Deployment of solar-based technology:** If the people of rural areas of a state can satisfy their low energy needs using renewable energy resources, that could be a massive benefit to both the rural people and the national utility. This would be a big relief to the utility grid extension burden. During the periods of COVID-19 like events in the future, where any future decision is unknown and people have to stay in their home, being energy self-sufficient is the best way to keep them functioning.

- **Deployment of biogas-based technology:** Biogas is another important source of energy that can fulfill the energy demand of rural areas in many countries around the world. As rural areas usually have small to big dairy farms, it is easier to install a biogas plant there and maintain the daily operation. This source of energy has a high impact on the life of rural women, especially which limits their daily tasks of fuel-wood gathering for cooking.
- **Hydrogen as a future fuel:** Research and innovation can contribute to proposing Hydrogen as one of the alternatives fuels to replace fossil fuel. A greener version of hydrogen can be produced using the renewable resource generated power for electrolysis of water. This would be environment friendly as no CO₂ would be produced in this process. The transportation sector can be highly decarbonizes using this technology

- **Microgrid:** Micro grid is a very well-known concept these days. If bigger urban areas or industrial zone can be clustered and