PLUGGING INTO THE FUTURE: AN EXPLORATION OF ELECTRCITY CONSUMPTION PATTERN

1. Introduction

Overview: Project Description

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 fiscal year (FY) 2019–20, the total electricity generation in the country was 1,598 TWh, of which 1,383.5 TWh generated by utilities. The gross electricity consumption per capita in FY2019 was 1,208 kWh. 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 March to June the impacts of the lockdown on economic activities have been faced by every sector in a positive or a negative way. The dataset is exhaustive in its demonstration of energy consumption state wise. Analyzing Electricity Consumption in India from January 2019 till 5th December 2020. This dataset contains a record of Electricity Consumption in each states of India; here we are going to analyze State wise, Region wise and overall Electricity Consumption in India.

Purpose of my Project:

Cost savings: one of the most significant benefits of reducing electricity consumption is cost savings. Businesses can save money on their electricity bills by adopting energy-efficient technologies, renewable energy sources, and implementing behavioral changes that reduce energy consumption.

Increased efficiency: By reducing energy consumption, businesses can increase their efficiency, which can lead to increased productivity and profitability. Energy-efficient technologies and processes can help business optimize their operations, reduce downtime, and improve their bottom line.

Environmental Benefits: Reducing electricity consumption can help businesses reduce their carbon footprint and contribute to a more sustainable future. This can help businesses meet their sustainability goals, comply with environmental regulations, and improve their reputation among customers and stakeholders.

Energy Security: By reducing their dependence on traditional energy sources, businesses can increase their energy security and reduce their exposure to price fluctuations and supply chain disruptions.

Improved Brand Image: By adopting sustainable practices and reducing their environmental impact, businesses can improve customer loyalty.

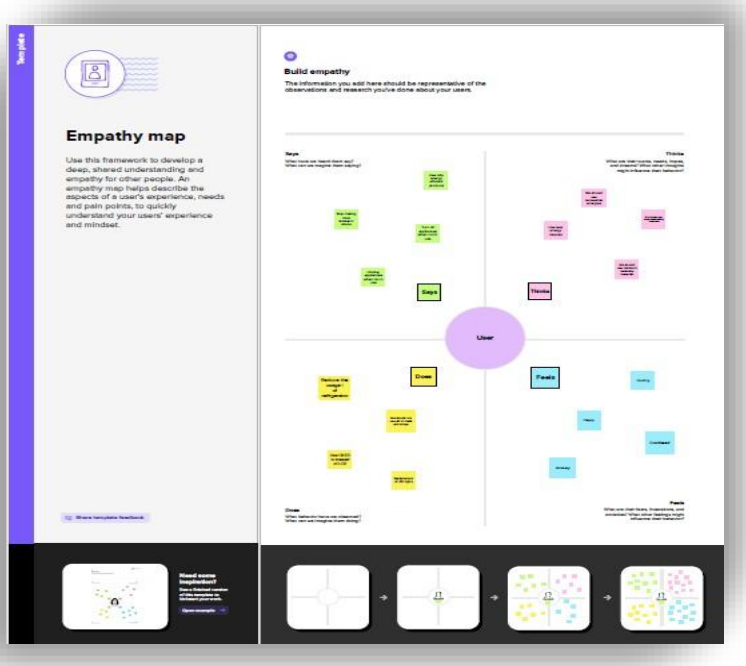
Overall reducing electricity consumption in the business sector can have significant benefits, including cost savings, increased efficiency, environmental benefits, energy security and improved brand image.

2. Problem Definition and Design Thinking

Empathy Map

An empathy map is a template that organizes a user's behaviors and feelings to create a sense of empathy between the user and your team. The empathy map represents a principal user and helps teams better understand their motivations, concerns, and user experience.

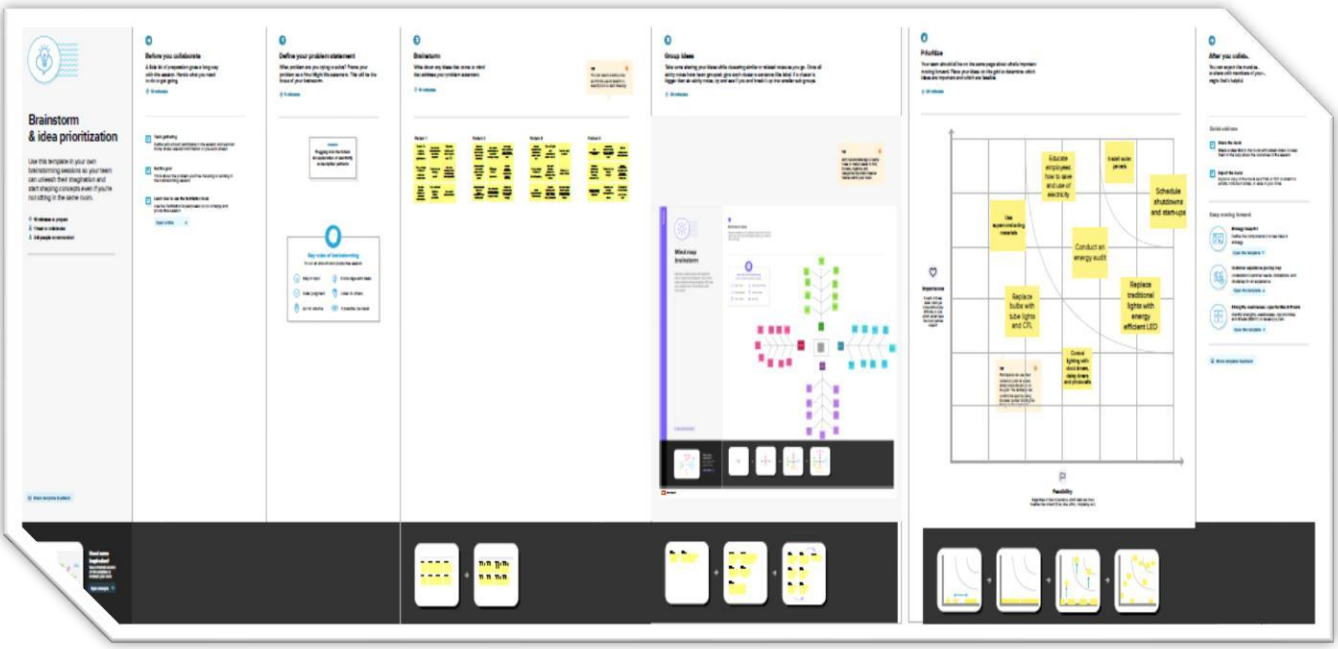
Empathy mapping is a simple yet effective workshop that can be conducted with a variety of different users in mind, anywhere from stakeholders, individual use cases, or entire teams of people. It can be conducted by many different teams such as design teams, sales, product development or customer service. Essentially, it is an exercise that seeks to get inside the head of the customer as they interact with your product/service.



Brainstorming:

Brainstorming is a group problem-solving method that involves the spontaneous contribution of creative ideas and solutions. This technique requires intensive, freewheeling discussion in which every member of the group is encouraged to think aloud and suggest as many ideas as possible based on their diverse knowledge.

Brainstorming combines an informal approach to problem-solving with lateral thinking, which is a method for developing new concepts to solve problems by looking at them in innovative ways. Some of these ideas can be built into original, creative solutions to a problem, while others can generate additional ideas.



3. Result: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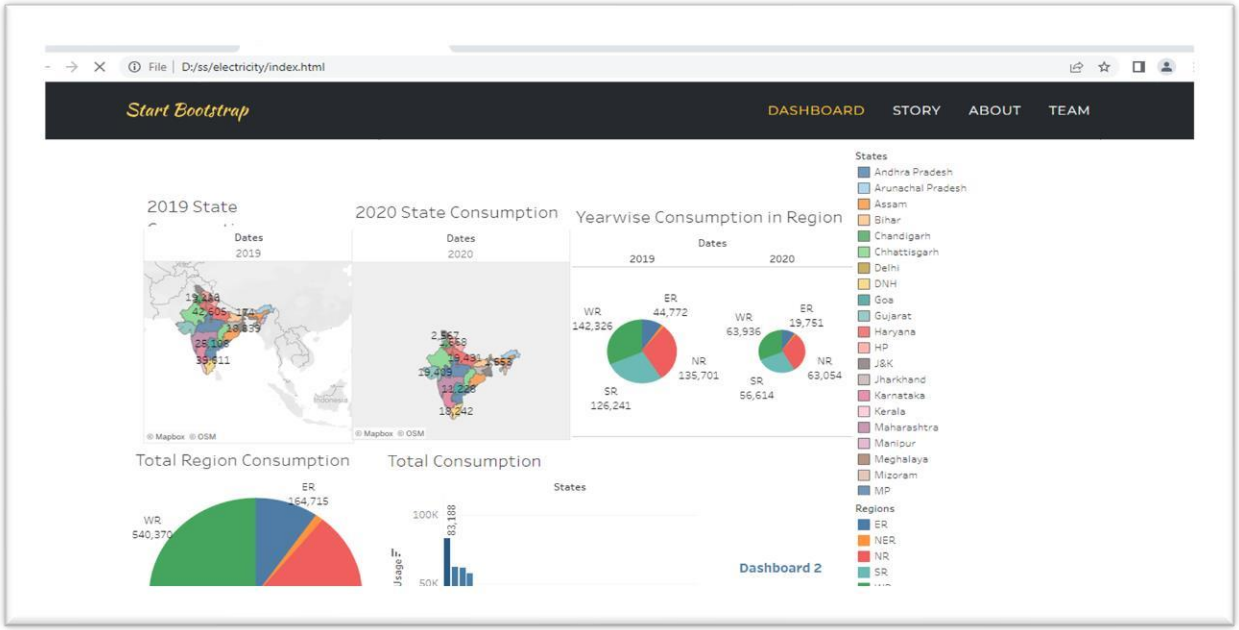
Start Bootstrap
DASHBOARD
STORY
ABOUT
TEAM
Welcome To NAAN MUDHALVAN Project!
ELECTRICITY CONSUMPTION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Start Bootstrap
DASHBOARD
STORY
ABOUT
TEAM
2019 State
2020 State Consumption
Yearwise Consumption in Region
Dates
2019
2020
WR
142,326
ER
44,772
NR
135,701
SR
126,241
WR
63,936
ER
19,751
NR
63,054
SR
56,614
States
Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chandigarh
Chhattisgarh
Delhi
DNH
Goa
Gujarat
Haryana
HP
J&K
Jharkhand
Karnataka
Kerala
Maharashtra
Manipur
Meghalaya
Mizoram
MP
Regions
ER
NER
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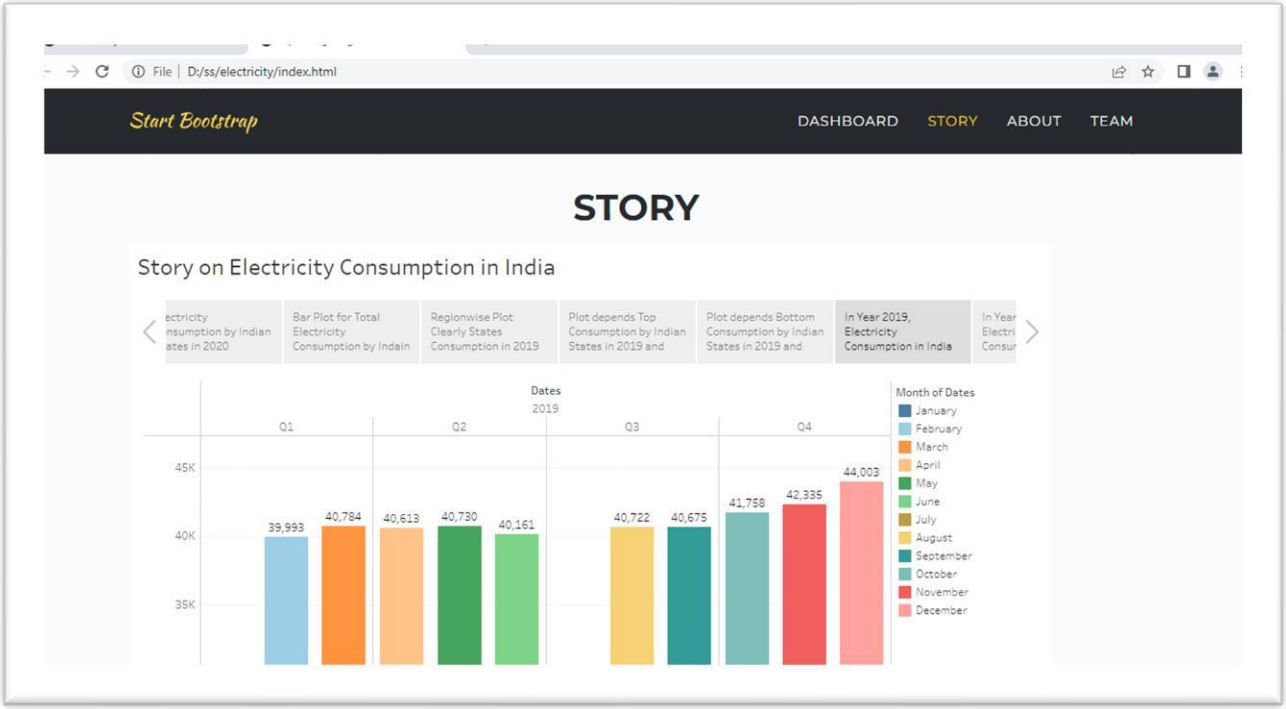
SR
Total Region Consumption
ER
164,715
WR
540,370
Total Consumption
States
100K
83,188
50K
Dashboard 2


File | D:/ss/electricity/index.html
Start Bootstrap
DASHBOARD
STORY
ABOUT
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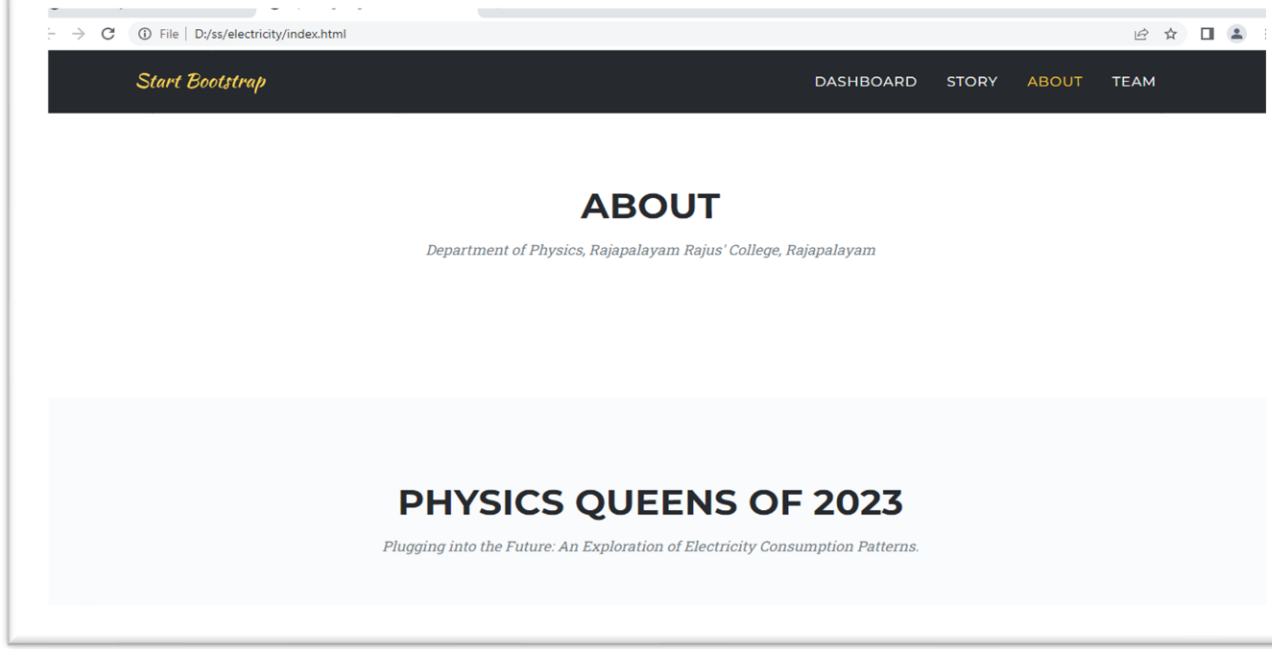
STORY
Story on Electricity Consumption in India
ectricity nsumption by Indian ates in 2020
Bar Plot for Total Electricity Consumption by Indain
Regionwise Plot Clearly States Consumption in 2019
Plot depends Top Consumption by Indian States in 2019 and
Plot depends Bottom Consumption by Indian States in 2019 and
In Year 2019, Electricity Consumption in India
Dates
2019
Q1
Q2
Q3
Q4
45K
40K
35K
39,993
40,784
40,613
40,730
40,161
40,722
40,675
41,758
42,335
44,003
Month of Dates
January
February
March
April
May
June
July
August
September
October
November
December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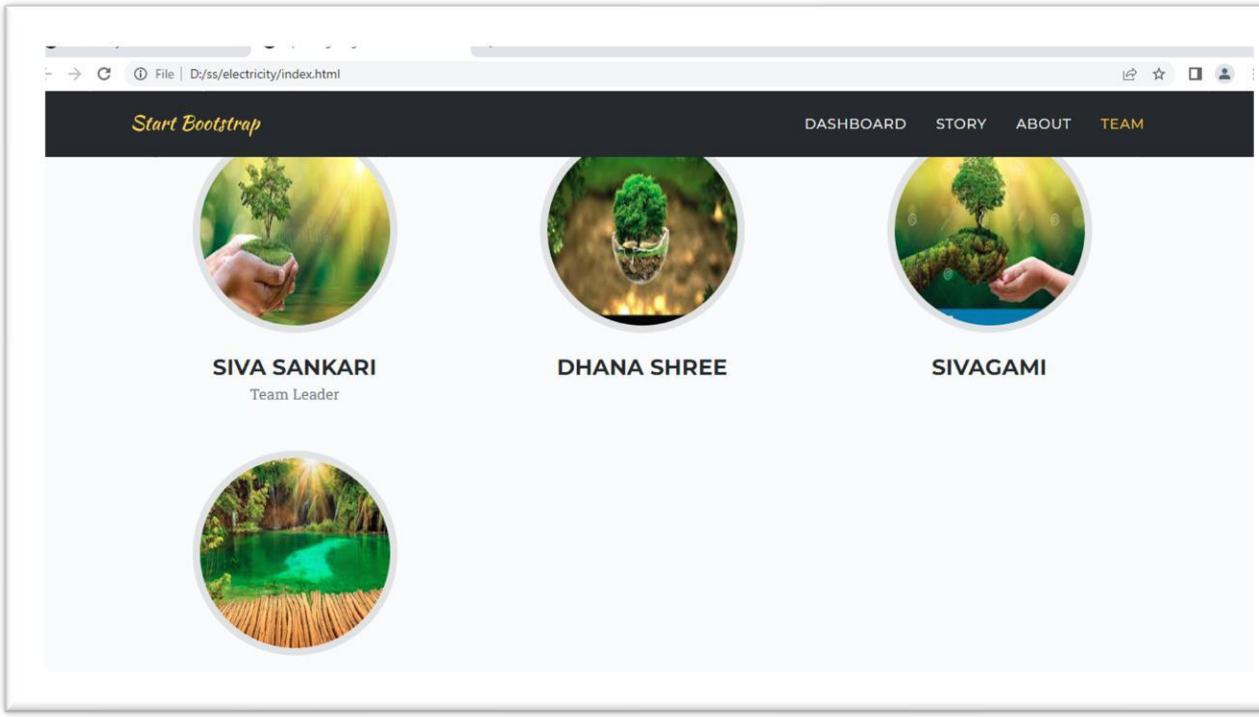
DASHBOARD
STORY
ABOUT
TEAM
ABOUT
Department of Physics, Rajapalayam Rajus' College, Rajapalayam
PHYSICS QUEENS OF 2023
Plugging into the Future: An Exploration of Electricity Consumption Patterns.


File | D:/ss/electricity/index.html
Start Bootstrap
DASHBOARD
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TEAM
SIVA SANKARI
Team Leader
DHANA SHREE
SIVAGAMI

4. a) Advantages:

Lower energy bills: When you use less electricity, you can reduce your energy bills, which can help you save money.

Improved energy security: When a country relies less on electricity, it can reduce its dependence on foreign sources of energy, which Can help improve energy security.

Reduced strain on the electrical grid: When People use less electricity, It can reduce the strain on the electrical grid, which can help prevent blackouts and brownouts.

Increased energy efficiency: By reducing electricity consumption, you can encourage the development and adoption of more energy efficient appliances and technologies, which can help save even more energy and reduce costs in the long run.

Improved quality of life: By reducing electricity consumption, you can help reduce the amount of energy that is wasted, which can help preserve natural resources and protect the planet for future generations.

b) Disadvantages:

Limitations on the use of certain appliances: If you are actively trying to reduce your electricity consumption, you may need to limit the use of certain appliances that consume a lot of energy, such as air conditioning units, electric heaters, or high-powered computers. This can be inconvenient, especially during the period of time extreme temperature.

Increased upfront costs: Releasing your electricity consumption may require you to invest in energy efficient appliances, light bulbs, or home insulation, which can be expensive upfront. Although these investments may ultimately save you money in the long run, they can be difficult to afford in the short term.

Reduced comfort levels: Depending on how much you reduce your electricity consumption, you may find that your comfort levels are affected. For example, you may need to turn down your air conditioning in the summer, which could make your home less comfortable on hot days.

5. Applications:

Cost savings: One of the most significant benefits of reduced electricity consumption is lower electricity bills. By using energy efficient appliances and adopting energy saving habits, individuals can save money on their monthly utility bills.

Environmental benefits: Reduced electricity consumption can also have a positive impact on the environment by reducing carbon emissions and decreasing the demand for fossil fuels. this can help mitigate energy climate change and improve air quality.

Improved energy security: By reducing the amount of electricity consumed, societies can decrease their reliance on imported energy sources and improve their energy security. This can help prevent energy storages and price spikes.

Better infrastructure: Reduce electricity consumption can help alleviate strain on the power grid, leading to fewer power outages and improved reliability of the energy infrastructure.

Increased productivity: Energy efficient technologies and practices can also improve productivity and economic competitiveness by reducing energy costs for businesses and allowing them to invest in other.

6. Conclusion:

The project is about reduce electricity consumption for future use. We have dataset about electricity consumption in India. We create an empathy map with our overview of this project and create a brainstorming with our idea with the help of Mural and upload with the help of GitHub. The dataset includes Indian States, States in Regions on Indian Map, Latitudes, Longitudes (Geographical coordinates of Indian States), Dates of usage and Power Consumption in Mega units by Indian Peoples. We studied the dataset. Then, we create a dashboard and story with the Tableau. And we publish that in Tableau public. Then, we create a webpage with the help of html code and visual studio. We concluded that we save electricity for future use.

7. Future Scope:

Adoption of energy efficient technologies: One of the most effective ways to reduce electricity consumption is by adopting energy efficient technologies such as LED lighting, smart thermostats and energy efficient appliances. In the future, we can expect the development of more energy efficient technologies that will help businesses reduce the air energy consumption further.

Renewable energy sources: More Businesses are likely to adopt renewable energy sources such as solar, wind and geothermal energy to reduce their dependence on the traditional energy sources. With the advancements in technology, the cost of installing renewable energy system is expected to decrease, making it more accessible for businesses.

Energy Audits: Regular energy audits can help businesses identify areas where they can reduce their energy consumption. In the future, we can expect the development of more advanced tools and techniques for energy audits, which can help businesses identify energy saving opportunities more accurately.

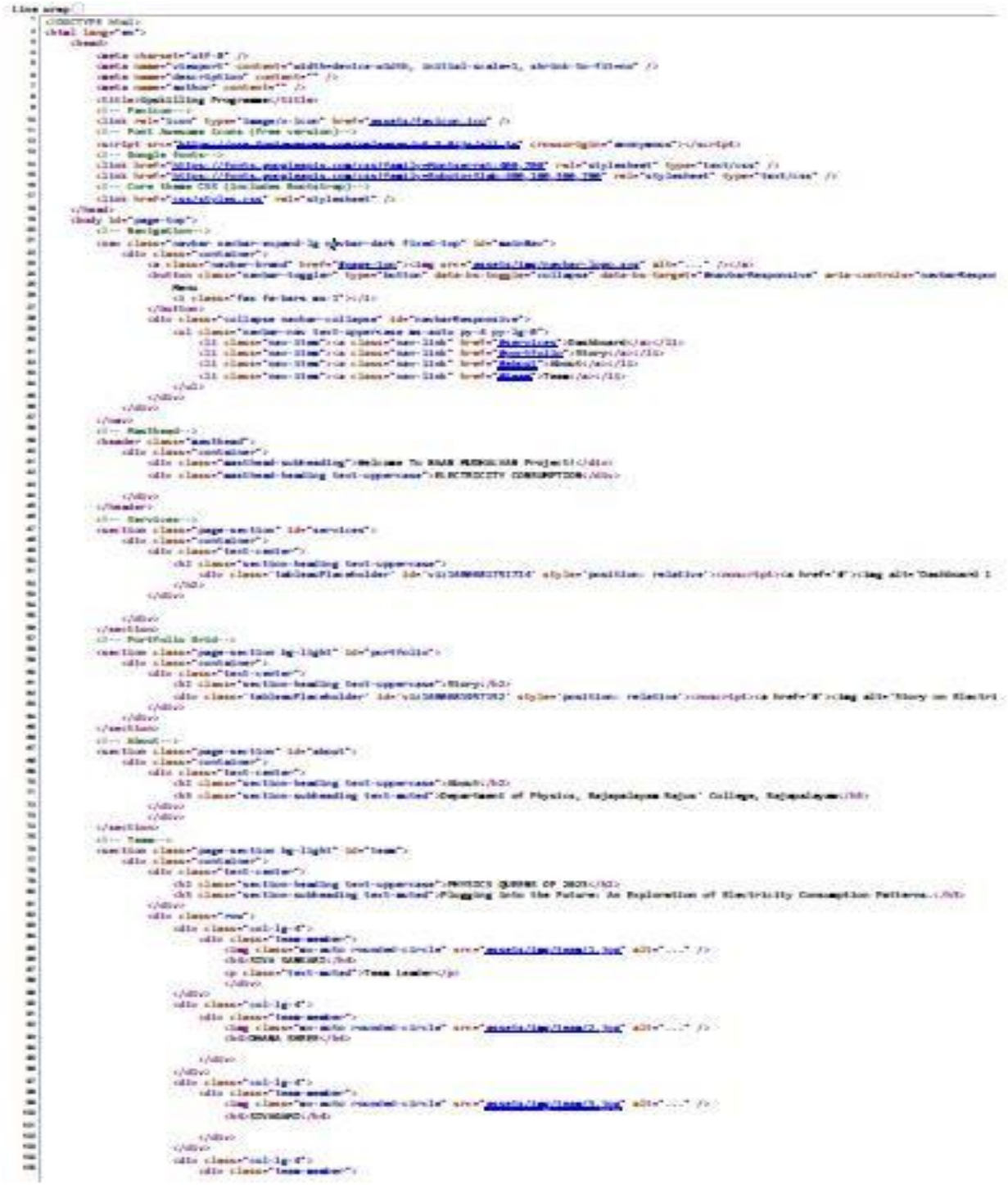
Demand response programs: Demand Response programs allow businesses to adjust their energy consumption during peak hours, reducing strain on the grid and saving money on electricity bills. In the future, we can expect the development of more sophisticated demand response programs that can provide businesses with more flexibility in managing their energy consumption.

Behavioral changes: Encouraging behavioral changes such as turning off lights and equipment when not in use can have a significant impact on reducing electricity consumption. In the future, businesses can use more advanced monitoring and feedback system to encourage employees to adopt more energy efficient behaviors.

Overall, the future looks promising for reducing electricity consumption in the business sector, with advancements in technology and increasing awareness of sustainability goals.

8. Appendix:

Source code:



Webpage Folder link:

https://drive.google.com/drive/folders/1fafPQTMyo6NAvA2w1WZddyfvIux92Vn?usp=share_link

Tableau Public Link:

Dashboard link:

https://public.tableau.com/views/ElectricityConsumption1/Dashboard1?:language=en-US&:display_count=n&:origin=viz_share_link

Story link:

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