



**Dr. MGR-JANAKI COLLEGE  
OF ARTS & SCIENCE FOR WOMEN**



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# **DEPARTMENT OF MATHEMATICS**

## **PROJECT RECORD**

**ON**

### **PLUGGING INTO THE FUTURE: AN EXPLORATION OF ELECTRICITY CONSUMPTION PATTERNS - DATA ANALYTICS WITH TABLEAU**

**TAMILNADU SKILL DEVELOPMENT CORPORATION,  
GOVERNMENT OF TAMILNADU,  
NAAN MUDHALVAN PROGRAM**

**Submitted**

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**(III B.Sc MATHEMATICS)**

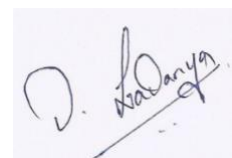
# CERTIFICATE

THIS IS TO CERTIFY THAT THE PROJECT IS **PLUGGING INTO THE FUTURE:  
AN EXPLORATION OF AN ELECTRICITY CONSUMPTION PATTERNS.**

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WOMEN, CHENNAI IN FULFILLMENT OF THE REQUIREMENTS FOR **TAMILNADU  
SKILL DEVELOPMENT CORPORATION, GOVERNMENT OF TAMILNADU,NAAN  
MUDHALVAN PROGRAM.** THIS PROJECT WAS AN AUTHENTIC WORK DONE BY  
HIM UNDER MY SUPERVISION AND GUIDANCE.



**PROJECT GUIDE**



**HOD**

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# **PLUGGING INTO THE FUTURE: AN EXPLORATION OF ELECTRICITY CONSUMPTION PATTERNS**

## **1. INTRODUCTION**

### **1.1 OVERVIEW**

India is the world's third-largest producer and third-largest consumer of electricity. The national electric grid in India has an installed capacity of 370.106 GW as of 31 March 2020. Renewable power plants, which also include large hydroelectric plants, constitute 35.86% of India's total installed capacity. During the 2018-19 fiscal year, the gross electricity generated by utilities in India was 1,372TWh and the total electricity generation (utilities and non-utilities) in the country was 1,547TWh. The gross electricity consumption in 2018-19 was 1,181 kWh per capita

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In 2015-16, electric energy consumption in agriculture was recorded as being the highest (17.89%) worldwide. The per capita electricity consumption is low compared to most other countries despite India having a low electricity tariff.

In light of the recent COVID-19 situation, when everyone has been under lockdown for the months of April & May the impacts of the lockdown on economic activities have been faced by every sector in a positive or a negative way.

With the electricity consumption being so crucial to the country, we came up with a plan to study the impact on energy consumption state and region wise.

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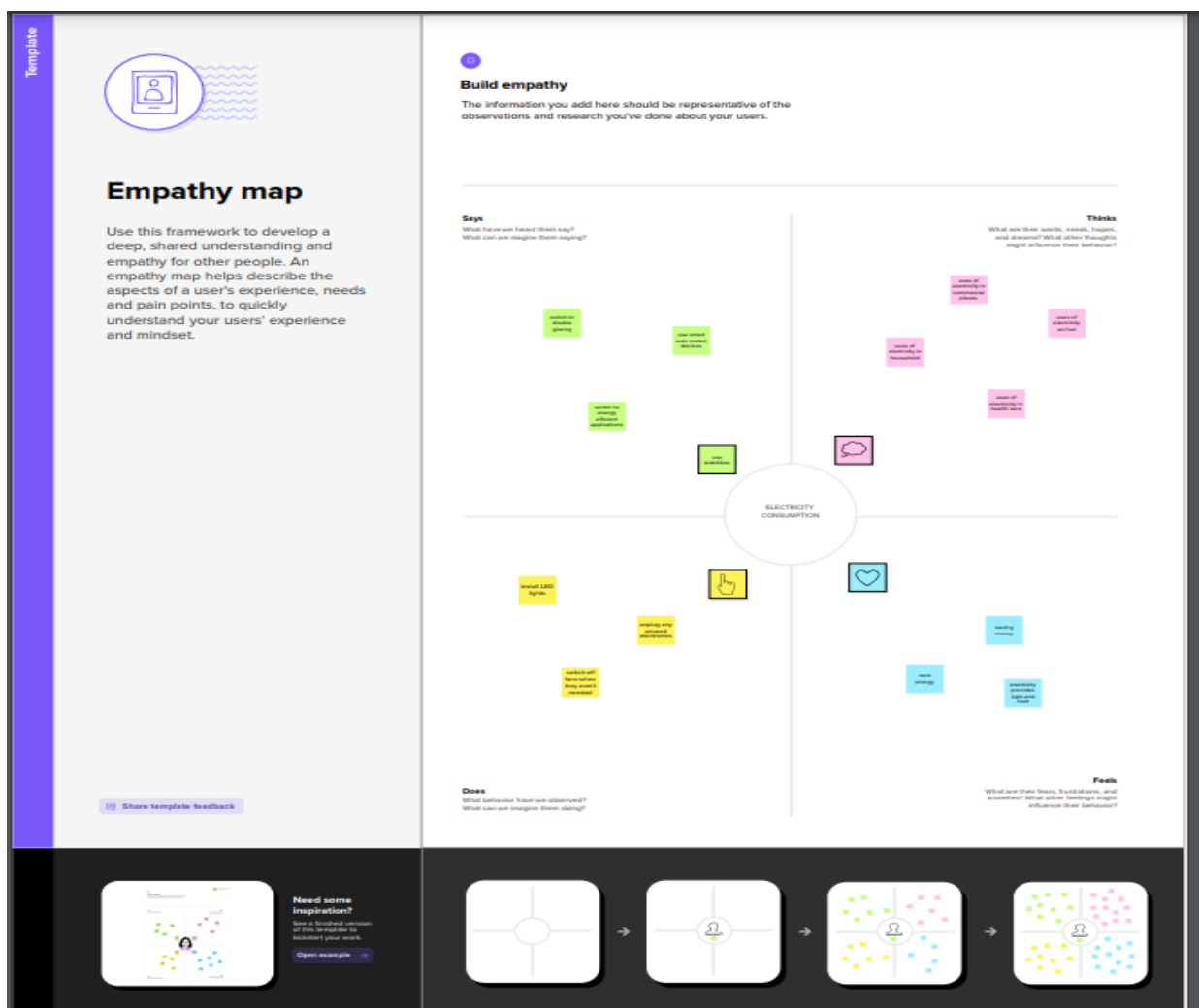
### **1.2 PURPOSE**

Annual electricity consumption per capita serves as an important measure of a country's electric power development. Generally speaking, electricity consumption grows faster when the industrialization process develops quickly and goes down rapidly when industrialization is completed or near completion. Electric energy consumption is the form of energy consumption that uses electrical energy. Electric energy consumption is the actual energy demand made on existing electricity supply for transportation, residential, industrial, commercial, and other miscellaneous purpose.

## 2. PROBLEM DEFINITION & DESIGN THINKING

### 2.1 EMPATHY MAP

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community. Assemble your team and have them bring any personas, data, or insights about the target of your empathy map. Print out or sketch the empathy map template on a large piece of paper or whiteboard. Hand each team member sticky notes and a marker. Each person should write down their thoughts on stickies. Ideally everyone would add at least one sticky to every section. You might ask questions, such as:



## 2.2 IDEATION & BRAINSTORMING MAP

Brainstorming is a method of generating ideas and sharing knowledge to solve a particular commercial or technical problem, in which participants are encouraged to think without interruption. Brainstorming is a group activity where each participant shares their ideas as soon as they come to mind. At the conclusion of the session, ideas are categorised and ranked for follow-on action. When planning a brainstorming session it is important to define clearly the topic to be addressed. A topic which is too specific can constrict thinking, while an ill-defined topic will not generate enough directly applicable ideas. The composition of the brainstorming group is important too. It should include people linked directly with the subject as well as those who can contribute novel and unexpected ideas. It can comprise staff from inside or outside the organisation.

2

**Brainstorm**  
 Write down any ideas that come to mind that address your problem statement.  
 10 minutes

**PROBLEM STATEMENT**  
 (Problem statement)  
 (Problem statement)  
 (Problem statement)

**IDEATION**  
 (Idea 1)  
 (Idea 2)  
 (Idea 3)

**MANAGEMENT**  
 (Management idea 1)  
 (Management idea 2)  
 (Management idea 3)

**TECHNICAL**  
 (Technical idea 1)  
 (Technical idea 2)  
 (Technical idea 3)

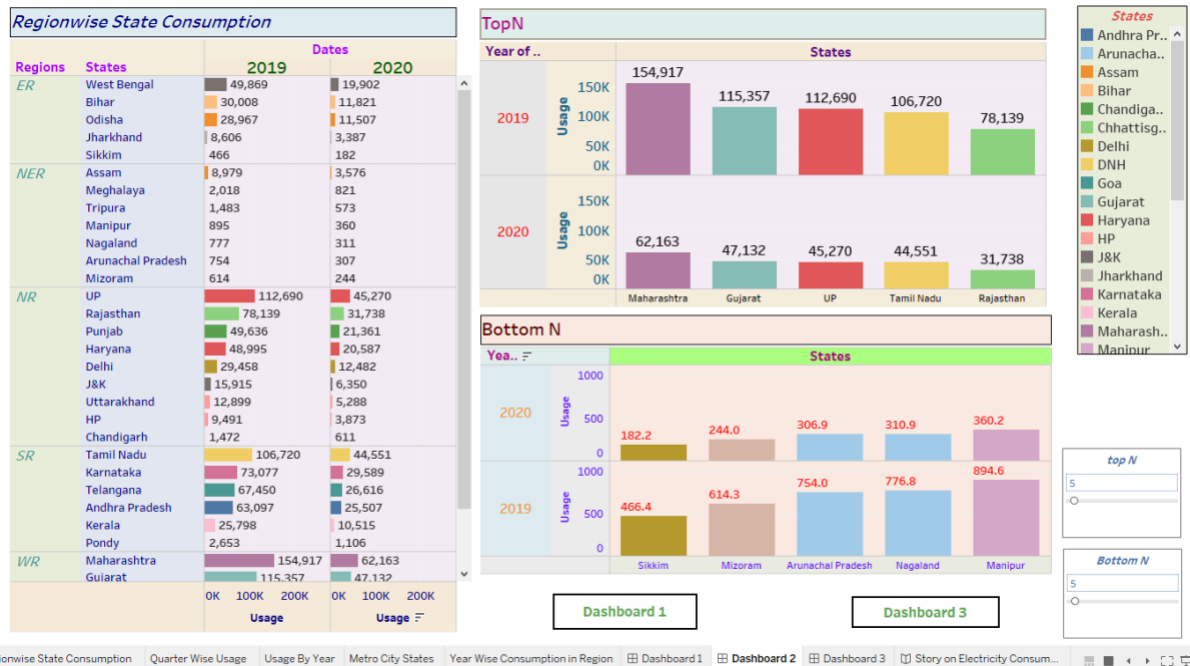
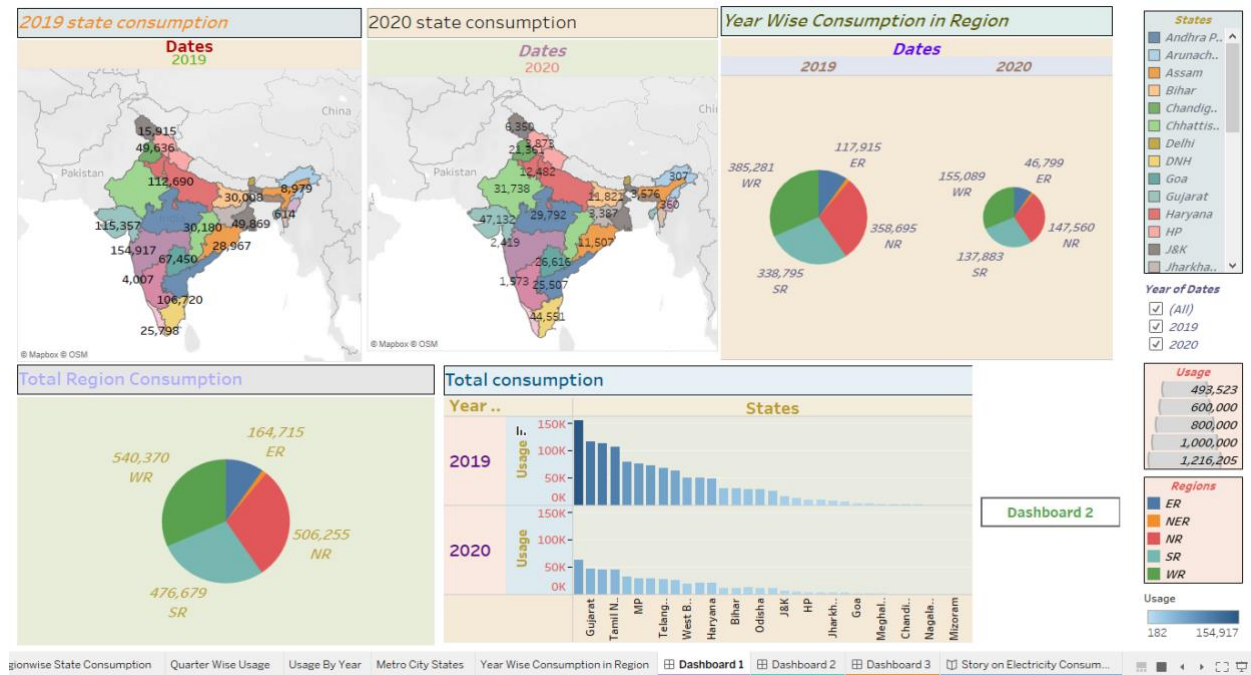
**Person 1**  
 (Person 1 idea 1)  
 (Person 1 idea 2)  
 (Person 1 idea 3)

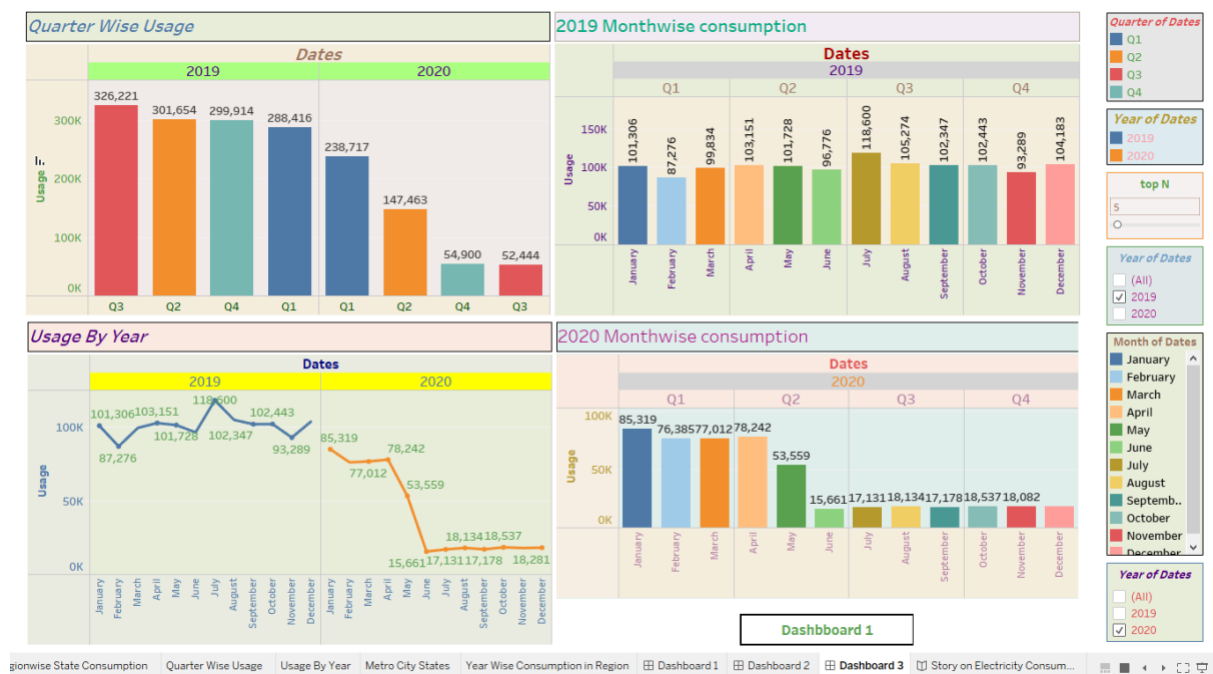
**Person 2**  
 (Person 2 idea 1)  
 (Person 2 idea 2)  
 (Person 2 idea 3)

**Person 3**  
 (Person 3 idea 1)  
 (Person 3 idea 2)  
 (Person 3 idea 3)

**Person 4**  
 (Person 4 idea 1)  
 (Person 4 idea 2)  
 (Person 4 idea 3)

### 3. RESULT







## **4. ADVANTAGES & DISADVANTAGES**

### **4.1. Electricity Consumption in India:**

In January 2002, power consumption stood at 111.80 billion units (BU), higher than the 109.76 BU in the same month of 2021, the data showed. Electricity consumption in January 2020 stood at 105.15 BU. The peak power demand met, which is the highest supply in a day, rose to 210.61 gigawatt (GW) in January 2023.

### **4.2. Advantages of Electric Power:**

Electric power has many advantages domestically and industrially, as most of the equipment run by electric power. Brightness in the night is only possible by the use of electricity. Almost all the factories and industries are running due to electric power. The advantage of electric power is its reliable and uninterrupted supply runs the equipment efficiently and continuously. The transportation of electricity is easy once the transmission lines are functional

### **4.3. Disadvantages of Electric Power:**

In the conventional system to generate electric power, coal is burnt to generate heat which boils the water to produce steam. The steam produced is used to run the turbines which in turn generate the electricity. This is a very old method to generate electricity which produces too much air pollution as a by-product. Due to the burning of coal, carbon monoxide, carbon dioxide, different oxides of sulphur and nitrogen are pumped into the atmosphere which pollutes it badly. As carbon dioxide is the greenhouse gas and its excessive presence in the atmosphere raises the earth's temperature.

## **5. APPLICATIONS**

- Electricity is a very powerful innovation of science. Electricity is widely used in all sectors like entertainment, engineering, healthcare, transport and communication, household, outdoors, office, commercial, space, and fuel.
- The use of electricity is very essential in the healthcare sector like the use of electricity in an operation theatre and for running medical devices and machines.
- Electricity is even required for the construction of buildings and structures like building houses, welding of materials, and installing windows and gates.
- Electricity is used in factories for running heavy machinery.
- Renewable energy includes wind, solar, biomass and geothermal energy sources. This means all energy sources that renew themselves within a short time or are permanently available. Energy from hydropower is only partly a renewable energy. This is certainly the case with river or tidal power plants. Otherwise, numerous dams or reservoirs also produce mixed forms, e.g: by pumping water into their reservoirs at night and recovering energy from them during the day when there is an increased demand for electricity. Since it is not possible to clearly determine the amount of generated energy, all energy from hydropower is displayed separately.
- In 2019, renewable energy accounted for around 32.9 percent of actual total consumption in India.

## 6. CONCLUSION

### Electricity Consumption States:

- Maharashtra is the Highest Electricity consumption user of India.
- Gujarat is the Second Highest Electricity consumption user of India.
- Sikkim is the Lowest Electricity Consumption user of India.

### Electricity Consumption before and during Lockdown in India:

- Electricity consumption was more in 2019 in month of March-June before Lockdown.
- Electricity Consumption was less in 2020 in month of March-June during the Lockdown.
- 

### Electricity Consumption in Quarters:

- Electricity Consumption in 2019 for Quarter 3 was Highest.
- Electricity Consumption in 2019 for Quarter 1 was Lowest.
- Electricity Consumption in 2020 for Quarter 3 was Lowest.
- Electricity Consumption in 2020 for Quarter 1 was Highest.

### Electricity Consumption in Regions

- Total Electricity consumption in Western Region is Highest.
- Total Electricity consumption in North Eastern Region is Lowest.
- Electricity Consumption in 2020 for Quarter 3 was Lowest.
- Electricity Consumption in 2020 for Quarter 1 was Highest

## **7. FUTURE SCOPE**

In the Stated Policies Scenario, global electricity demand grows at 2.1% per year to 2040, twice the rate of primary energy demand. This raises electricity's share in total final energy consumption from 19% in 2018 to 24% in 2040. Electricity demand growth is set to be particularly strong in developing economies. Government policies, market conditions and available technologies collectively set a course for electricity supply to shift towards low-carbon sources, with their share increasing from 36% today to 52% in 2040 in the Stated Policies Scenario.

In the Sustainable Development Scenario electricity plays an even larger role, reaching 31% of final energy consumption. In the Sustainable Development Scenario, electricity is one of the few energy sources that sees growing consumption in 2040 – mainly due to electric vehicles – alongside the direct use of renewables, and hydrogen. The share of electricity in final consumption, less than half that of oil today, overtakes oil by 2040. Accelerated efforts on renewables, nuclear power and carbon capture technologies rapidly decarbonise electricity supply, compensating for the sharp decline of coal-fired power generation and reducing power sector CO<sub>2</sub> emissions by three-quarters by 2040.

## **8. REFERENCE**

VIDEO LINK:

<https://drive.google.com/file/d/11QhKuGtP6aivZ9p-rPjWzA40QCmGlc0O/view?usp=drivesdk>