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**EMPIRICAL INVESTIGATION: POWER CONSUMPTION DURING CORONAVIRUS (COVID-19) PANDEMIC  
OUTBREAK WITH REFERENCE TO RESIDENTIAL SOCIETY**

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**ABSTRACT**

*The Coronavirus COVID-19 was declared as a global pandemic and a public health emergency in January 2020. Lockdown was imposed all around the world. Lockdown was imposed on India nationwide for the first time on 25th March 2020. This lockdown forced many people to confine themselves to their apartments and houses, and to abandon their offices or workplaces, as they were allowed to work from home or they were laid off. Due to this the power sector was affected significantly. There were huge changes in the various sectors such as industrial, financial, agricultural, and residential. Some of the changes are load curve changes, demand and supply management, etc., specifically in the residential sector. This article attempts a study to find out the changes that have happened in the residential sector, through a questionnaire that has collected data from two hundred and twelve (212) respondents all over India during this lockdown using convenience sampling. Simple percentage analysis was incorporated along linear regression model and Analysis of Variance were applied to prove the impact of pandemic on energy consumption. The outputs obtained from these analyses were used to carry out the objective of the study.*

**KEYWORDS**

COVID-19, pandemic, power consumption, residential sector.

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**1. INTRODUCTION**

As COVID-19 sweeps through the whole world, the electricity sector was deeply affected and faced with great challenges. Since governments around the globe executed several lockdown restrictions, electricity demand has dropped sharply while the load composition and daily load profile have also changed. The operation and control of the power system are affected by the change of load pattern. Voltage violation issues that are caused by reduced loads are met by the operators. Power stations that are operated by coal-fire and their utilities have run into financial problems. Investment projects are suspended, but long-term investments in the electricity sector and the future transition to renewables are expected to be largely unscathed [1]. Due to the increase in the outbreak of COVID 19, there were several restraints in the economy of the country and it was a reality check for us, as to where we stand as a country in terms of infrastructure and basic necessity services. As a result of the pandemic, electric power demand decreased which impacted a big blow to the electric power sector. There are many challenges yet to come for the sustainability of this sector in the future [2]. The energy industry needs high fixed costs in daily operations. The energy industry is closely related to daily life, providing electricity, energy, etc. So, the stability of the energy industry is important for the social and economic stability of a country. COVID had a negative impact on the energy industry. The industries were unable to cover up the expenses which resulted in poor corporate performance. A new strategy is much needed for post-pandemic [3]. There is a consistent need for power for households and for the people working from home along with basic health

care services and institutes. The Ministry of Home Affairs filed an Order inter alia giving the details about imposed restrictions. But, they said order provides the essential services with certain exceptions. There is a chance for big financial implication as there is a problem of liquidity [4].

## 2. LITERATURE REVIEW

The world came to a halt during the COVID-19 pandemic. This includes the business and industry sector also. This was a precautionary measure taken by the government in order to reduce the severity of the coronavirus. Elavarasan et al [5]. discuss the various ways in which power can be produced sustainably. Indian and global scenarios are taken into account and an extensive study has been conducted by Elavarasan et al [5]. using various journals, research papers, and third-party data [5]. Indian energy consumption was highly affected, it was in fact dropping down very quickly during the 1st lockdown and when the lockdown got relaxed and when the months rolled by, the energy consumption was able to recover, this was found out with the help of ARDL (Auto Regressive Distributed Lag) model which was proposed [6]. The IEA (International Energy Agency) observed a decrease in the demand for electricity. The IFC (International Finance Corporation) also observed a drop in the demand. Low oil price was predicted and which in turn will also result in the low price of natural gas that is indexed to oil. The economic activity is likely to pick up as time passes and there will be an increase in demand for industrial and commercial use of electricity [7].

In India the industrial and commercial sector departments utilize an approximate of 52% of electricity, domestic households consume around 24% and the agriculture sector consumes around 18%. Since the beginning of the nationwide lockdown, the daily power demand of India has decreased by 25 to 28% driven essentially by the factory and office shutdown and termination in the industrial and commercial sectors. The price during the lockdown on the platform was averagely approximated at Rs 2.40 per unit with supply bids outstripping the demand at the exchange. Confederation of Indian Industry (CII) has now proposed prolonging the debt servicing ban from three to six months, enhancing credit to the generators by Coal India for 30 to 45 days for coal extraction, and allowing deferment of payments of indirect taxes such as coal cess and electricity duty in order to ensure liquidity in the sector by minimizing the outflow of cash [8]. There are both harmful and positive effects of COVID outbreak to the environment, the renewable energy was also affected by this. There was a decrease in energy demand and the same goes for solar energy too. Environmental pollution decreased, but at the same time, it took a huge toll on the renewable energy sector which also prevented the investors from investing their money in this sector [9]. Numerous industries were affected by the COVID outbreak and the renewable energy sector is one of them. It was plummeting mainly because India imports most of the raw materials from China, which was highly affected by the virus during the initial days of lockdown, and the Indian law banned import and export from outside India. But it is relieving to know that our nation is leading the solar energy sector. But to gain an absolute advantage, we must get independent in terms of raw materials and should be able to solve internal problems that arise [10]. COVID has resulted in an increase in pollution and limitation in waste management. It also led to higher unemployment and poverty. The world energy demand declined so much in the first quarter of 2020 even though the demand for residential energy was increasing and the natural gas demand was decreasing. The impact of COVID on the environment, socio-economic issues, and energy sector were addressed [11]. Prices get decreased in the market, the power demand is very low and the last option available for us is to see if the costs are within the limits to ensure viability of operation. Improvement in the financial health of Distribution Company (discoms), availability of fuel at basic price to generators, restructuring of the power plants that have been impacted with debts, and purchase agreements for medium and long term power in the sector can help in reviving the power sector. It will take time for renewable energy to be used by the common public by taking into accounts the economic availability. Till then, coal will be our main source of fuel. Studies show that India's power consumption is going to increase gradually by the next decade [12].

Due to the COVID-19 pandemic, the companies, industries and governments are forced to make difficult choices between balancing citizen's safety and their economic sustenance. Firstly, the industry has to be ready for the post-COVID situation and plan accordingly. Secondly, the industry is going to come under unprecedented and novel scrutiny for its social and environmental, and governance criteria. Thirdly, this will be a great opportunity to establish how solar, hydro-power and wind coalesce together. Now is the time to showcase the great coordination through these hybrid focused projects such as pumped storage with wind or solar power and solar photovoltaic. Concurrently, these projects would establish to the world that the hydropower is the future and it can also be helpful in changing the climatic and economic environment. The role of the International Hydropower Association's (IHA) is to advance sustainable hydropower. The IHA is a cosmopolitan organization which strives to enhance the hydropower's image [13]. Kanitkar et al. [14] proposed a linear input output mode framework to determine the financial losses during the COVID-19 pandemic in India. The loss in the Indian economy and future losses in GDP has also been discussed. There was a huge fluctuation in the power demand during the pandemic. Economy wide influence of the energy and power sector was also explored. Due to this, the level of carbon emissions was also altered [14]. There was an increase in the consumption of electricity in the lockdown period as compared to the pre-lockdown period. As people spend more time at home, it is expected that residential electricity consumption will increase. An increase in summer temperatures and people spending more time at home during lockdown are the factors that contribute to an increase in residential electricity consumption. The magnitude of the increment varies with region and ownership of air-conditioners (AC) [15].

Discom dues have soared and overdue payments are increased during this lockdown period. In order to help power distribution companies, the Centre has rolled out a relief program to pay their dues to generators (gencos). By the end of the current fiscal year, it is said that these losses will increase even further due to lower demand [16]. Whilst the short-term impacts include significant reductions in the consumption of petroleum products by 20-30%, aviation turbine fuels being on the higher side at 30%, and the range of road transport fuels being on the lower side. In terms of electricity generation, the drop-in demand has impacted the coal generation the most, comparing the three weeks preceding the lockdown 25% drop in coal production has been seen contrasting to the increase of 9 to 11% with renewables and hydroelectricity. This in turn resulted in slight "greening" of electric supply with CO<sub>2</sub> emissions falling by 25% during the period on a per-unit basis. On the other hand, as the long-term effects of coronavirus are still unknown, a few impacts look likely. An economic impact instigated by coronavirus resulting in recession. If the government has to meet its ambitious 450GW of renewables then measures have to be taken to provide sufficient capital. An impact already seen as a 3GW solar project is delayed due to the trade restrictions of goods from China. The outbreak and lockdown undoubtedly represent a significant shock to India's energy system [17]. Houston - a new study indicates that by the end of 2025 COVID-19 crisis would likely diminish electricity usage by 65.2 TWh to 158.8 TWh or 1.6% to 4% reducing the need for baseload generation by 28 GW. The report projects that by the end of 2025, COVID-19 will have decreased annual power demand by 4 TWh to 47TWh in offices, by 111 to 193 TWh in the retail sector, and between zero and 33 TWh in the hospitality sector [18].

When we look at New York and Houston, the night sky light has so much of contrast when we compare it before and after Covid-19. In the case of Manhattan, the night city light was dimmed by 40% from the month February to April. Key finding mobility was proved to be a strong indicator of changes in electricity consumption from this research [19]. As Covid got widespread in African countries, they suffered a lot due to no access to reliable health systems and modern electricity. This made the African government head towards renewable energy sources for electricity. This pandemic added challenges to already existing challenges for electricity in Africa. The pandemic also helped them in knowing the importance of the reinforcement of sustainable energy sources. Covid definitely had a positive impact on the energy sector in Africa [20]. The energy sector was affected the most out of all sectors during the corona pandemic. Oil production and the fall and rise in demand for oil were discussed. A worldwide analysis based on oil was given such as which country had the upper hand and which country had the lower hand during the economic crisis. Since the investment/finance sector is also closely related to the energy sector, the finance sector also had a dramatic fall. Renewable energy was most welcomed during this time and they had a substantial development during the pandemic [21]. To reduce the severity of the coronavirus various countries initiated a lockdown. Similarly, India also had established a nationwide full lockdown. Due to this lockdown, there was a rise and drop in power demand in various sectors. Using artificial neural networks (ANN), machine learning algorithms, and electric load forecasting the electric consumption of Haryana is observed for a week and analyzed. ANN proved to have better prediction analysis compared to machine learning [22]. An assessment of the current economic situation is required at the high spatial granularity and in real-time to mitigate the economic impact while lessening the possibilities of transmission. A consumption model is designed and it is compared to the energy consumption and it explains 90% of the variation during normal times. All union territories and states have been affected differently, some suffered more damage than the others and in terms of electrical consumption some states doubled their consumption whereas some halved their consumption. This is due to the prevalence of COVID-19 infections, the share of manufacturing, and return migration [23].

The lockdown measures have caused a drop in the electricity demand in the countries affected by the pandemic resulting in a cut down of 25% energy demand per week in areas having full lockdown, -18% per week in areas having partial lockdown having a total impact of -6% energy demand worldwide. Lockdown has

also led to an increase in renewable energy by 10% and a decrease in nuclear energy by 28%, coal by 55%, gas by 35% including the cross-border exchanges in Germany, France, Italy, Spain when compared to the previous year [24]. Even before the COVID pandemic, India needed many necessary reforms on regulation, pricing, market design, and risk allocation. The load curves were affected at a large scale due to the shift in the behavioural pattern, such as work from home. The peak demand became lower by 25% due to the shutdown of many factories and industries and DISCOM (distribution companies) due to the pandemic lockdown across the country. This caused a major structural change in the Indian power system. If the planned reforms were implemented it would greatly improve the flexibility of the Indian electricity system [25]. The COVID pandemic has affected many countries and has made a major impact on every household all around the world. The lockdown that was mandatorily imposed upon the country's civilians to not leave their buildings has resulted in the rise of higher energy usage. This had led to a scarcity in energy supply. S.S.Qarnain et al., has identified all the factors that are responsible for the spike in energy consumption and tries to optimize the energy consumption. They used various approaches like a Multiple Criteria Decision Making (MCDM) methodologies based on Best Worst Method (BWM) and a Decision-Making Trial and Evaluation Laboratory (DEMATEL) methodology [26]. It is found that the banking sector has been affected deeply due to the COVID pandemic. It is also said that the electricity, supply, demand, and the power sector have contributed a significant amount to the CO<sub>2</sub> emissions during this pandemic lockdown. This paper analyses how the banking sector was affected during the pandemic and how has the power sector affected the banking sector [27].

During the pandemic, the commercial and industrial loads were shut down. As a result, the grid was also experiencing a sudden fall in the power demand. The sudden decrease in load demand had a major impact in the power sector in terms of reactive power management, voltage stability, reactive power management, and voltage security. The rise in electricity demand was also observed as the lockdown rules were gradually lifted. The COVID-19 pandemic had a significant impact on the Indian power system [28]. This paper discusses the mid to long-range impacts of the pandemic lockdown in the power sector. An extensive study was conducted and despite these studies, the pandemic has raised more questions regarding the future of the power system sector, like how the renewable energy sources will be integrated with the power systems and how the pandemic has affected this project. The main challenges faced by the power system sector during this pandemic have been addressed in this paper. Some of the problems are frequency deviation, electricity demand, and generation and load forecasting [29]. The impact of lockdown due to COVID on different aspects of environment widely in Indian background has been surveyed in this paper. Some future possible scenarios have also been analysed. The electricity demand decreased during the COVID lockdown. The rudiments like deforestation, adapting to renewable energy has been modified, although the investments regarding the setting up of renewable energy will be postponed for a short period of time [30].

Sustainability in energy is incorporated in order to get broader access in electricity, improvement in the efficiency of energy with low carbon renewables, and happen to get greater financing in cleaner technology. Wind, solar, hydropower, geothermal, ocean power and bio energy are the various types of renewable energy. Renewables are highly competitive with traditionally used energy sources. The share of renewable energy sources has risen drastically in the cooling, electricity, heating and transport sectors. Volatile and high energy rates and prices and the political geographic debate related to fossil fuels use will enhance the market accessibility and development for renewable energy by various governments. The whole world's interest towards sustainable development has increased and renewable energy consumption has also increased in recent times. The change from non-renewable to renewable energy is very much visible in China, Korea, Denmark, Bulgaria, Czech Republic, Greece, Netherlands, Portugal and Poland. In most of the countries, unemployment is reduced in the society which in turn affects the economy of the country positively. But it also had a negative impact in the these countries:- India (0.118), the United States (0.072), Israel (0.061), Ukraine (0.162) [31]. Manufacturing industry, which contributes almost 20% of the GDP, was adversely affected due to the outbreak of Coronavirus. The heinous effects of covid-19 on foreign direct investment (FDI) investments are foreseen to be peak in the energy, automotive, and airline industries. Due to the corona pandemic all around the world, the automobile, electronics, chemical and aircraft industries faced the scarcity of raw materials. After the lift of restrictions, the market is contemplated to be extremely cash-constricted and tight. This is because of the utmost qualms with respect to the need for the products of Ministry of Micro, Small and Medium Enterprises (MSME) or/and capability to provide the products to the market and resulting low or non-existing business income at the same time the expenses for energy, labour, rent and other business inputs will be facing the brunt [32].

The increased fossil fuel resources for power generation has led to greenhouse gas emissions and resulted in climate change. NAPCC (National Action Plan on Climate Change) works on climate change and its effects actively. Focus on solar, wind, and biogas energy production should be more in order to reduce our dependence on fossil fuel resources which will, in turn, decrease greenhouse gas emissions. The study by NAPCC has said that there is a considerable amount of contribution from the renewable energy side for power generation [33]. Due to the change in the lifestyle of people during the pandemic, there is a significant fluctuation in the energy consumption of both households and corporates. Due to the imbalance in the generation side and the consumer side, an idea for investing in oil developments has arisen. The cleaner generation always had an upper hand, but it increased very much since the demand got low. There is a focus on decreasing Carbon emission and decarbonized environment [34]. As the government imposed the lockdown there will be an adverse impact on all India electricity demand, where demand is expected to decline on a year-on-year basis during the lockdown period. Following the lockdown implemented by the Government of India, renewable power projects in solar segment are expected to face execution delays because of disruption in supply chain in India and labour availability [35]

### 3. RESEARCH METHODOLOGY

#### 3.1. OBJECTIVES

1. To find out the impact of COVID 19 on electricity consumption at residential sector.
2. To measure the influence of demographic profile on the electricity consumption.

#### 3.2. METHODOLOGY

The methodology incorporated for this study is descriptive research design. The primary data has been collected using a questionnaire and secondary data also used from various internet sources, journals and articles. The questionnaire prepared was aimed to identify characteristics, trends and frequencies. Due to pandemic situation the questionnaire was circulated using google forms collected data from two hundred and twelve (212) respondents all over India using convenience sampling. This ensures that the research carried out and the data obtained would be valid and reliable. Simple percentage data analysis was carried out using Microsoft Excel and MATLAB software was used to conduct regression and ANOVA data analysis. The results are presented and discussed.

### 4. DATA ANALYSIS AND INTERPRETATION

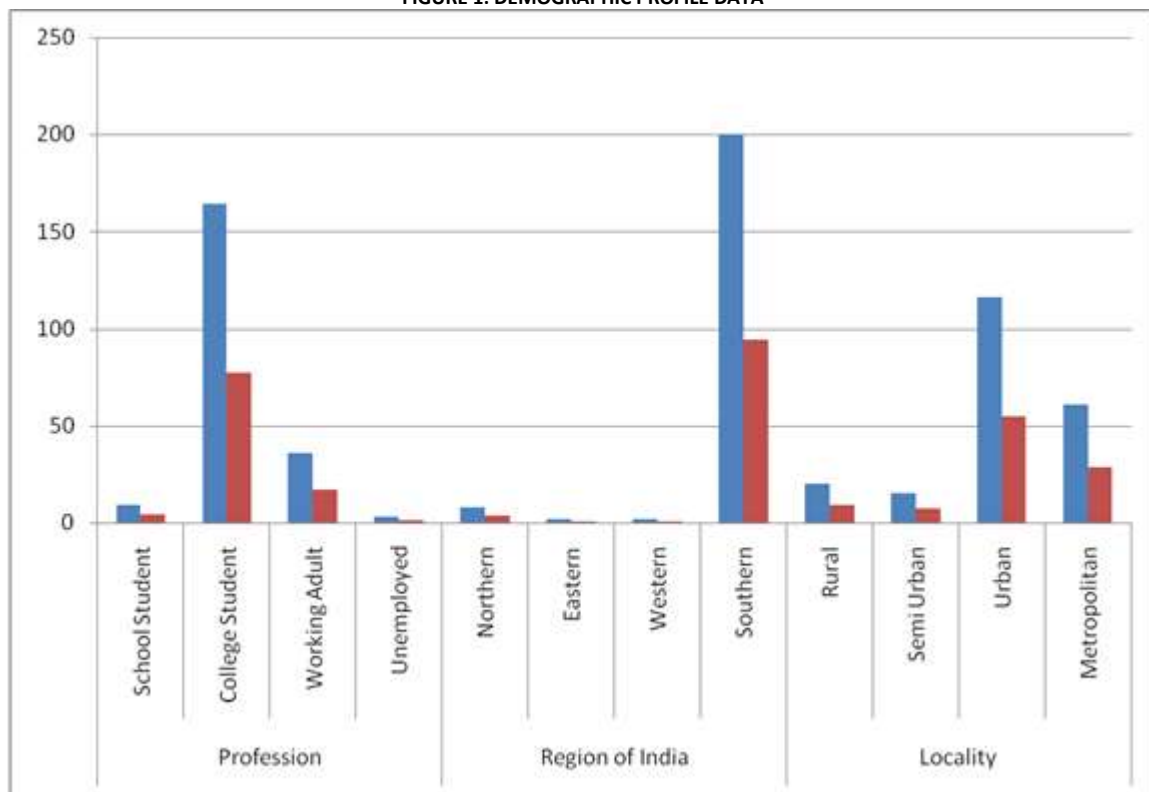
The data used in this study is collected using a pretested questionnaire from 212 respondents.

TABLE 1: DEMOGRAPHIC PROFILE

Particulars	Classification	No. of. Respondents	Percentage
Profession	School Student	9	4.2
	College Student	164	77.4
	Working Adult	36	17
	Unemployed	3	1.4
Region of India	Northern	8	3.8
	Eastern	2	0.9
	Western	2	0.9
	Southern	200	94.3
Locality	Rural	20	9.4
	Semi Urban	15	7.1
	Urban	116	54.7
	Metropolitan	61	28.8

Source: Primary data

FIGURE 1: DEMOGRAPHIC PROFILE DATA



Source: Primary data

**Inference**

From Table 1 and Figure 1, we can conclude that most of our respondents are college students (77.4%), majority of the respondents are from the southern sector of India (94.3%) and most of the respondents are also from urban (54.7%).

TABLE 2: PERCENTAGE ANALYSIS OF QUESTIONNAIRE

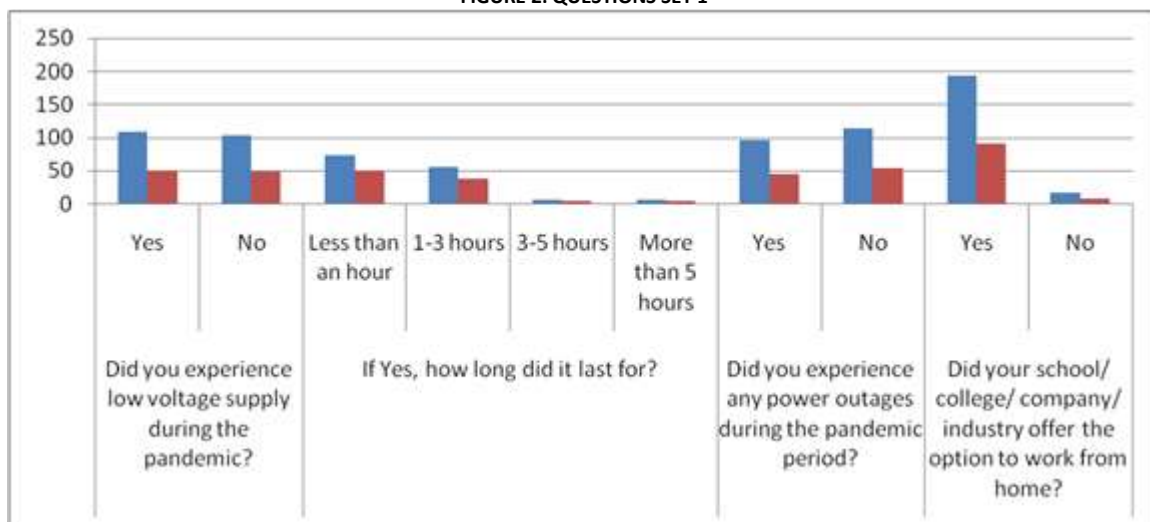
Particulars	Options	No. of. Respondents	Percentage
Did you experience low voltage supply during the pandemic?	Yes	109	<b>51.4</b>
	No	103	48.6
If Yes, how long did it last for?	Less than an hour	74	<b>51.4</b>
	1-3 hours	56	38.9
	3-5 hours	7	4.9
	More than 5 hours	7	4.9
Did you experience any power outages during the pandemic period?	Yes	97	45.8
	No	115	<b>54.2</b>
Did your school/ college/ company/ industry offer the option to work from home?	Yes	194	<b>91.5</b>
	No	18	8.5
If yes, what was your comfort level studying/working from home on a scale of 1 to 5?	1-least comfortable	32	15.8
	2	32	15.8
	3	71	<b>35.1</b>
	4	34	16.8
	5-most comfortable	33	16.3
If no, did your company/ industry face power outages which gave some technical issues?	Yes	58	<b>37.7</b>
	No	35	22.7
	Not sure	61	39.6
Did the power fluctuation affect the efficiency of your work in your respective fields?	1-least efficient	32	15.1
	2	27	12.7
	3	83	<b>39.2</b>
	4	37	17.5
	5-most efficient	33	15.6
How often do you charge your gadgets?	Once a day	54	25.5
	Twice a day	82	<b>38.7</b>
	More than twice	76	35.8
How many rooms does your home have?	2	46	21.7
	3	76	35.8
	More than 4	90	<b>42.5</b>
How many large essential appliances you have in your home?	Fridge	68	32.1
	Washing machine	56	26.4
	TV	70	33
	More than 3	168	<b>79.2</b>

How many units of power have you consumed per month before the pandemic?	Less than 400 units	47	<b>22.2</b>
	400 units	25	11.8
	500 units	37	17.5
	More than 500units	24	11.3
	Not sure	79	37.3
How many units of power have you consumed per month during the pandemic?	Less than 400 units	23	10.8
	400 units	25	11.8
	500 units	22	10.4
	More than 500units	54	<b>25.5</b>
	Not sure	88	41.5
Did you notice any difference in your electricity bill before and after COVID-19?	Yes	145	<b>68.4</b>
	No	29	13.7
	Not sure	38	17.9
If yes, was there a spike in your electricity consumption?	Yes	147	<b>80.3</b>
	No	36	19.7
During this traumatic pandemic experience, did you feel the need of self-sustaining power sources like solar power or hydroelectricity?	Yes	140	<b>66</b>
	No	30	14.2
	Not sure	42	19.8
Did you have any alternate power supply during the pandemic?	Yes	73	34.4
	No	139	<b>65.6</b>
If yes, how did you fuel that power supply?	Battery	69	<b>32.5</b>
	Diesel	13	6.1
	Solar power	17	8
	N/A	113	53.3
Were you able to receive subsidies given by the government in order to reduce the electricity bill?	Yes	31	14.6
	No	100	<b>47.2</b>
	Not sure	81	38.2
Do you think that there was an imbalance in the energy sector during the pandemic?	Yes	94	<b>44.3</b>
	No	31	14.6
	Not sure	87	41
Do you think that the power demand was met?	Yes	122	<b>61.9</b>
	No	75	38.1
What are the sectors that you think were the most affected by the imbalance in energy/power sector?	Agricultural	127	59.9
	Financial	69	32.5
	Industrial	130	<b>61.3</b>
	Residential	73	34.4

Source: Primary data

Table 2, depicts the percentage analysis of the questionnaire. It is explained below in the form of bar graphs.

FIGURE 2: QUESTIONS SET 1

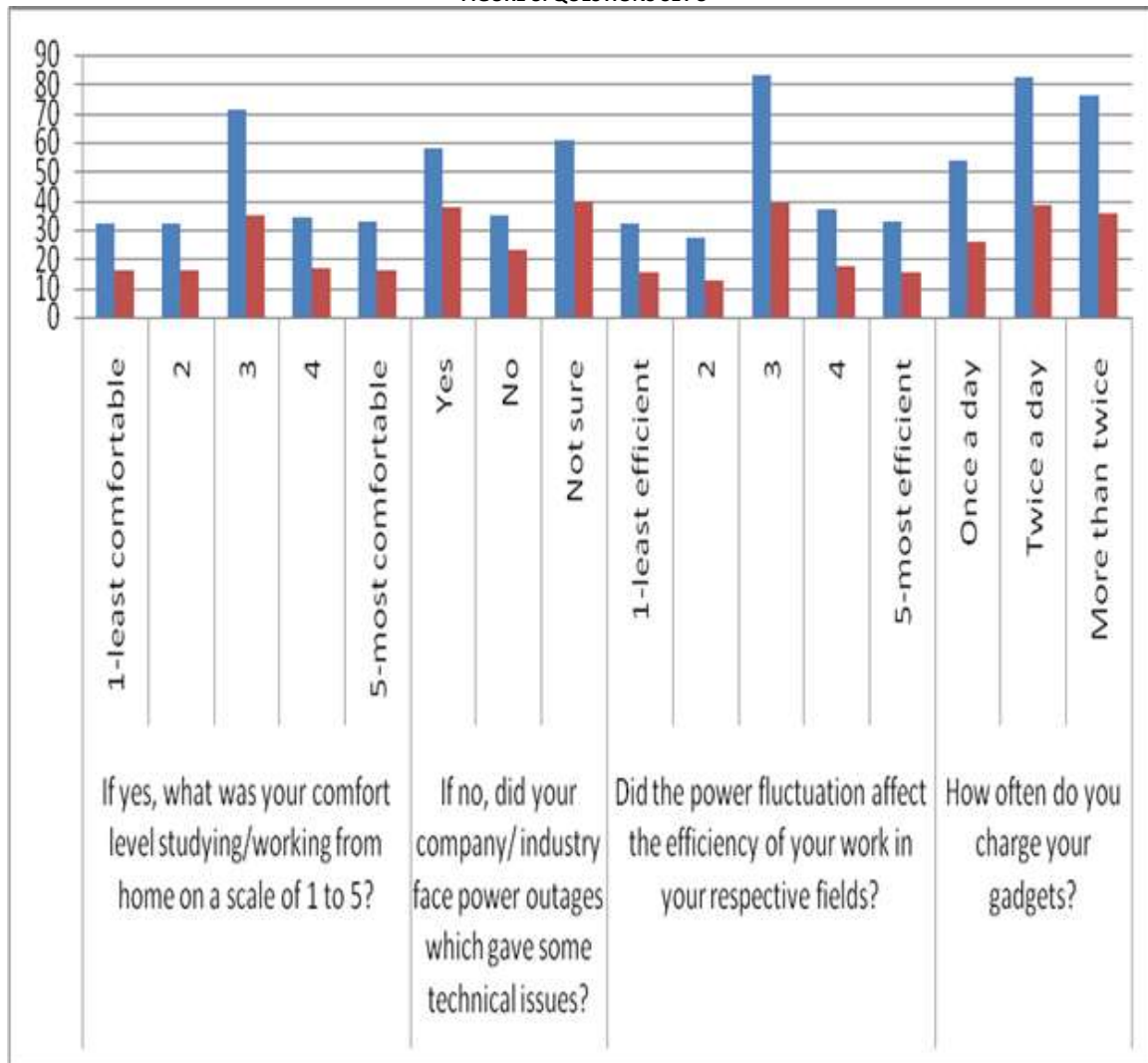


Source: Primary data

**Inference**

From the above chart, Figure 2 we can infer that 51.4% of the respondents have agreed that they have experienced a low voltage supply during the pandemic. 51.4% of the respondents have also answered that the low voltage supply lasted for only less than an hour. 54.2% of the respondents did not experience any power outages during the pandemic, indicating there was uninterrupted power supply for more than half of the respondents. 91.5% of the respondents were offered online mode of study or work from home option for safety purposes, this can indicate the increased consumption of electricity in the residential sector.

FIGURE 3: QUESTIONS SET 3

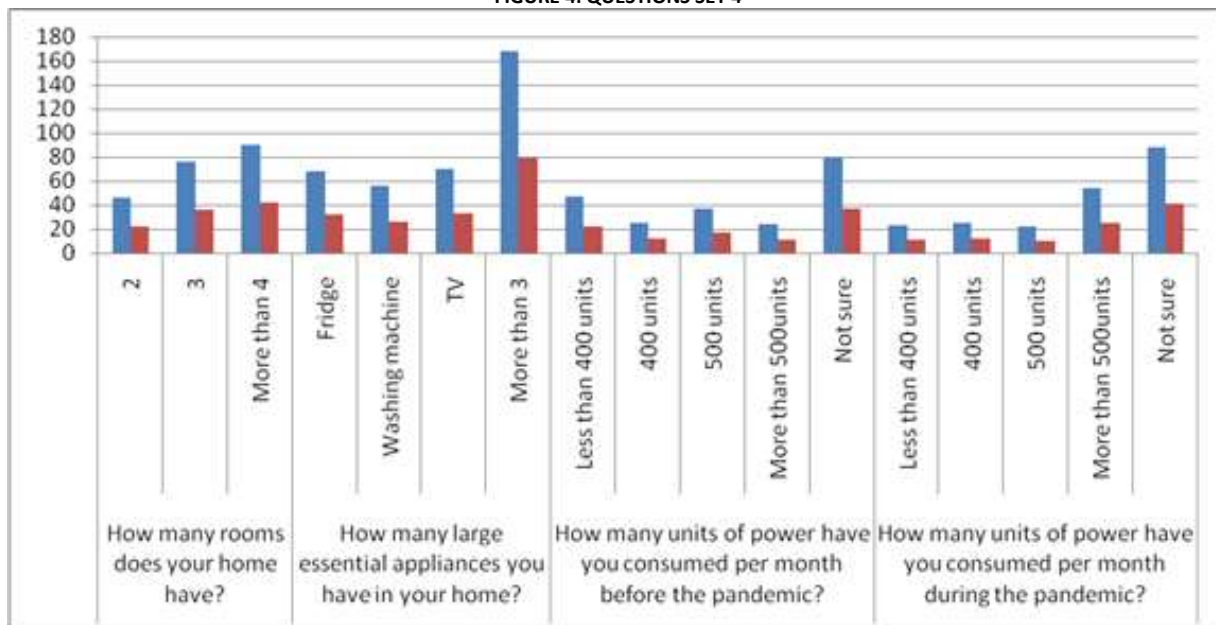


Source: Primary data

**Inference**

From the above, Figure 3 chart we can infer that 35.1% of the respondents have indicated that their comfort level during work from home or online classes was similar to their day to day life before the pandemic. 37.7% of the respondents stated that they faced technical issues due to power outages in their company. 39.2% of the respondents felt that the power fluctuation did not affect their efficiency in their respective workplaces. 38.7% of respondents have said that they charge their gadgets twice a day.

FIGURE 4: QUESTIONS SET 4

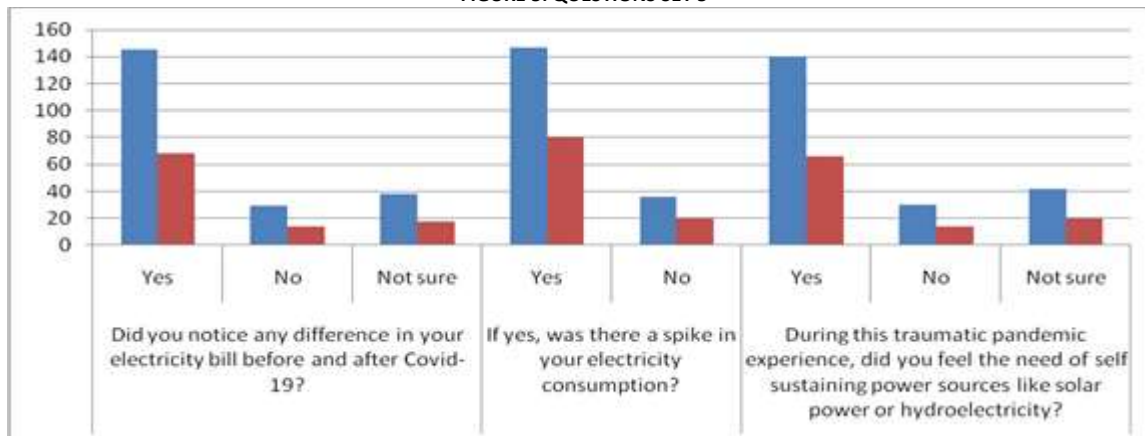


Source: Primary data

**Inference**

From the above chart, Figure 4 we can infer that 42.5% of the respondents have more than 4 rooms in their home. 79.2% of the respondents have more than 3 large essential appliances in their home. 22.2% of the respondents consumed less than 400 units of power before the pandemic lockdown. 25.5% of the respondents consumed more than 500 units of power during the pandemic lockdown.

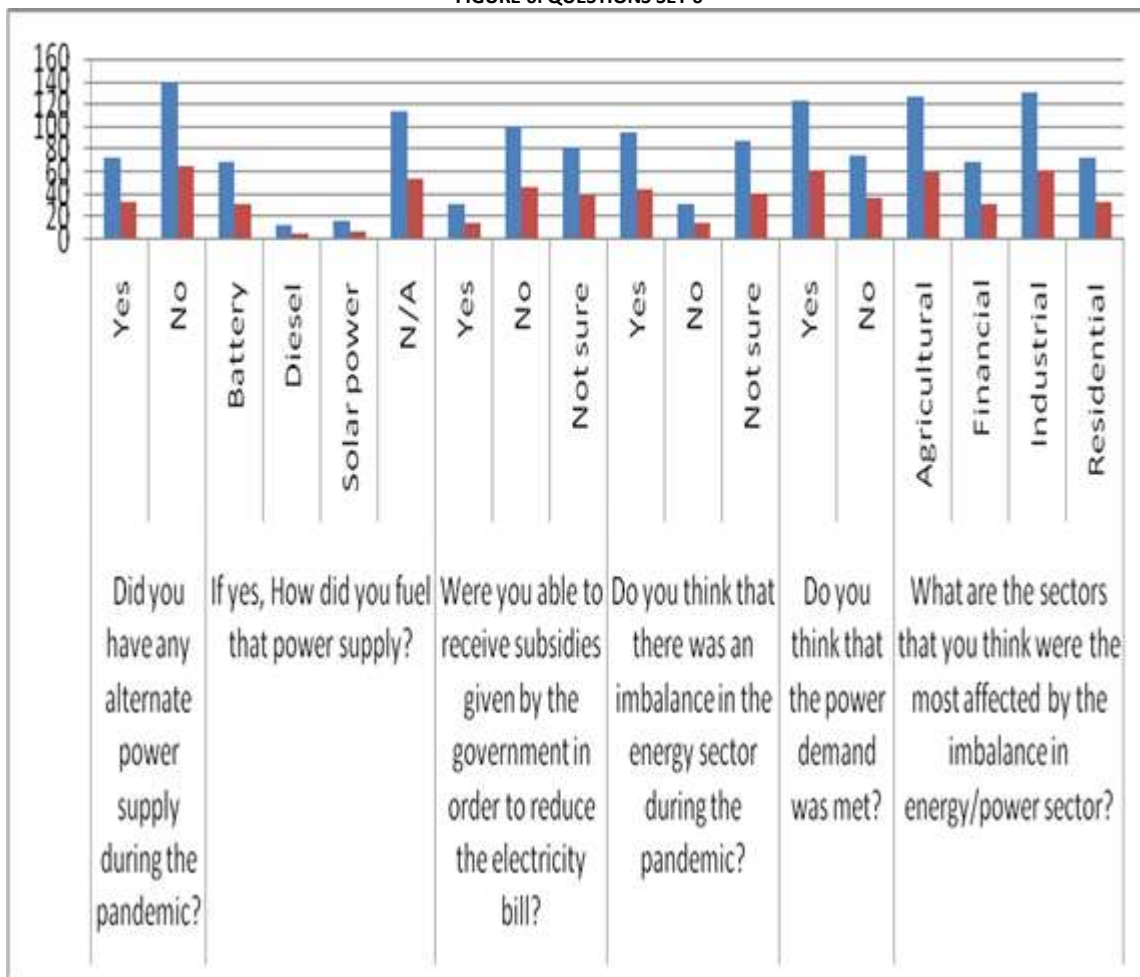
**FIGURE 5: QUESTIONS SET 5**



**Inference**

From the above chart, Figure 5 we can infer that 68.4% of the respondents noticed a difference in their electricity bill. 80.3% of the respondents have observed a spike in their electricity consumption. 66% of the respondents felt a need to have self-sustaining power sources during the pandemic lockdown.

**FIGURE 6: QUESTIONS SET 6**



Source: Primary data

**Inference**

From the above chart, Figure 6 we can infer that 65.6% of the respondents did not have any alternate power supply during the pandemic lockdown. 47.2% of the respondents said that they were not able to receive any subsidies from the government during the lockdown, this indicates that India suffered economically since the government had denied the subsidies due to safety measures. 44.3% of the respondents thought that there was an imbalance in the energy sector during the pandemic although 61.9% of the respondents thought the power demand was met. We can also infer that agricultural and industrial sector were the most affected sector in this pandemic.

5. RESULTS AND DISCUSSION

A linear regression fit model is incorporated using MATLAB software for the data obtained and the calculations and results are presented.

TABLE 3: ESTIMATED COEFFICIENTS

	Estimate	SE	tStat	pValue
Intercept	264.2	37.137	7.1141	1.8071e-11
Gadget	-0.090877	6.7339	-0.013495	0.98925
Rooms	-11.327	7.079	-1.6001	0.11111
Appliances	14.655	5.9063	2.4812	0.01389
Units before pandemic	0.50556	0.057851	8.739	8.0712e-16
Powernew = 440.3227 494.1158				

Source: Primary data

A linear regression model is implemented for these data values and the units of electric power consumed during the pandemic lockdown is predicted using four input parameters. Powernew is the predicted output. As seen in Table 3, we can see that the predicted output is within range (i.e, 200-600).

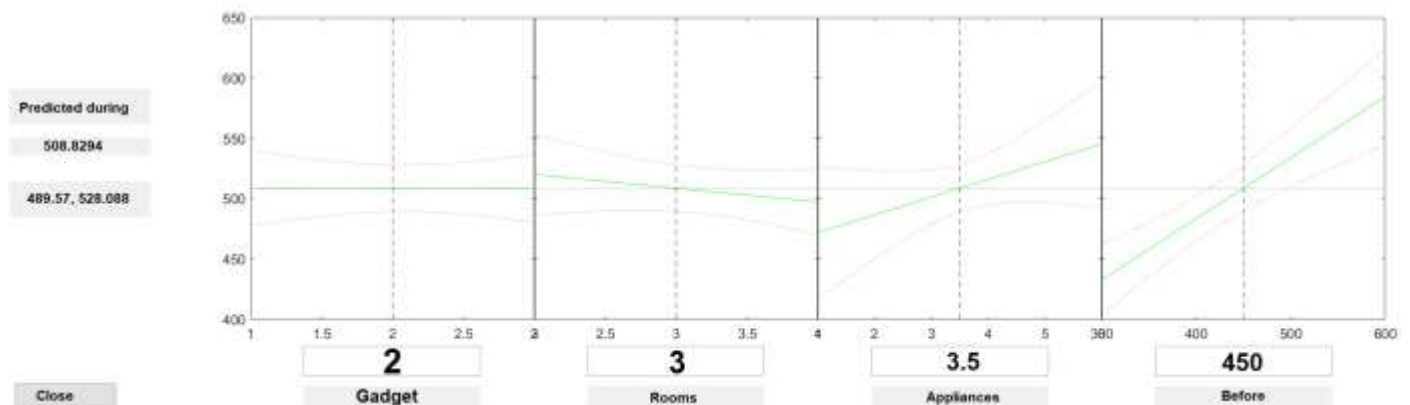
TABLE 4: ANOVA TABLE 1

	SumSq	DF	MeanSq	F	pValue
Gadget	1.0455	1	1.0455	0.00018213	0.98925
Rooms	14697	1	14697	2.5602	0.11111
Appliances	35341	1	35341	6.1564	0.01389
Units before pandemic	4.3841e+05	1	4.3841e+05	76.37	8.0712e-16
Error	1.1883e+06	207	5740.5		

Source: Primary data

ANOVA is implemented and the results are presented, as shown in Table 4.

FIGURE 7: PREDICTION SLICE GRAPH



Source: Primary data

The prediction slice graph is shown in Figure 7.

ANOVA

Ho: There is no significant difference between the location and electricity consumption.

H1: There is a significant difference between the location and electricity consumption.

TABLE 5: ANOVA TABLE 2

Location and Electricity Consumption	F	P value (Sig.)	Results
What was your comfort level studying/working from home on a scale of 1 to 5?	.131	.941	Not significant
Did the power fluctuation affect the efficiency of your work in your respective fields?	2.842	.040	Significant

Source: Primary data

Inference

From the table 5 it is inferred that the p value is more than table value at 5% level of significance in case of comfort level studying/working from home on a scale of 1 to 5. The null hypothesis is accepted. Therefore, it is inferred that there is no significant difference between location and comfort level. However, the p value is less than table value at 5% level of significance in case of power fluctuation affects the efficiency of your work in your respective fields. The null hypothesis is rejected. Hence there is significant difference between location and power fluctuation affect the efficiency of your work in your respective fields.

6. CONCLUSION

The study shows that there was an increase in electricity consumption in the residential sector and a decrease in electricity consumption in the industrial sector. This has caused a change in daily load curves and a fluctuation in the demand and supply curve resulting in the imbalance of the power sector. Although the demand for power was more, it was met by the power sector as they used various methodologies to restrict the losses and novel ideas were implemented to forecast the demand for power during the lockdown. Many renewable energy sources have come into play during this lockdown and it is also predicted by various researchers that renewable energy sources will be a great contributor in the future of power sector.

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