“Analysis of Commercial Electricity Consumption in an Indian State”

“ST.JOHN’S COLLEGE PALAYAMKOTTAI”

NM ID	NAME
0366FCC383DF246B23749047AD136401	AFRAFATHIMA S

T.UMAMAGESHWARI	Trainer Name
T.UMAMAGESHWARI	Master Trainer

ABSTRACT

"This study conducts a comprehensive analysis of commercial electricity consumption in an Indian state. Utilizing data spanning several years, various factors influencing commercial electricity usage are examined, including economic indicators, sector-specific trends, and policy impacts. Through statistical methods and econometric modeling, the study aims to provide insights into consumption patterns, contributing to informed energy planning and policy formulation for sustainable development."

INDEX

CHAPTER 1

INTRODUCTION

- **Problem Statement**

In today's competitive banking landscape, understanding customer behavior and preferences is crucial for customer retention and revenue generation. However, banks often face challenges in analyzing customer data due to the sheer volume and velocity of data generated. Traditional data analysis methods are time-consuming and often fail to provide real-time insights. This lack of real-time analysis can lead to missed opportunities for customer engagement, cross-selling, and up-selling, impacting the bank's revenue generation and customer satisfaction. Furthermore, the complexity and diversity of customer data, which includes transaction history, customer feedback, and demographic data, pose additional challenges for data analysis.

- **Proposed Solution**

The proposed solution is to develop a Power BI dashboard that can analyze and visualize real-time customer data. The dashboard will integrate data from various sources such as transaction history, customer feedback, and demographic data. It will provide a comprehensive view of customer behavior, preferences, and trends, enabling banks to make informed decisions. The dashboard will be interactive, user-friendly, and customizable, allowing banks to tailor it to their specific needs. The real-time analysis capability of the dashboard will enable banks to respond promptly to changes in customer behavior or preferences, identify opportunities for cross-selling and up-selling, and tailor their products and services to meet customer needs.

- **Feature**

- 1. Longitudinal Analysis: Continuously monitoring and analyzing electricity consumption trends over time to identify evolving patterns and factors influencing commercial energy usage.

- 2. Expansion: Scaling up the analysis to encompass multiple states or regions within India to provide a broader understanding of commercial electricity consumption dynamics across the country.

- **Advantages**

- 1. Informed Decision-Making: Providing policymakers, utility providers, and businesses with data-driven insights to make informed decisions regarding energy planning, infrastructure investment, and policy formulation.

- 2. Resource Optimization: Identifying opportunities for optimizing commercial electricity usage, reducing wastage, and promoting energy efficiency measures to lower operational costs and enhance sustainability..

- **Scope**

1. Data Collection: Gathering historical electricity consumption data from commercial sectors within the chosen Indian state.

2. Data Analysis: Employing statistical techniques to analyze trends, patterns, and factors influencing commercial electricity consumption.

3.Sectrolal Analysis: Examining consumption patterns across different commercial sectors such as retail, hospitality, manufacturing, etc.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services**: Banks need to collect and store customer data in real-time. This could be achieved through services like Azure Data Factory, Azure Event Hubs, or AWS Kinesis for real-time data collection, and Azure SQL Database or AWS RDS for data storage.

- **Data Processing Services**: Services like Azure Stream Analytics or AWS Kinesis Data Analytics can be used to process the real-time data.

- **Machine Learning Services**: Azure Machine Learning or AWS SageMaker can be used to build predictive models based on historical data.

2.2 Tools and Software used

Tools:

- **Power BI**: The main tool for this project is Power BI, which will be used to create interactive dashboards for real-time data visualization.

- **Power Query**: This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

Software Requirements:

- **Power BI Desktop**: This is a Windows application that you can use to create reports and publish them to Power BI.

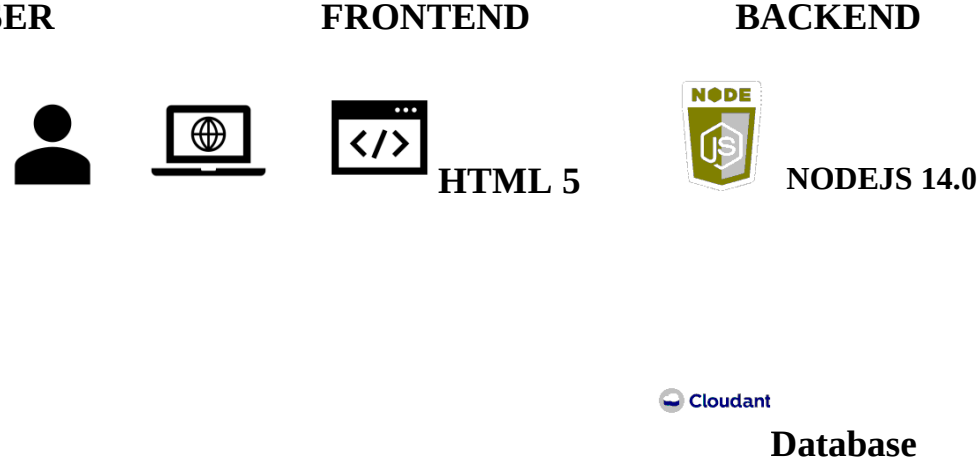
- **Power BI Service**: This is an online SAAS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- **Power BI Mobile**: This is a mobile application that you can use to access your reports and dashboards on the go.

CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture



Here's a high-level architecture for the project:

- **Data Collection**: Real-time customer data is collected from various sources like bank transactions, customer interactions, etc. This could be achieved using services like Azure Event Hubs or AWS Kinesis.
- **Data Storage**: The collected data is stored in a database for processing. Azure SQL Database or AWS RDS can be used for this purpose.
- **Data Processing**: The stored data is processed in real-time using services like Azure Stream Analytics or AWS Kinesis Data Analytics.
- **Machine Learning**: Predictive models are built based on processed data using Azure Machine Learning or AWS Sage Maker. These models can help in predicting customer behavior, detecting fraud, etc.
- **Data Visualization**: The processed data and the results from the predictive models are visualized in real-time using Power BI. Power BI allows you to create interactive dashboards that can provide valuable insights into the data.

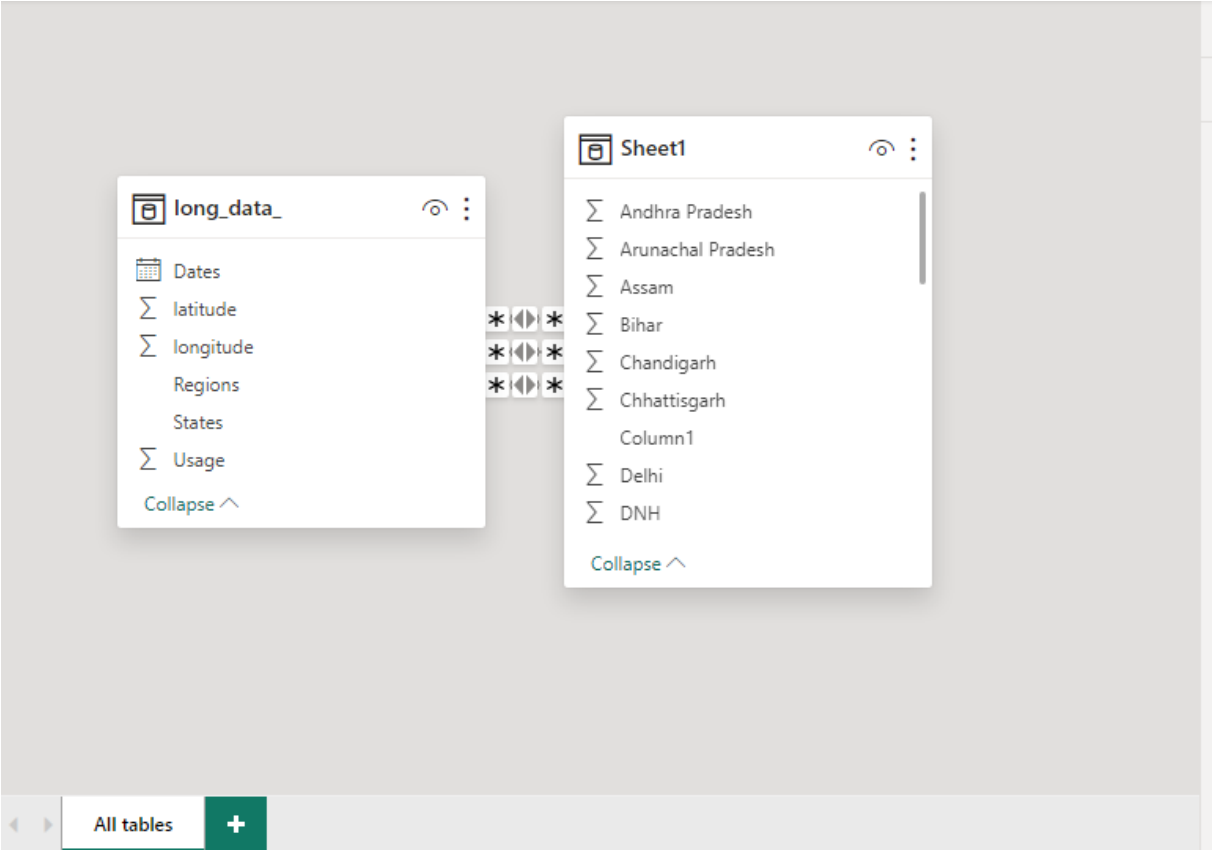
- **Data Access**: The dashboards created in Power BI can be accessed through Power BI Desktop, Power BI Service (online), and Power BI Mobile.

This architecture provides a comprehensive solution for real-time analysis of bank customers. However, it's important to note that the specific architecture may vary depending on the bank's existing infrastructure, specific requirements, and budget. It's also important to ensure that all tools and services comply with relevant data privacy and security regulations.

CHAPTER 4

MODELING AND RESULT

Manage relationship



Modeling For States;

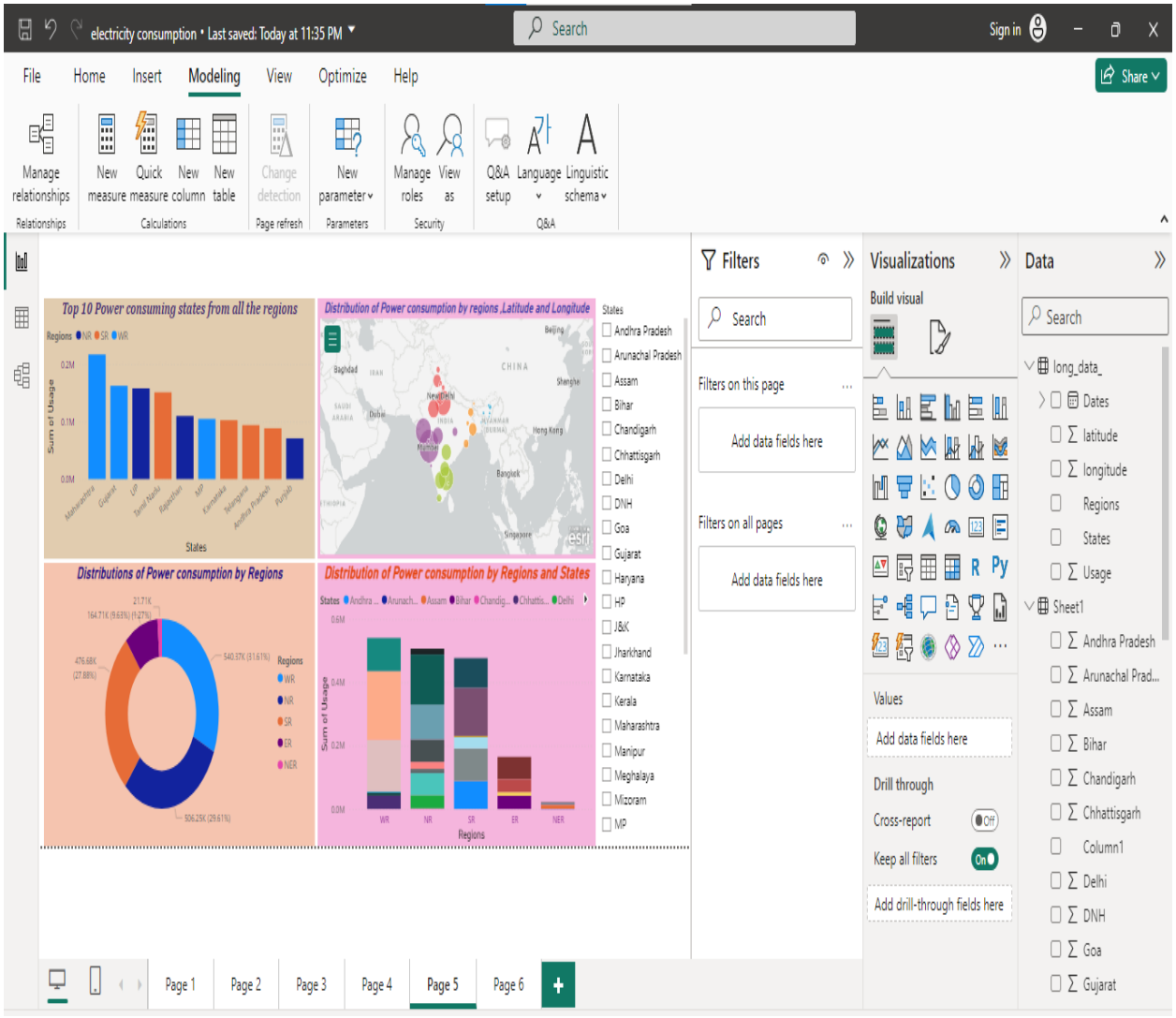
```
= Table.TransformColumnTypes(#"Promoted Headers",{{"Column1", type datetime}, {"Punjab", type number
```

	Column1	1.2 Punjab	1.2 Haryana	1.2 Rajasthan	1.2 Delhi
1	1/2/2019 12:00:00 AM	119.9	130.3	234.1	
2	1/3/2019 12:00:00 AM	121.9	133.5	240.2	
3	1/4/2019 12:00:00 AM	118.8	128.2	239.8	
4	1/5/2019 12:00:00 AM	121	127.5	239.1	
5	1/6/2019 12:00:00 AM	121.4	132.6	240.4	
6	1/7/2019 12:00:00 AM	118	132.1	241.9	
7	1/8/2019 12:00:00 AM	107.5	121.4	237.2	
8	1/9/2019 12:00:00 AM	132.5	148.2	197	
9	1/10/2019 12:00:00 AM	131.5	157	199.9	
10	1/11/2019 12:00:00 AM	130.3	145.3	187.7	
11	1/12/2019 12:00:00 AM	137.9	151.9	189.9	
12	1/13/2019 12:00:00 AM	135.8	141.4	186.9	
13	1/14/2019 12:00:00 AM	139.3	143.8	195.2	
14	1/15/2019 12:00:00 AM	141.1	142.9	185.4	
15	1/16/2019 12:00:00 AM	231.9	180.5	175.3	
16	1/17/2019 12:00:00 AM	253.8	196.4	197.2	
17	1/18/2019 12:00:00 AM	236.4	193.9	209.8	
18	1/19/2019 12:00:00 AM	229.8	201.8	197.6	
19	1/20/2019 12:00:00 AM	195	192.3	197.6	

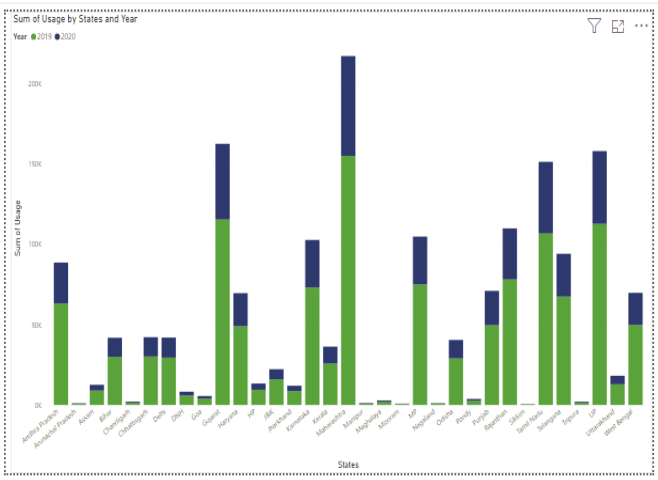
Modelling For Regions:

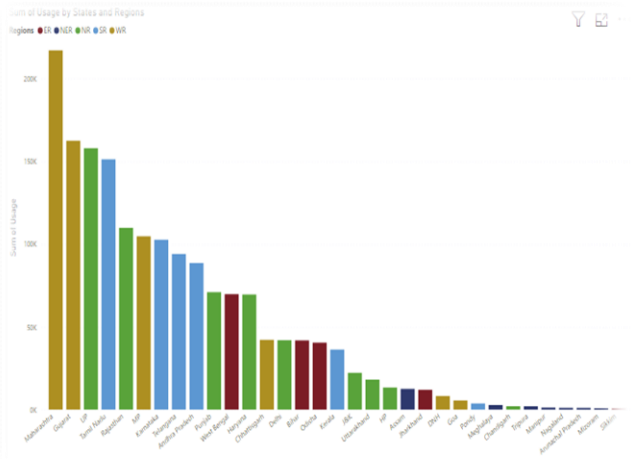
```
= Table.TransformColumnTypes(#"Promoted Headers",{{"States", type text}, {"Regions", type text}, {"latitude", type
    number}, {"longitude", type number}, {"Dates", type datetime}, {"Usage", type number}})
```

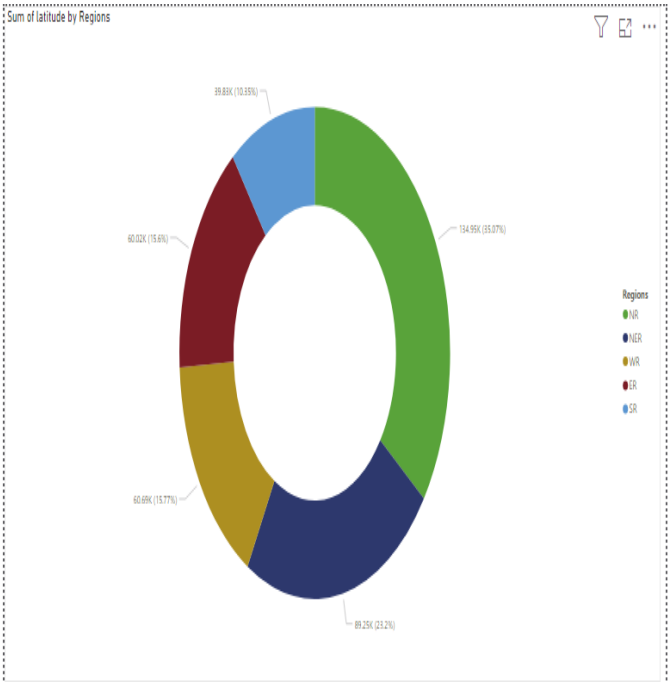
	States	Regions	latitude	longitude	Dates	Usage
1	Punjab	NR	31.51997398	75.98000281	02-01-2019 00:00:00	
2	Haryana	NR	28.45000633	77.01999101	02-01-2019 00:00:00	
3	Rajasthan	NR	26.44999921	74.63998124	02-01-2019 00:00:00	
4	Delhi	NR	28.6699929	77.23000403	02-01-2019 00:00:00	
5	UP	NR	27.59998069	78.05000565	02-01-2019 00:00:00	
6	Uttarakhand	NR	30.32040895	78.05000565	02-01-2019 00:00:00	
7	HP	NR	31.10002545	77.16659704	02-01-2019 00:00:00	
8	J&K	NR	33.45	76.24	02-01-2019 00:00:00	
9	Chandigarh	NR	30.71999697	76.78000565	02-01-2019 00:00:00	
10	Chhattisgarh	WR	22.09042035	82.15998734	02-01-2019 00:00:00	
11	Gujarat	WR	22.2587	71.1924	02-01-2019 00:00:00	
12	MP	WR	21.30039105	76.13001949	02-01-2019 00:00:00	
13	Maharashtra	WR	19.25023195	73.16017493	02-01-2019 00:00:00	
14	Goa	WR	15.491997	73.81800065	02-01-2019 00:00:00	
15	DNH	WR	20.26657819	73.0166178	02-01-2019 00:00:00	
16	Andhra Pradesh	SR	14.7504291	78.57002559	02-01-2019 00:00:00	
17	Telangana	SR	18.1124	79.0193	02-01-2019 00:00:00	
18	Karnataka	SR	12.57038129	76.91999711	02-01-2019 00:00:00	
19						

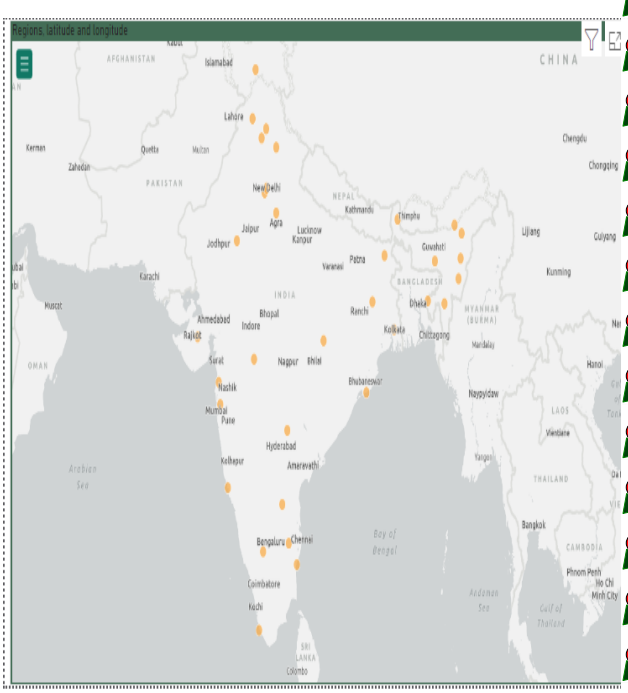

electricity consumption • Last saved: Today at 11:35 PM
Search
Sign in
File
Home
Insert
Modeling
View
Optimize
Help
Share
Manage relationships
New measure
Quick measure
New column
New table
Change detection
New parameter
Manage roles
View as
Q&A setup
Language
Linguistic schema
Relationships
Calculations
Page refresh
Parameters
Security
Q&A
Top 10 Power consuming states from all the regions
Distribution of Power consumption by regions ,Latitude and Longitude
Distributions of Power consumption by Regions
Distribution of Power consumption by Regions and States
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
Filters
Search
Filters on this page
Add data fields here
Filters on all pages
Add data fields here
Visualizations
Build visual
Values
Add data fields here
Drill through
Cross-report
Keep all filters
Add drill-through fields here
Data
Search
long_data_
Dates
latitude
longitude
Regions
States
Usage
Sheet1
Andhra Pradesh
Arunachal Prad...
Assam
Bihar
Chandigarh
Chhattisgarh
Column1
Delhi
DNH
Goa
Gujarat
Page 1
Page 2
Page 3
Page 4
Page 5
Page 6

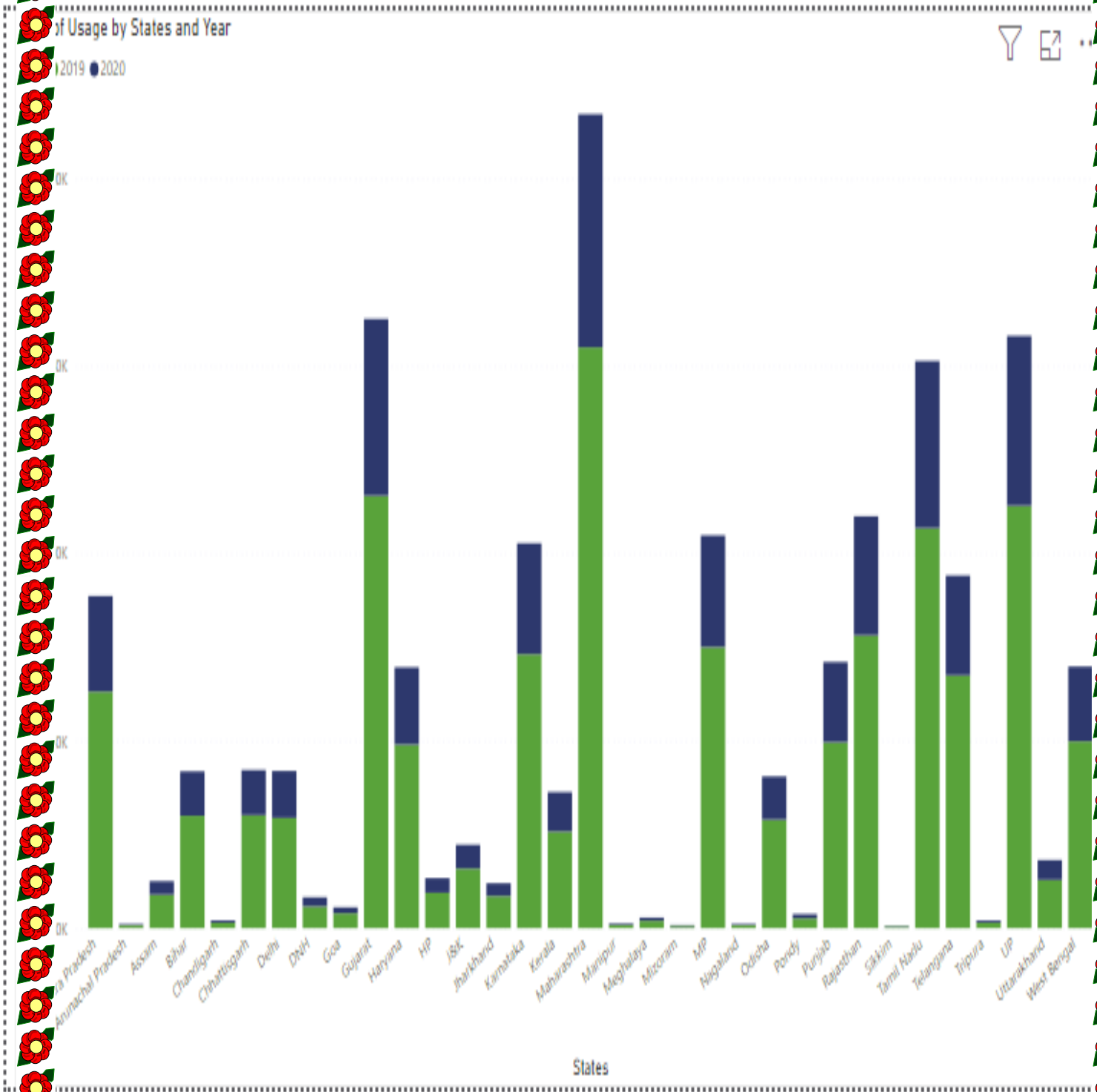
DASHBOARD

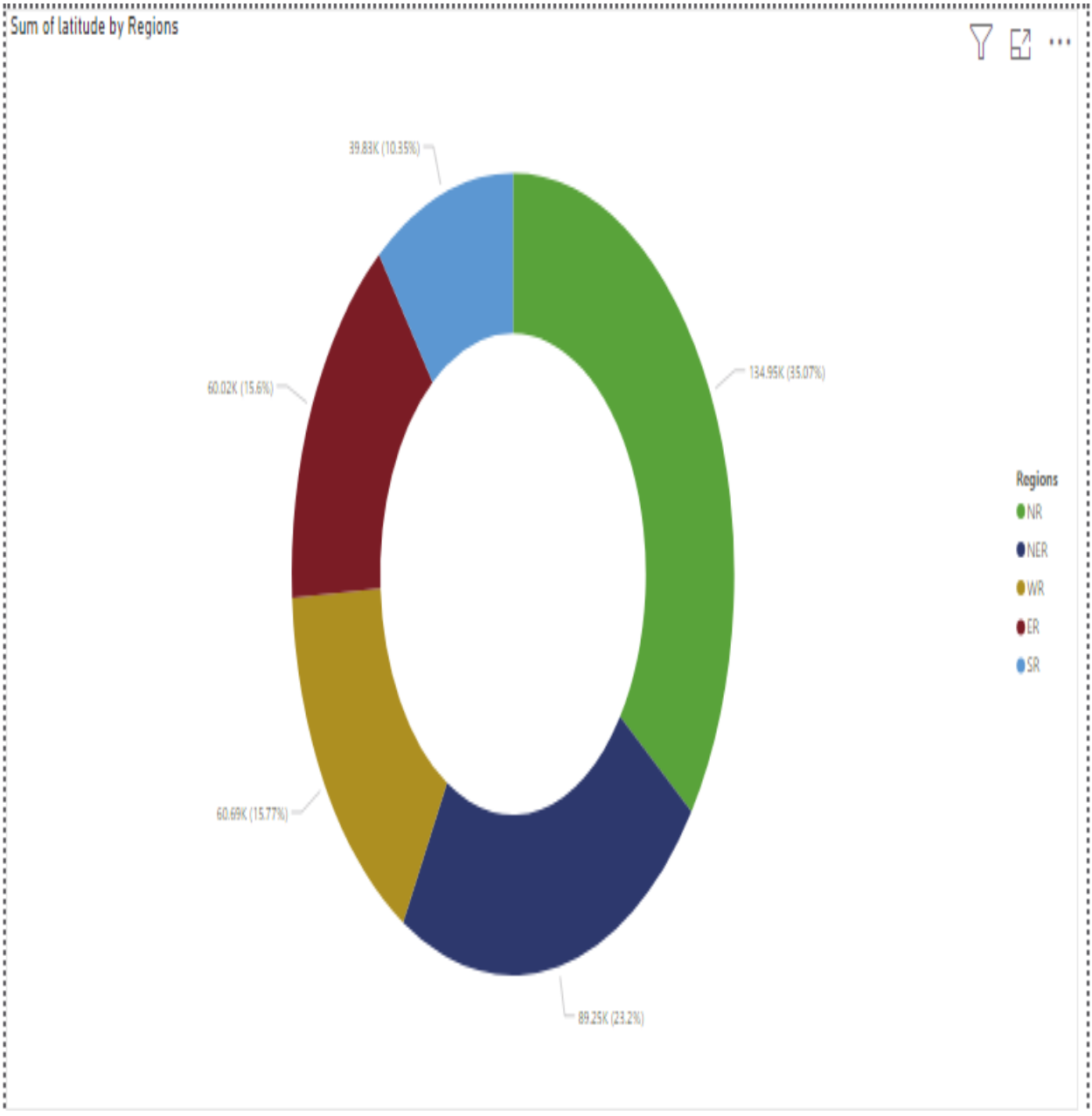

Sum of Usage by States and Year
Year 2019 2020
Sum of Usage
States

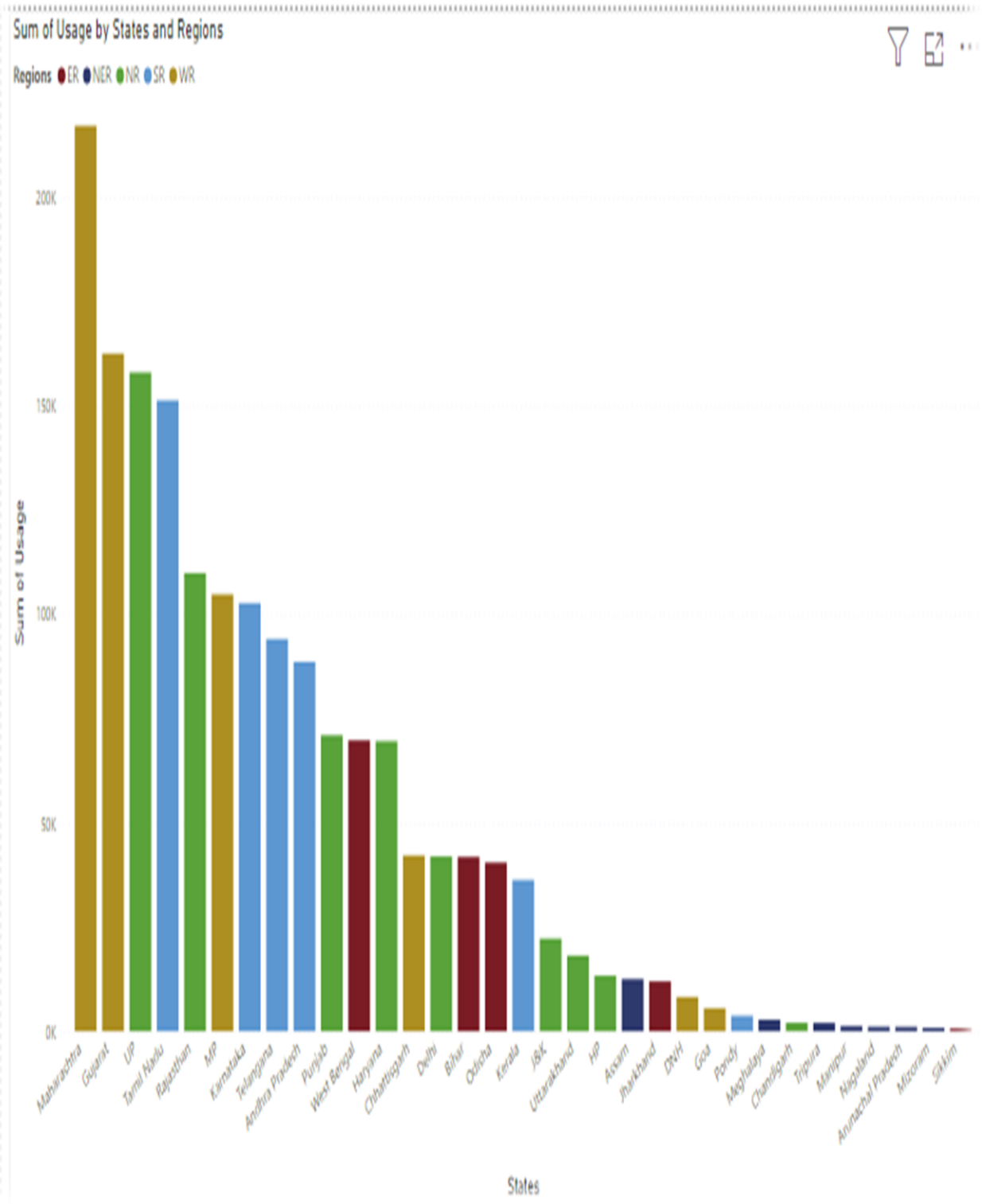



Sum of latitude by Regions
39.83K (10.35%)
134.95K (35.07%)
60.02K (15.6%)
60.69K (15.77%)
89.25K (23.2%)
Regions
NR
NER
WR
ER
SR


Regions, latitude and longitude


of Usage by States and Year
2019
2020
0K
0K
0K
0K
Arunachal Pradesh
Assam
Bihar
Chandigarh
Chhattisgarh
Delhi
DNH
Goa
Gujarat
Haryana
HP
J&K
Jharkhand
Karnataka
Kerala
Maharashtra
Manipur
Meghalaya
Mizoram
MP
Nagaland
Odisha
Pondy
Punjab
Rajasthan
Sikkim
Tamil Nadu
Telangana
Tripura
UP
Uttarakhand
West Bengal
States


Sum of latitude by Regions
39.83K (10.35%)
134.95K (35.07%)
60.02K (15.6%)
60.69K (15.77%)
89.25K (23.2%)
Regions
NR
NER
WR
ER
SR


Sum of Usage by States and Regions
Regions ER NER NR SR WR
200K
150K
100K
50K
0K
Sum of Usage
Maharashtra
Gujarat
UP
Tamil Nadu
Rajasthan
MP
Karnataka
Telangana
Andhra Pradesh
Punjab
West Bengal
Haryana
Chhattisgarh
Delhi
Bihar
Odisha
Kerala
J&K
Uttarakhand
HP
Assam
Jharkhand
DNH
Goa
Pondy
Meghalaya
Chandigarh
Tripura
Manipur
Nagaland
Arunachal Pradesh
Mizoram
Sikkim
States


egions, latitude and longitude
AFGHANISTAN
Islamabad
CHINA
Lahore
Kerman
Quetta
Multan
Zahedan
PAKISTAN
Chengdu
Chongqing
New Delhi
NEPAL
Kathmandu
Thimphu
Agra
Jaipur
Lucknow
Kanpur
Jodhpur
Lijiang
Guiyang
Guwahati
Patna
Varanasi
Karachi
Kunming
BANGLADESH
INDIA
Liuzhou
Muscat
Dhaka
Ranchi
MYANMAR
(BURMA)
Ahmedabad
Bhopal
Indore
Nanning
Kolkata
Rajkot
Chittagong
Mandalay
Surat
Nagpur
Bhilai
OMAN
Hanoi
Nashik
Bhubaneswar
Naypyidaw
Gulf of Tonkin
Mumbai
Pune
LAOS
Vientiane
Hyderabad
Yangon
Kolhapur
Amaravathi
Arabian Sea
THAILAND
Da Nang
VIETNAM
Bangkok
Bay of Bengal
Bengaluru
Chennai
CAMBODIA
Phnom Penh
Coimbatore
Ho Chi Minh City
Andaman Sea
Kochi
Gulf of Thailand
SRI LANKA
Colombo
esri

CONCLUSION

In conclusion, the project on "Analysis of Commercial Electricity Consumption in an Indian State" serves as a crucial endeavor with multifaceted implications. Through comprehensive data analysis and rigorous examination of various factors influencing commercial electricity usage, the study provides valuable insights and recommendations for stakeholders involved in energy planning, policy formulation, and business operations.

Ultimately, the project underscores the importance of evidence-based approaches in tackling energy issues, advocating for holistic strategies that balance economic, environmental, and social considerations. As such, the findings and recommendations of this project have the potential to catalyze positive change, driving towards a more resilient, inclusive, and sustainable energy future for the Indian state and beyond

FUTURE SCOPE

Features for Analyzing Commercial Electricity Consumption in an Indian State .Here's a breakdown of features you can consider for analyzing commercial electricity consumption in an Indian state:

Location and Sector:

State: Analyze consumption patterns across different regions within the state.

City Tier: Compare consumption between metro cities, tier-2 cities, and smaller towns.

Commercial Sector: Differentiate consumption by industry type (e.g., offices, retail stores, hotels, restaurants).

Consumption Data:

Total Consumption: Track overall electricity use by the commercial sector over time (monthly, yearly).

Peak Demand: Identify periods of highest electricity demand and influencing factors.

Consumption by Time of Day: Analyze consumption patterns during weekdays, weekends, and peak hours.

Consumer Characteristics:

Number of Establishments: Consider the growth or decline in commercial establishments.

Floor Area: Relate consumption to the size of commercial spaces.

Business Activity: Account for seasonal variations in consumption for specific industries (e.g., tourism).

Weather Data: Analyze how temperature and humidity affect air conditioning usage.

Electricity Tariffs: Consider the impact of different commercial electricity tariffs on consumption patterns.

REFERENCES

https://medium.com/analytics-vidhya/analysis-of-bank-customers-using-dashboard-in-power-bi-a366f2b3e563

LINK

https://github.com/githubtraining/hellogitworld.git