Tech Saksham

Case Study Report

Data Analytics with Power BI

"Analysis of Commercial Electricity Consumption in Indian States"

"SOUTH TRAVANCORE HINDU COLLEGE NAGERCOIL.

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ABSTRACT

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In the digital age, data has become an invaluable asset for businesses, particularly in the electricity sector. The proposed project, "Analysis of Commercial Electricity consumption in Indian states" aims to leverage Power BI, a leading business intelligence tool, to analyze and visualize real time state wise energy consumption data. This project will enable analyzers to gain deep insights into end users' behavior, preferences, and trends, thereby facilitating data-driven decision-making and enhancing end users' satisfaction. The real-time analysis will allow the analyzers to compare the data of energy consumption of various states before and after lockdown and also helps the analyzers to explain the visualization to end-users and satisfies them.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

Electricity is one of the most important needs of human life. Without electricity the world will stagnate in all things, because human depends upon electricity for every need like charging, lighting rooms, working fans and domestic appliances like using electric stoves, motors and so on. In large industries large machines are worked with help of electricity. Essential needs like Food, cloth, paper and many other things are the product of electricity. our project is to analyze the usage of electricity in state wise before and after pandemic period.

1.2 Proposed Solution

The proposed solution is to develop a Power BI dashboard that can analyze and visualize state wise energy consumption data. The dashboard will integrate data from various sources such as electricity consumption of each state, region, latitude, longitude, date and electricity usage of various state. It will provide a comparative view of electricity usage before lockdown and after lockdown. The dashboard will be interactive, user-friendly, and customizable, allowing analyzers to find out the usage of electricity before and after lockdown. The real-time analysis capability of the dashboard will enable us to know clearly about the usage of electricity and helps us to explains the outcome to the end users.

1.3 Feature

- **Real-Time Analysis**: The dashboard will provide real-time analysis of Energy consumption data.
- **State Segmentation**: It will segment states based on parameters electricity usage on each dates.

- **Trend Analysis**: The dashboard will identify and display out the top10 power consumption states and regions.
- **Predictive Analysis**: It will use historical data to predict future energy consumption of each state.

1.4 Advantages

- **Data-Driven Decisions:** Analyzers can make informed decisions based on real-time data analysis.

- **Improved end user Engagement:** Understanding end user behavior and trends can help the analyzers engage with their end users more effectively.

- **Increased Revenue:** By identifying opportunities in rising price can increase the revenue, increase the material conductivity.

1.5 Scope

The scope of this project extends to all Analyzers that aim to leverage data for decision-making and user engagement. 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 into end user behavior. Furthermore, the project contributes to the broader goal of digital transformation in the electricity sector, promoting efficiency, innovation, and end user-centricity.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services**: Analyzers need to collect and store energy consumption data in real-time.

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.
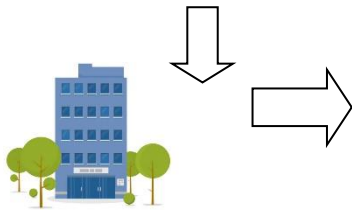
CHAPTER 3

PROJECT ARCHITECTURE
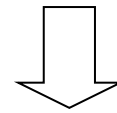
3.1 Architecture
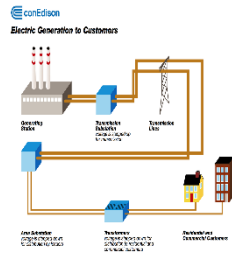
Electricity distribution

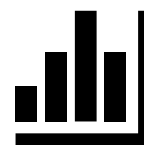**Electricity department**   **database**   **through analyzer**

Transform, load, analyze

End users   Data visualization

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

1. **Data Collection**: Real-time   data is collected from various sources like state-wise energy power usage in date wise, etc.

2. **Data Storage**: The collected data is stored in a database for processing.
3. **Data Processing**: The stored data is processed in real-time using services like power BI

4. **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.
5. **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 real-time analysis of end users. However, it's important to note that the specific architecture may vary depending on the 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.
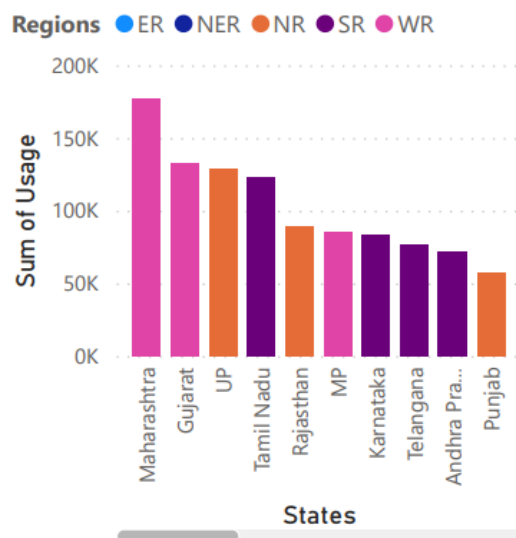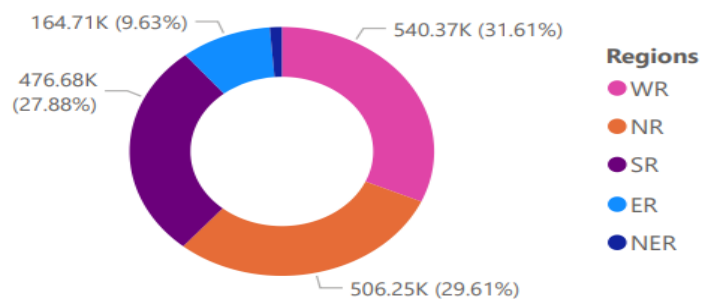
CHAPTER 4

visualization

Visualizations:

Top 10 Power Consuming States

Regions ● ER ● NER ● NR ● SR ● WR

Top 10 power consuming states

Distribution of Power Consumption by Region

164.71K (9.63%)

476.68K (27.88%)

540.37K (31.61%)

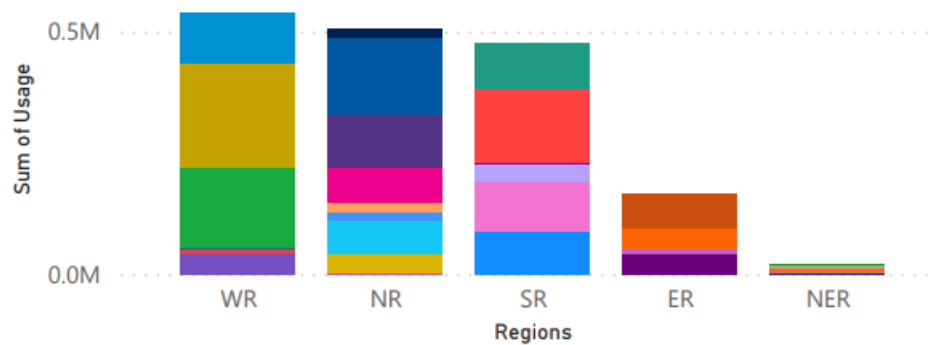506.25K (29.61%)

Regions
● WR
● NR
● SR
● ER
● NER

Distribution of Power Consumptions by Regions, Latitude and Longitude
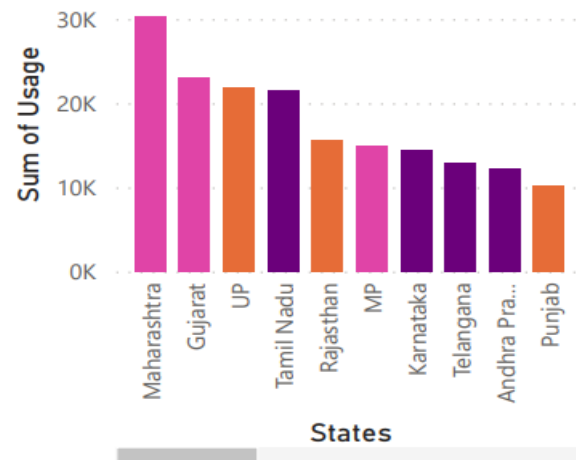
Regions ● ER ● NER ● NR ● SR ● WR

Distribution of Power Consumption by Regions and States

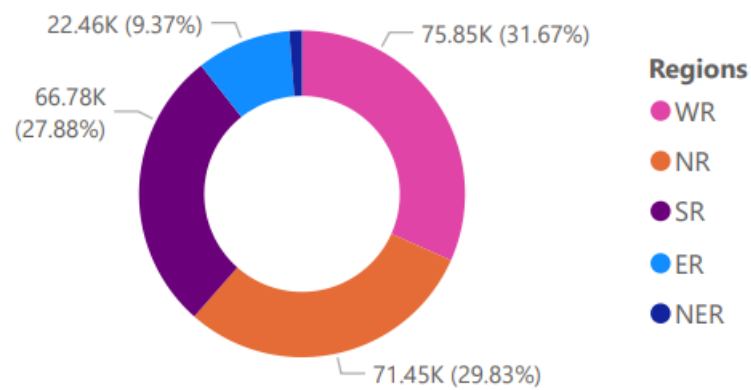States ● Andhra Pradesh ● Arunachal Pradesh ● Assam ● Bihar ● Chandigarh ▶
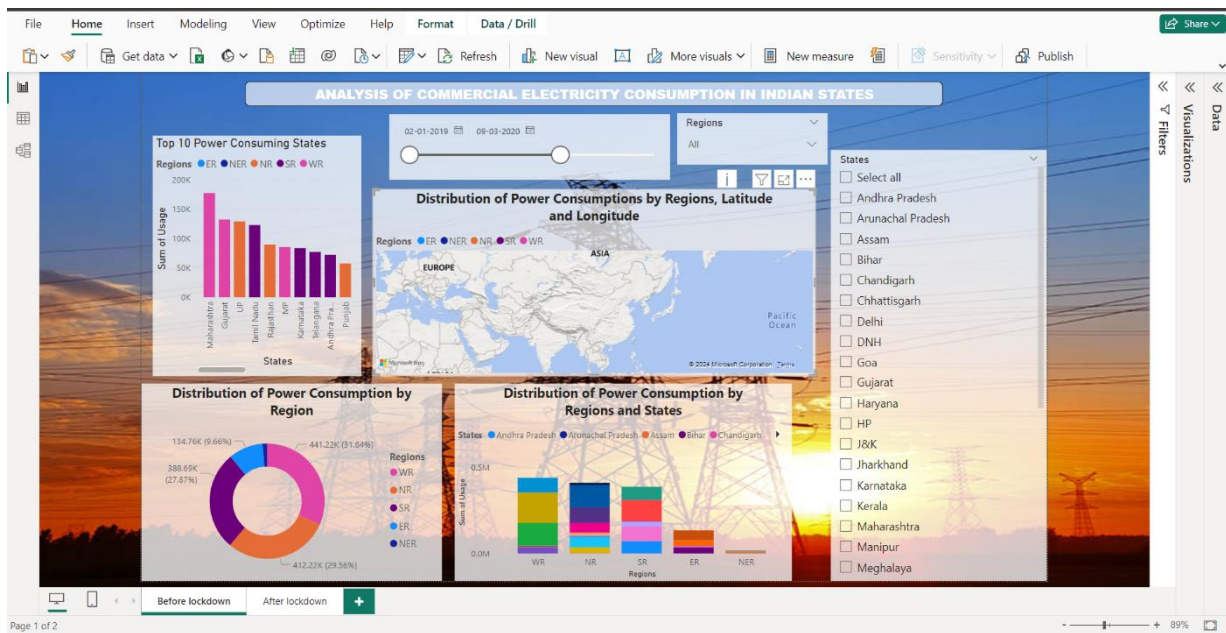
Top 10 Power Consuming States

Regions ● ER ● NER ● NR ● SR ● WR
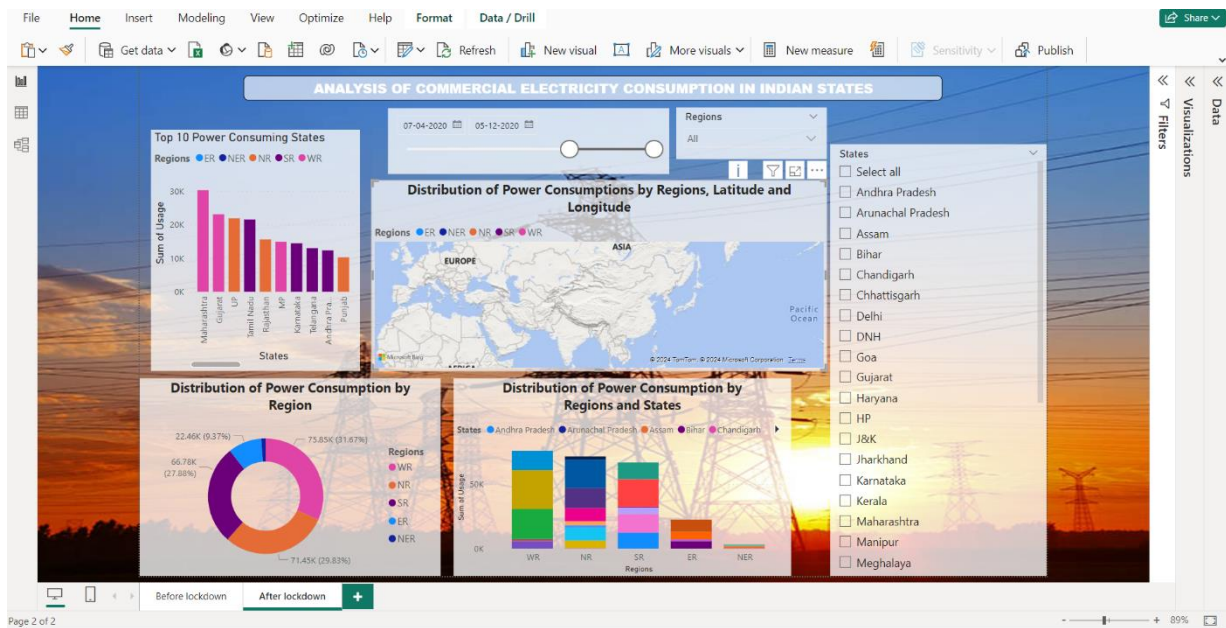

Distribution of Power Consumption by Region

22.46K (9.37%)

66.78K (27.88%)

75.85K (31.67%)

71.45K (29.83%)

Regions
● WR
● NR
● SR
● ER
● NER

Dashboard

Dashboard of Before Lockdown

Dashboard of After lockdown

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CONCLUSION

The project "Analysis of commercial electricity consumption in Indian states" using Power BI has successfully demonstrated the potential of data analytics in the electricity sector. The real-time analysis of customer data has provided valuable insights into end users behavior and trends, thereby facilitating informed decision-making. The interactive dashboards and reports have offered a comprehensive view of energy consumption data, enabling the identification of patterns and correlations. This has not only improved the efficiency of data analysis but also enhanced the analyzers' ability to provide personalized services to its end users. The project has also highlighted the importance of data visualization in making complex data more understandable and accessible. The use of Power BI has made it possible to present data in a visually appealing and easy-to-understand format, thereby aiding in better decision-making. From the given data visualization, it is clear that, the usage of electricity was high before

lockdown and the energy consumption was less during lockdown. During lockdown period the industries and companies were closed for preventing measures, it caused decreases in energy consumption.

FUTURE SCOPE

The future scope of this project is vast. With the advent of advanced analytics and machine learning, Power BI can be leveraged to predict future trends based on historical data. Integrating these predictive analytics into the project could enable the Analyzers to anticipate end users needs and proactively offer solutions. Furthermore, Power BI's capability to integrate with various data sources opens up the possibility of incorporating more diverse datasets for a more holistic view of end users. As data privacy and security become increasingly important, future iterations of this project should focus on implementing robust data governance strategies. This would ensure the secure handling of sensitive energy consuming data while complying with data protection regulations. Additionally, the project could explore the integration of real-time data streams to provide even more timely and

relevant insights. This could potentially transform the way Analyzers interact with their end users, leading to improve end users' satisfaction.

LINK

https://github.com/Jeshanabr/ANALYSIS-OF-COMMERCIAL-ELECTRICITY-CONSUMPTION-IN-INDIAN-STATES-NEW.git