NANMUDHALVAN PROJECT REPORT

On

“An exploration of Electricity Consumption patterns”

Bachelor of Science

In

Physics

Submitted by

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INTRODUCTION

OVERVIEW:

Electricity consumption refers to the amount of electricity used by consumers, including households, businesses, and industrial facilities. It is a critical component of modern society, as electricity powers many of the devices and systems that we rely on daily, from lights and appliances in our homes to machinery and equipment in factories. Electricity consumption is typically measured in kilowatt-hours (kWh), which represents the amount of energy consumed by a device or system over time. The amount of electricity consumed by a particular consumer or facility depends on a variety of factors, including the number and type of appliances or machines in use, the length of time they are in use, and their energy efficiency.There are several factors that can influence overall electricity consumption patterns.

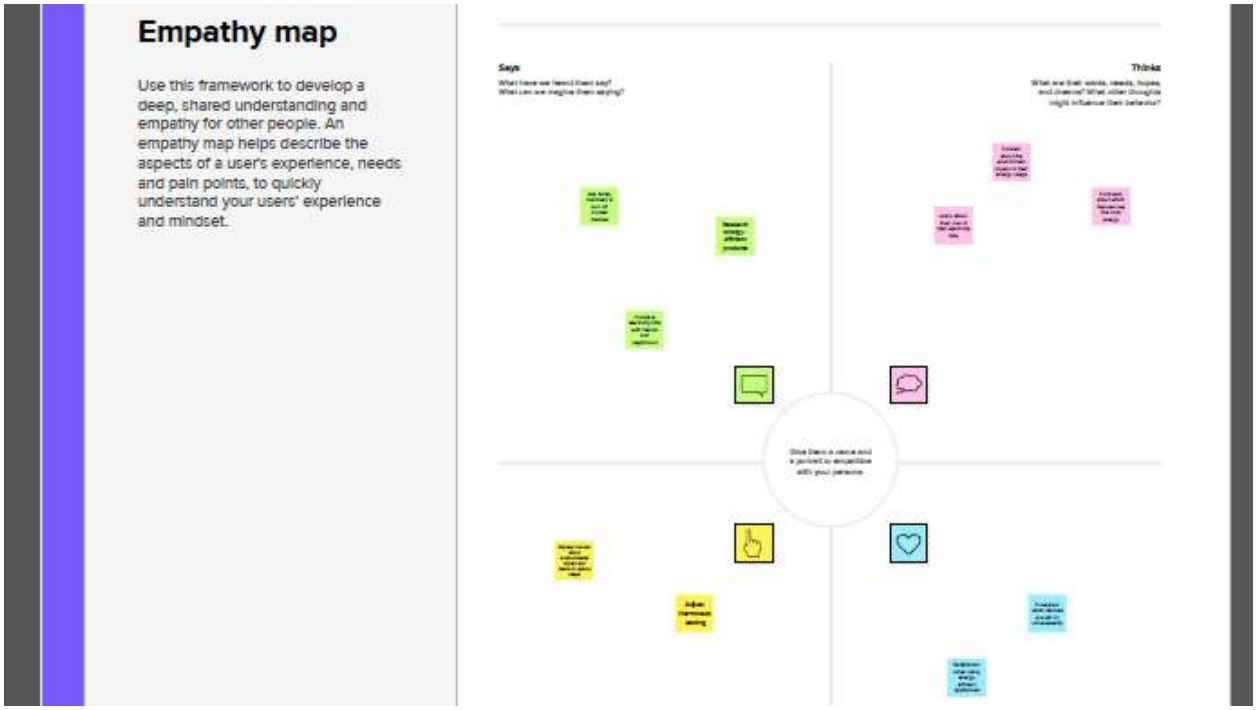
PURPOSE:

The purpose of studying electricity consumption patterns is multifaceted. One important goal is energy conservation, which involves identifying areas of high energy usage and finding ways to reduce consumption without sacrificing comfort or convenience. Understanding when and where electricity is consumed can also inform infrastructure planning, as utilities need to invest in additional capacity to

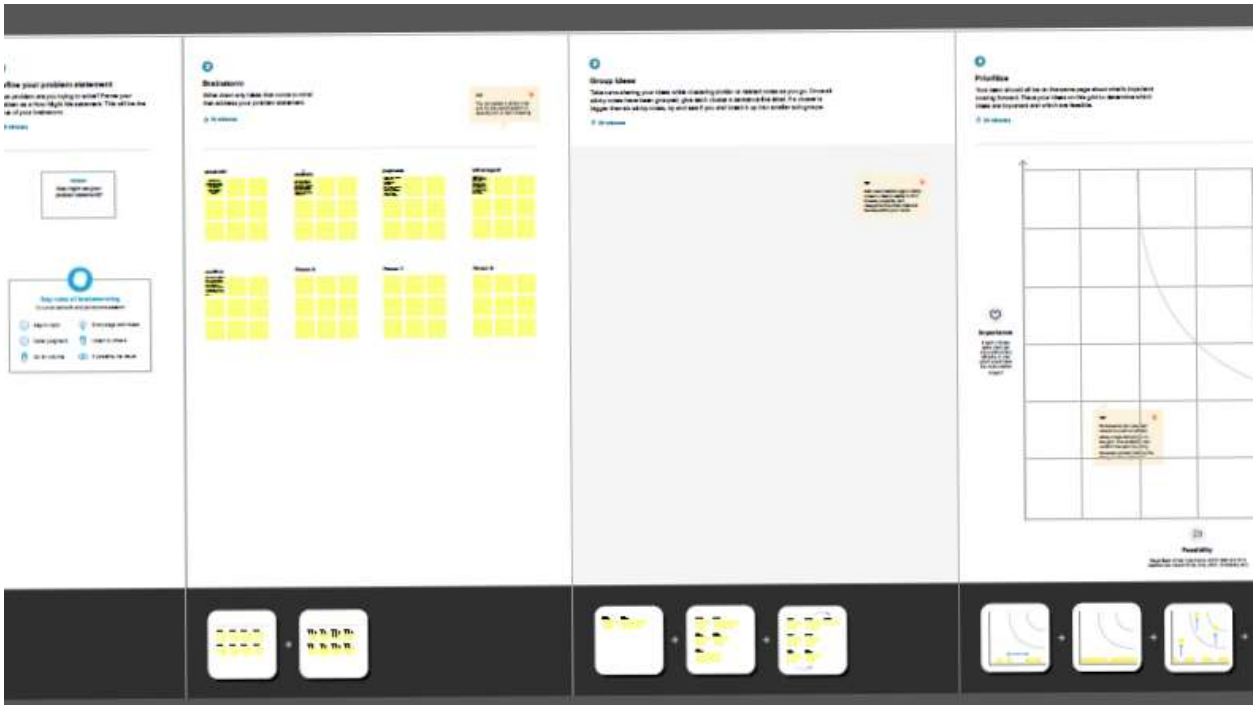
meet peak demand during certain times of the year. Consumption patterns can also inform billing and pricing strategies, with utilities incentivizing customers to reduce their energy usage during peak demand periods by charging higher rates. Load balancing is another important purpose of analyzing electricity consumption patterns, as utilities need to ensure a stable and reliable supply of electricity while avoiding blackouts and brownouts. Additionally, consumption patterns can help in integrating renewable energy sources into the grid, optimizing the use of solar and wind power. Finally, studying consumption patterns is crucial for the development of a smart grid, which relies on data and communication technologies to optimize electricity delivery and consumption. Overall, the purpose of electricity consumption patterns is to improve energy efficiency, reliability, and sustainability, benefiting both consumers and the environment.

2. Problem definition &Design thinking

2.1 Empathy map

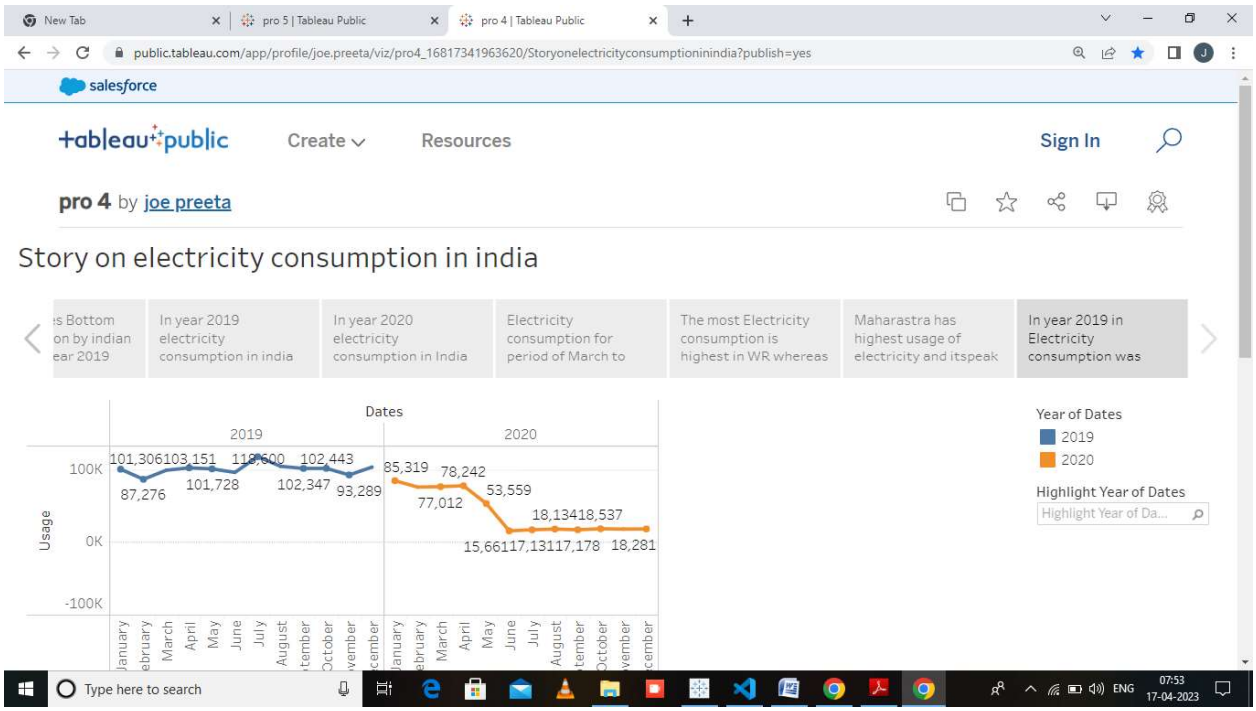


2.2 Ideation &Brainstorming map screenshots

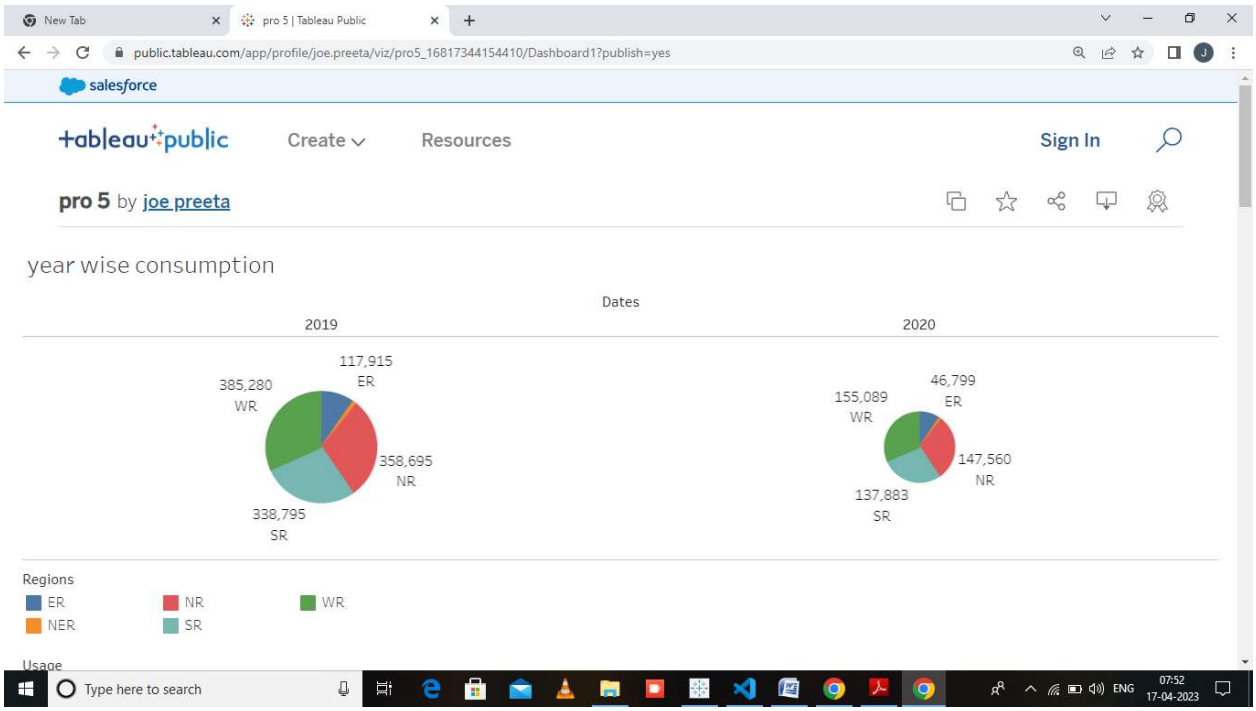


3. RESULT

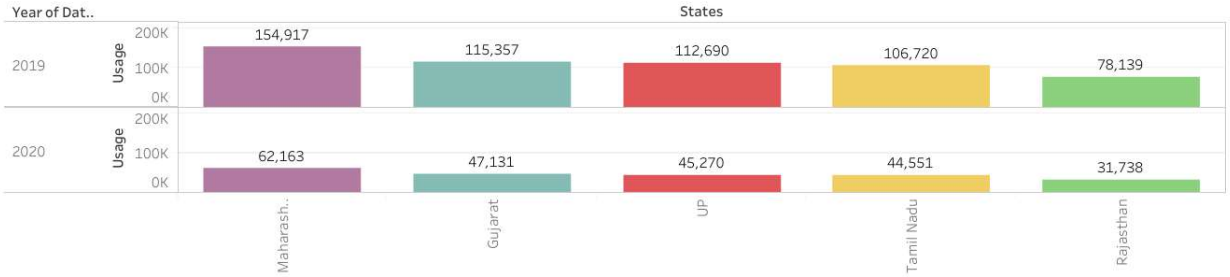
Story:



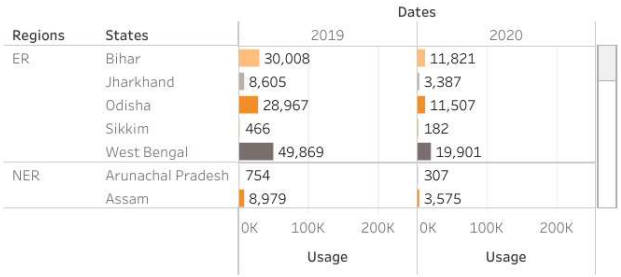
Dashboard:

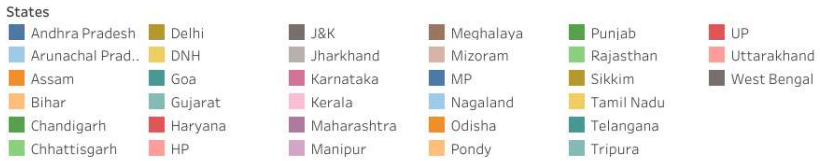

New Tab
pro 5 | Tableau Public
public.tableau.com/app/profile/joe.preeta/viz/pro5_16817344154410/Dashboard1?publish=yes
salesforce
+ableau public
Create
Resources
Sign In
pro 5 by joe preeta
year wise consumption
Dates
2019
2020
117,915
ER
385,280
WR
358,695
NR
338,795
SR
46,799
ER
155,089
WR
147,560
NR
137,883
SR
Regions
ER
NR
WR
NER
SR
Usage
Type here to search
ENG
07:52
17-04-2023

topN

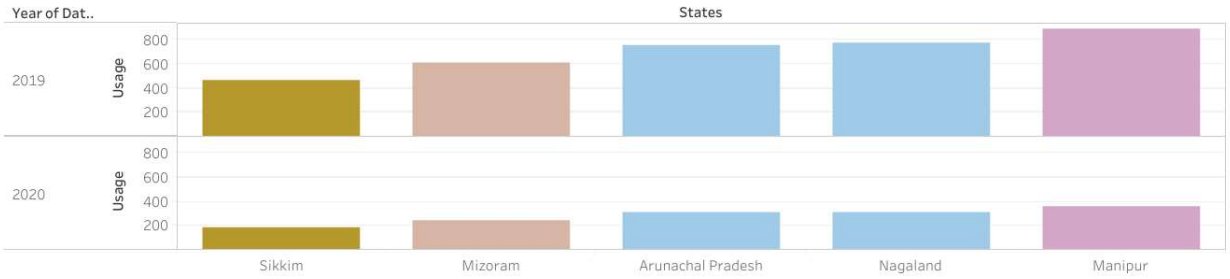


region wise state consumption





bottomN



topN

5

Dashboard 1

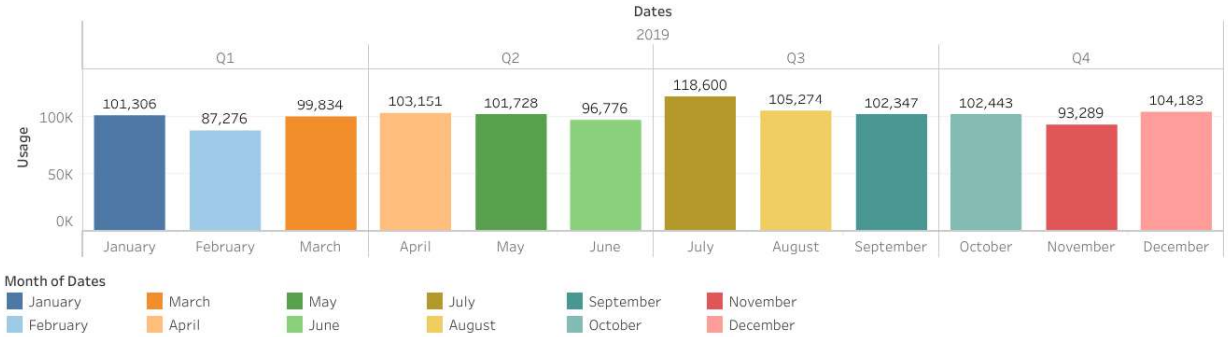
Dashboard3

bottom N

5

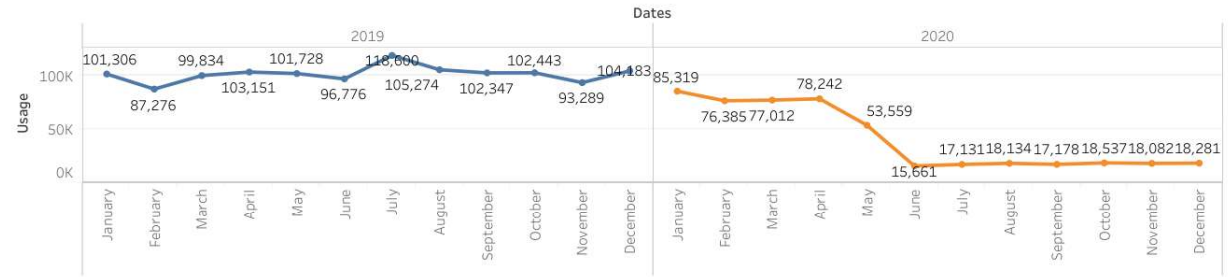
quarter wise usage

2019monthwise consumption

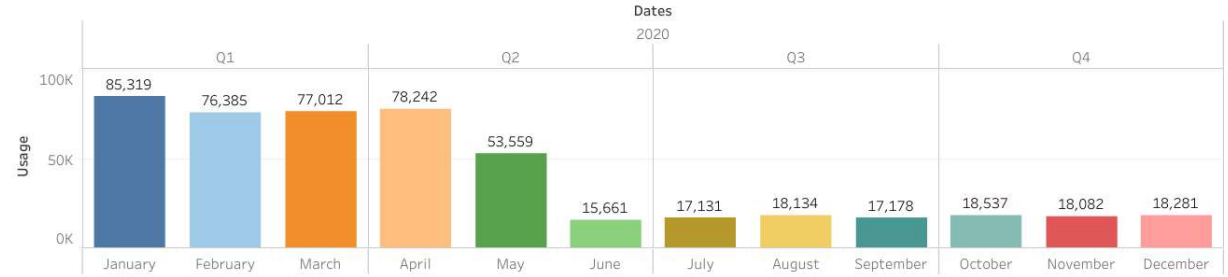


Highlight Year of Dates
No items highlighted

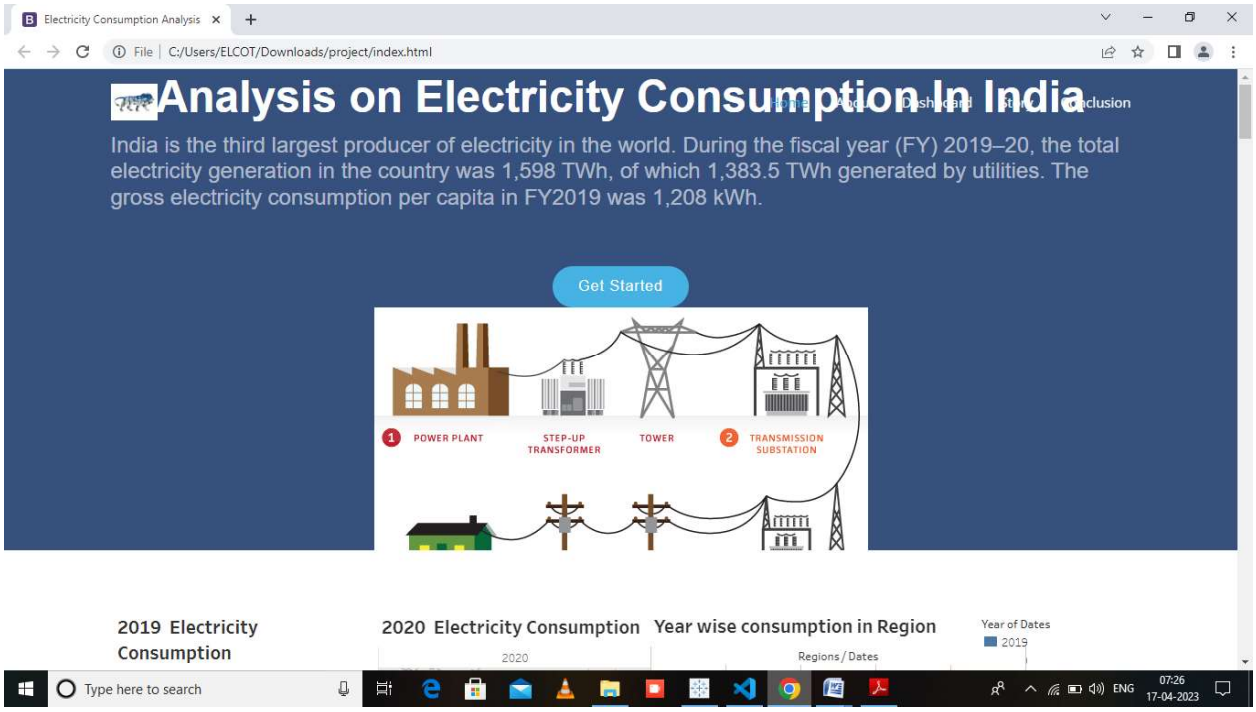
usage by year



2020 monthwise consumption



WEB PAGE:



ADVANTAGES:

Energy Efficiency: Studying electricity consumption patterns can help identify areas of high energy usage and find ways to reduce energy consumption without compromising on comfort or convenience. By reducing energy waste, we can conserve natural resources and reduce greenhouse gas emissions.

Infrastructure Planning: Understanding when and where electricity is consumed can help utility companies plan for future infrastructure needs. By investing in additional capacity in areas with high demand, utilities can ensure a

reliable supply of electricity and avoid blackouts and brownouts.

DISADVANTAGES:

Privacy Concerns: To analyze consumption patterns, utilities need access to data on customers' electricity usage, which can raise concerns about privacy and data security.

Cost: Analyzing electricity consumption patterns can require significant investments in data collection and analysis tools, which can be costly for utilities.

Inaccuracies: Consumption patterns can be influenced by a wide range of factors, including weather patterns, changes in customer behavior, and fluctuations in the economy. As a result, consumption patterns may not always accurately predict future energy needs.

APPLICATIONS:

1. With utilities incentivizing customers to reduce Smart Home Automation: Smart home automation systems can use electricity consumption patterns to optimize energy usage and reduce waste. For example, a system might automatically adjust thermostat settings based on when people are at home or turn off lights and appliances when they are not in use.

2. Renewable Energy Integration: Electricity consumption patterns can help utilities integrate renewable energy sources into the grid by optimizing the use of solar and wind power. By encouraging customers to use electricity during times when renewable energy sources are most abundant, utilities can reduce their reliance on fossil fuels and move towards a more sustainable energy system.
3. Billing and Pricing: Consumption patterns can inform billing and pricing strategies, their energy usage during peak demand periods by charging higher rates.

CONCLUSION:

Analyzing electricity consumption patterns is a crucial step in improving energy efficiency, reducing costs, and promoting sustainability. By understanding when and where electricity is consumed, individuals, organizations, and utilities can make more informed decisions about how to manage their energy usage. This can lead to a wide range of benefits, including lower energy bills, reduced greenhouse gas emissions, and a more reliable and sustainable energy system.

However, it's important to recognize that there are also potential drawbacks to analyzing electricity consumption patterns, including privacy concerns, cost, inaccuracies, customer resistance, and infrastructure limitations. Utilities must carefully balance the advantages and disadvantages of consumption

pattern analysis to ensure that they are making the most effective and efficient use of their resources.

Overall, by leveraging the insights provided by electricity consumption patterns, we can work towards a more sustainable and efficient energy system that benefits both consumers and the environment.

APPENDIX:

file:///C:/Users/ELCOT/Downloads/project/index.html