

Tech Saksham

Case Study Report

Data Analytics with Power BI

“ANALYSIS OF COMMERCIAL ELECTRICITY COSUMPTION IN INDIAN STATE”

“Nesamony Memorial Christian College”

NM ID	NAME
E2DE2EC6BD989C1B83A4C59 663E6121C	DIVYA S

ABSTRACT

In the digital age, data has become an invaluable asset for businesses, particularly in the Electricity sectors. The proposed project, "Analysis of Commercial Electricity Consumption in Indian State," aims to leverage PowerBI, a leading business intelligence tool, to analyze and visualize energy consumption data. Energy has been universally recognized as one of the most important input for economic growth and human development. Generally, it has defined as "Capacity to do work" there by for bring out desirable design on economic level there must be need of intensive of energy performance in various sectors of the country. Perceiving commercial energy at the one of economic viability consumption has equip the present status of economic level to be boost and reach global advance in due period with identification of which are highly consumes among public and the statistics of this has brought out in this study.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

Popularly, Energy is “Capacity to do work” this is a mean which applying in the Economic aspects. Because, energy is live blood of modern economics. So, the Energy is how prominent to physical, same like significant for the economic development or any nations maturity in the Economic views. As we know, developing country like India has been promoting itself by enhancing various initiatives on all sectors and regions to achieve economic targets and for prepare to meet global competition for proclaim efficient nation. Accumulation of changes in energy consumption especially commercial energy pointed is indirectly spurs the problems on the consumption of non-commercial energy regularly consumes by rural people.

1.2 Proposed Solution

The proposed solution is to develop a PowerBI dashboard that can analyze and visualize electricity consumption data. The dashboard will integrate data from various sources from commercial, industrial and residential sectors. It will provide as to use time series techniques to analyze seasonality, trends, and cyclical patterns in commercial electricity consumption. The dashboard will be interactive, user-friendly, and customizable, allowing electricity sectors to tailor it to their specific needs. The commercial electricity consumption analysis capability of the dashboard will enable electricity sectors to evaluate the effectiveness of existing policies or interventions aimed at promoting energy efficiency or reducing electricity consumption among commercial consumers.

1.3 Feature

- **Monthly Consumption data:** The dashboard will provide electricity consumption in monthly basis.
- **Economic indicators:** The dashboard includes economic indicators like GDP growth, unemployment rate and consumer spending as they can influence commercial electricity consumption.
- **Trend Analysis:** The dashboard will identify and display trends in electricity consumption behavior.
- **Predictive Analysis:** It will use historical data to predict future consumption records.

1.4 Advantages

- **Economic Growth:** Increased commercial electricity consumption indicates economic growth in various sectors.
- **Job Creation:** Higher electricity consumption in commercial sectors often correlates with increased business activities, leading to job creation and reducing unemployment rates.
- **Technological Advancement :** Demand for electricity in commercial sectors incentivizes innovation and investment in energy efficient technologies leading to productivity improvements.

1.5 Scope

The scope of this project is to explore regional differences in commercial electricity consumption within India, considering factors like urbanization levels, economic development, climate variations, and infrastructure availability. The project can be further extended to incorporate more data sources and advanced analytics techniques, such as machine learning and artificial intelligence, to provide more sophisticated insights. The project also has the potential to be adapted for other sectors, such as retail, healthcare ,IT, Manufacturing and telecommunications.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Electricity Consumption Data:** Access to detailed data on commercial electricity consumption, preferably monthly or yearly consumption.
- **Energy Management Systems:** These systems can provide real-time monitoring and analysis of electricity consumption data.

2.2 Tools and Software used

Tools:

- **PowerBI:** The main tool for this project is PowerBI, 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:

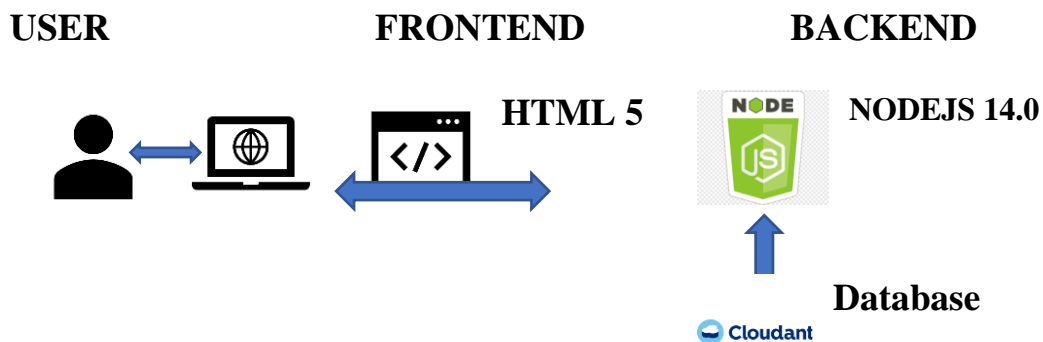
- **PowerBI Desktop:** This is a Windows application that you can use to create reports and publish them to PowerBI.
- **PowerBI Service:** This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- **PowerBI 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:

1. **Data Collection:** Real-time customer data is collected from various sources like commercial, residential etc. This could be achieved using services like Azure Event Hubs or AWS Kinesis.
2. **Data Storage:** The collected data is stored in a database for processing. Azure SQL Database or AWS RDS can be used for this purpose.
3. **Data Processing:** The stored data is processed in real-time using services like Azure Stream Analytics or AWS Kinesis Data Analytics.
4. **Machine Learning:** Predictive models are built based on processed data using Azure Machine Learning or AWS SageMaker. These models can help in predicting customer behavior, detecting fraud, etc.
5. **Data Visualization:** The processed data and the results from the predictive models are visualized in real-time using PowerBI. PowerBI allows you to create interactive dashboards that can provide valuable insights into the data.
6. **Data Access:** The dashboards created in PowerBI can be accessed through PowerBI Desktop, PowerBI Service (online), and PowerBI Mobile.



This architecture provides a comprehensive solution for analysis of commercial electricity consumption in India. It's important to ensure that all tools and services comply with relevant data privacy and security regulations.

CHAPTER 4

MODELING AND RESULT

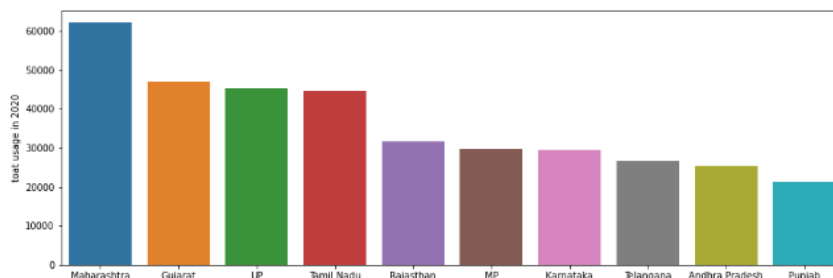
Manage relationship

This modeling text provides a structured framework for analyzing commercial electricity consumption in India, incorporating key elements such as literature review, methodology, results and discussion.

TOP 10 STATES THAT CONSUME MAXIMUM POWER IN 2019 & 2020

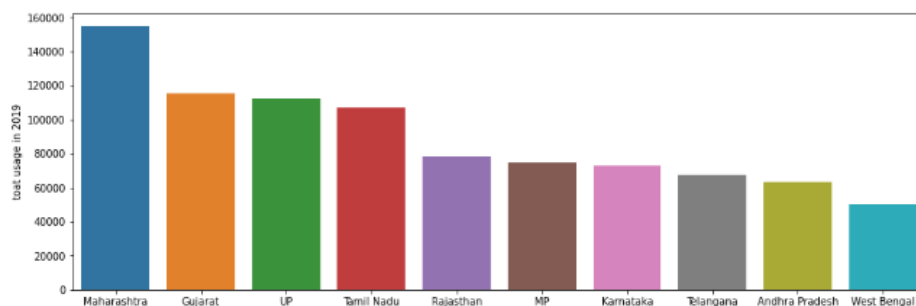
```
table6=table3.head(10)
plt.figure(figsize=(15, 5))
sns.barplot(y="toat usage in 2020",x=table6.index,data=table6)
print("Top 10 states that consume maximum power in 2020")
```

Top 10 states that consume maximum power in 2020



```
table5=table4.head(10)
plt.figure(figsize=(15, 5))
sns.barplot(y="toat usage in 2019",x=table5.index,data=table5)
print("Top 10 states that consume maximum power in 2019")
```

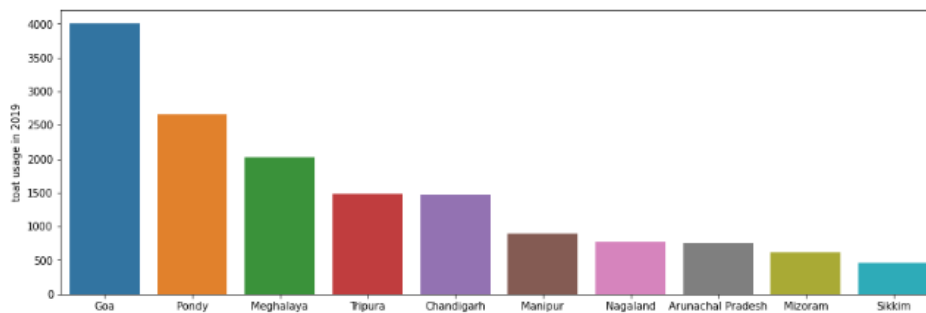
Top 10 states that consume maximum power in 2019



TOP 10 STATES THAT CONSUME LEAST POWER IN 2019 & 2020

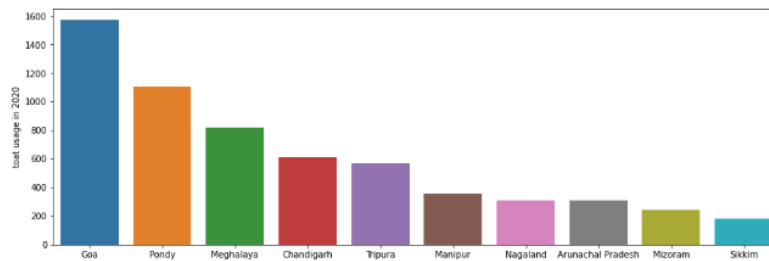
```
plt.figure(figsize=(15, 5))
sns.barplot(y="toat usage in 2019", x=table8.index, data=table8)
print("Top 10 states that consume least power in 2019")
```

Top 10 states that consume least power in 2019

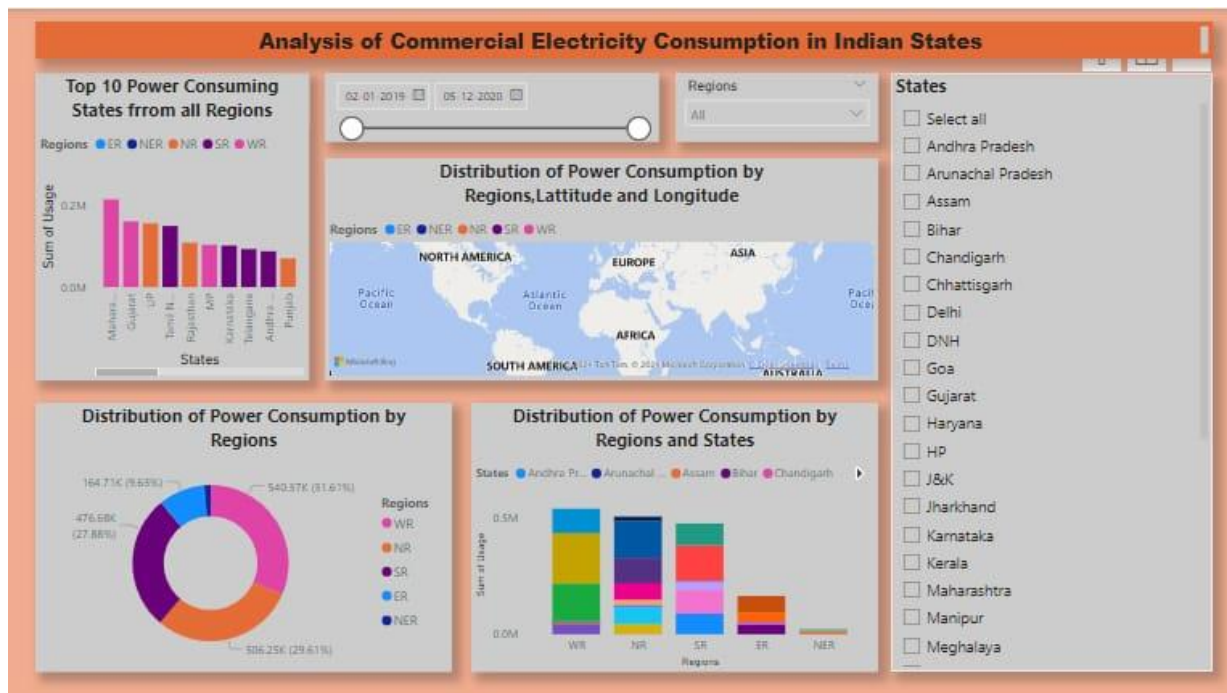


```
plt.figure(figsize=(15, 5))
sns.barplot(y="toat usage in 2020", x=table7.index, data=table7)
print("Top 10 states that consume least power in 2020")
```

Top 10 states that consume least power in 2020



Dashboard:



CONCLUSION

The project “Analysis of Commercial Electricity Consumption in Indian State” using PowerBI has successfully demonstrated the potential of data analytics in the electricity sector. In conclusion, the analysis of commercial electricity consumption reveals important insights into energy usage patterns, trends and potential areas for improvement. By examining factors such as sectoral distribution, seasonal variations and efficiency measures, stakeholders can develop targeted strategies to optimize energy consumption, enhance sustainability, and support economic growth in the region. The project has also highlighted the importance of data visualization in making complex data more understandable and accessible. The use of PowerBI has made it possible to present data in a visually appealing and easy-to-understand format, thereby aiding in better decision-making.

FUTURE SCOPE

The future scope of this project is vast. With the advent of advanced analytics and machine learning, PowerBI can be leveraged to predict future trends based on historical data. It involves integrating advanced data analytics techniques such as machine learning and predictive modeling, forecast demand more accurately . Furthermore, PowerBI's capability to integrate with various data sources opens up the possibility of incorporating more diverse datasets for a more holistic view of customers. As data privacy and security become increasingly important, future iterations of this project should focus on implementing robust data governance strategies. Embracing a holistic approach that incorporates both technological innovation and interdisciplinary collaboration will be key to addressing the evolving challenges and opportunities in commercial electricity consumption in Indian State.

REFERENCES

https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.kaggle.com/datasets/twinkle0705/state-wise-power-consumption-in-india&ved=2ahUKEwj02LHeg_aEAXUayTgGHYxEACAQFnoECBMQAQ&usg=AOvVaw3A2-LjBkpRQyRQOjwXIPSP