

Tech Saksham

Case Study Report

Data Analytics with Power BI

“Analysis of Commercial Electricity Consumption in Indian State”

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ABSTRACT

In the digital age, data has become an the analysis examine the electricity consumption patterns in a specific Indian state.The proposed project. “Analysis of Consumption in Indian State,” aims to leverage PowerBI a leading tool to analyze and visualize electricity consumption data.The project will enable analyze the aggregate electricity consumption of many consumers, and extract key components such as heating, ventilation and air conditioning, residential lighting, and street lighting consumption from the total consumption. Economic growth, industrial activities, government policies, and technological advancements are evaluated to provide a holistic understanding of the dynamics driving electricity consumption.

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” thereby, 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. Electricity, LPG, Kerosene, coal and natural gas are the chosen commercial energy and data for the specified years have collected from central electricity authority CAE and Energy statistics 2015 for 2007-2014.

Moreover, the study examines the effectiveness of existing energy policies and initiatives aimed at promoting energy efficiency and reducing electricity consumption in the commercial sector.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

Analyze of commercial electricity consumption Indian states to identify patterns, trends, and factors influencing consumption, ultimately providing insights for efficient resource allocation and policy formulation.

1.2 Proposed Solution

The proposed solution is to develop a PowerBI dashboard that can analyze and visualize commercial electricity consumption data. A detailed analysis based on factors such as the number and types of businesses, the size of the street, lighting requirements, hours of operation, and seasonal variations. Data on electricity usage patterns in similar areas and statistical modeling could also be utilized to arrive at a reliable estimate. Additionally, implementing energy-efficient lighting solutions and promoting sustainable practices could be part of the proposed solution to optimize electricity consumption commercial state.

1.3 Feature:

- **Commercial electricity consumption:** The dashboard will provide analysis of commercial electricity consumption in Indian state data.
Trend Analysis: The dashboard will identify and display trends in customer behavior.

- . **Predictive Analysis:** It will use historical data to predict future Customer behavior.
- **Total consumption:** Understanding the overall electricity consumption in the commercial sector within the state.
- **Trends over time:** Analyzing consumption patterns over different time periods to identify trends, such as seasonal a variations or long- term growth .
- **Peak Demand:** Identifying peak demand periods and their impact on electricity infrastructure.
- **Regional Distribution:** Examining consumption patterns across different regions within the state to understand disparities and tailor policies ,accordingly.
- **Sectoral Breakdown:** Differing consumption patterns among various commercial sectors like retail, hospitality, manufacturing, etc., to target specific areas for efficiency improvements or policy interventions.
- **Energy Itsenty:** Calculating energy intensity metrices to understand the efficiency of energy usage within the commercial sector.
- **Policy impacts:** Assessing the effects of government policies, such as subsidies, incentives, or regulations, on commercial electricity consumption.
- **Technological Adoption:** Evaluating the impact of technology industrial as energy-efficient appliances, renewable energy systems, or smart meters, on electricity usage patterns.
- **Economic indicators:** Correlating electricity consumption data with economic indicators like growth, industrial output, or employment rates to understand broader the economic trends.
- **Environmental indicators:** Assessing the environmental consequences of commercial electricity consumption, including carbon emissions and air pollution.

1.4 Advantages:

- **Economic growth:** Higher commercial electricity consumption indicates increased economic activity.
Increased Revenue: By indentifying opportunities for cross-selling and up-selling ,electricity can increase their revenue.
- **Economic Insights**:** Understanding commercial electricity consumption provides valuable insights into the economic activity of the state. Higher consumption often correlates with increased business activity, investment, and employment opportunities.
- ****Policy Formulation**:** Data on commercial electricity usage helps policymakers formulate effective energy policies and infrastructure development plans. It can guide decisions on electricity generation, distribution, and pricing to meet the demands of businesses and support economic growth.
- ****Market Research**:** Commercial electricity consumption data can be valuable for market research and business planning. It provides insights into sector-specific energy requirements, consumer behavior, and emerging trends, aiding businesses in strategic decision-making and resource management.
- ****Investment Attraction**:** Transparent data on electricity consumption enhances investor confidence by demonstrating the state's commitment to reliable and affordable power supply. It attracts businesses seeking stable energy infrastructure, thereby promoting economic development and job creation.

1.5 Scope

Analyzing commercial electricity consumption in Indian states involves examining various factors such as industrial development urbanization, population density, and economic activities. Data on electricity consumption can typically be obtained from government agencies or electricity boards in each state. Analyzing this data can provide insights into the growth trends, demand patterns, and potential opportunities for energy efficiency measures or infrastructure development within the commercial sector. Additionally, studying regional policies, investment trends, and technological advancements can provide a comprehensive understanding the cope.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Comparative Analysis:** Compare electricity consumption across different types of commercial services within the state. Identify sectors that consume the most electricity and investigate the reasons behind their higher usage.
- **Segmentation:** Break down the commercial sector into different types of businesses such as retail, hospitality, healthcare, etc. This segmentation helps in understanding the patterns of electricity usage among different types of services.

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 Analysis commercial electricity consumption of 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.
- Gather relevant data on commercial electricity consumption in the chosen Indian state. This data may be available from government sources, utilities, or

other reliable sources. Ensure that the data is comprehensive and covers the required time period.

- Clean the data to remove any inconsistencies, errors, or missing values. Preprocess the data as needed, such as converting units, formatting dates, or handling outliers.
- Conduct exploratory data analysis to gain insights into the data. This may involve visualizing trends, distributions, correlations, and outliers using techniques such as histograms, scatter plots, and time series analysis.
- Identify relevant features that may impact commercial electricity consumption, such as economic indicators, population density, industrial activity, and seasonal factors. Engineer new features if necessary to improve model performance.

CHAPTER 3

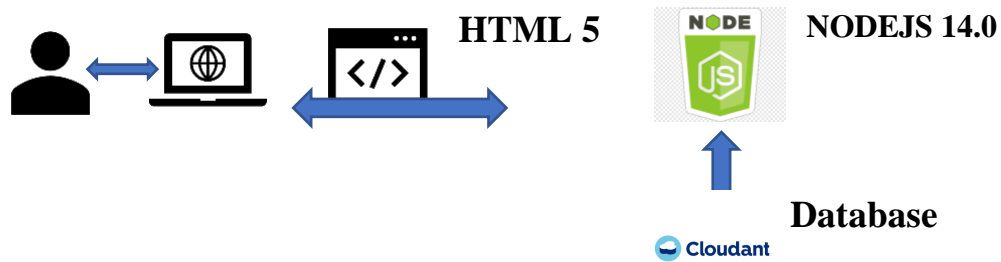
PROJECT ARCHITECTURE

3.1 Architecture

USER

FRONTEND

BACKEND



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

1. **Data Collection:** commercial electricity consumption data is collected from reliable sources such as electricity boards, government agencies, or energy regulatory bodies.
2. **Data Storage:** The collected data is stored in a database for processing. Electricity due to the constant need for cooling systems, servers, power back equipment.
3. **Data Processing:** The stored data is processed in commercial electricity consumption using services like consume massive amounts of electricity due to the constant operation of servers..
4. **Machine Learning:** Predictive models are built based on processed data using the scale of operations, and server and GPUs.
5. **Data Visualization:** The processed data and the results from the predictive models are visualized in commercial electricity consumption in Indian state 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.

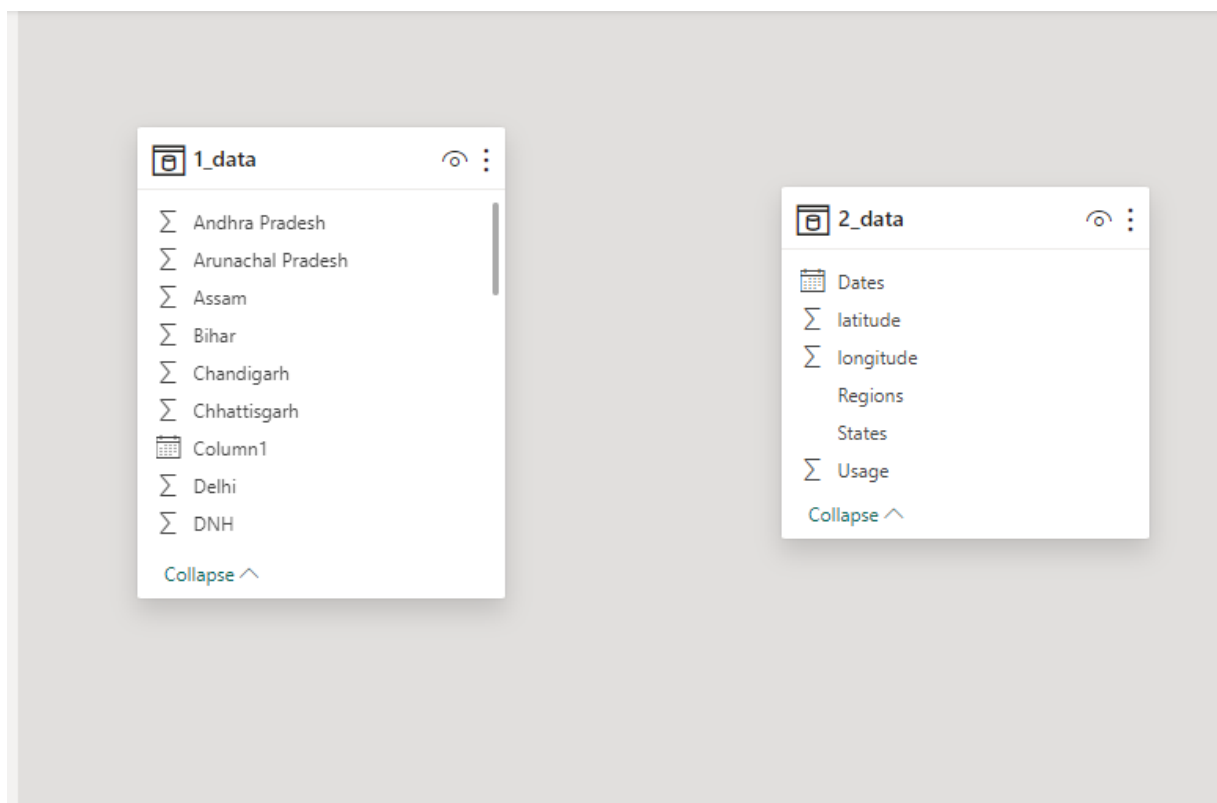
This architecture provides a comprehensive solution for real-time analysis of bank customers. However, it's important to note that the specific architecture may vary depending on the bank's existing infrastructure, specific requirements, and budget. It's also important to ensure that all tools and services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

CHAPTER 4

MODELING AND RESULT

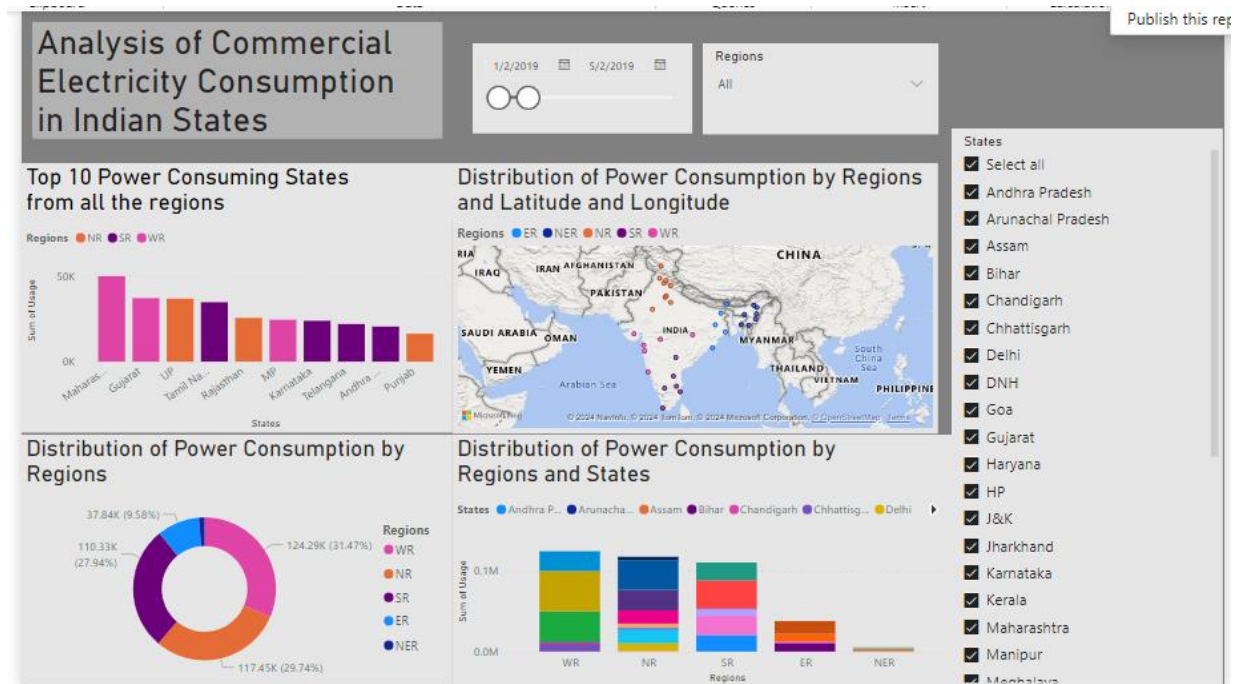
Manage relationship

The “data” file will be used as the main connector as it contains most key identifier (states, regions) which can be use to relates the 2 data files together. The “state” file is use to link the client profile geographically with “state id”

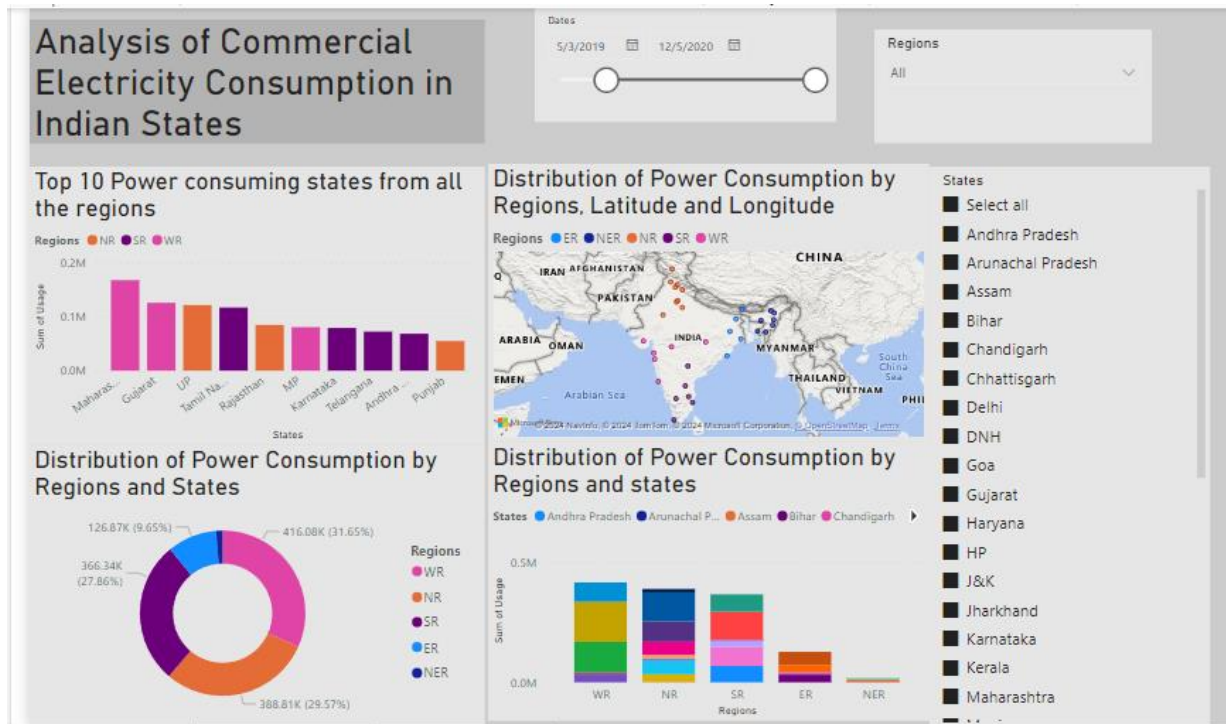


Dashboard

Before Lockdown



After Lockdown



CONCLUSION

The project “ Analysis Commercial electricity consumption in Indian state” using PowerBI has successfully demonstrated the potential of data analytics in the commercial electricity consumption. The commercial electricity consumption in analysis of data has provided valuable insights into electricity preferences, and trends, thereby facilitating informed decision-making. The interactive dashboards and reports have offered a comprehensive view of state data, enabling the identification of patterns and correlations. This has not only improved the efficiency of data analysis but also enhanced the commercial electricity consumption in ability to provide personalized services to its states. 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.

- This study presents a comprehensive analysis of commercial electricity consumption patterns in an Indian state, aiming to provide insights into the dynamics and trends of energy usage in the commercial sector. Utilizing a dataset spanning several years, the analysis employs various statistical and machine learning techniques to uncover patterns, trends, and factors influencing commercial electricity consumption. the study begins with an overview of the commercial sector's importance in the state's economy, highlighting its contribution to overall energy consumption. It then delves into exploratory data analysis to identify seasonal variations, peak consumption periods, and any discernible patterns within the dataset.

initiatives Gather data on commercial electricity consumption in the state over a specific period. This data might be available from the state electricity board or government agencies responsible for energy. Segment the data by different parameters such as urban vs. rural areas, types of businesses, time periods (peak vs. off-peak hours), and geographical regions within the state .Identify factors that influence commercial electricity consumption, such as economic growth, industrial activities, government policies, technological advancements, and weather conditions. Use historical data and trends to forecast future commercial electricity consumption in the state. This can help in planning infrastructure and energy policies. Based on the analysis, draw conclusions about the current state of commercial electricity consumption in the state, its key drivers, challenges, and opportunities. Provide recommendations for optimizing consumption, improving energy efficiency, and promoting sustainable practices.

FUTURE SCOPE

The future scope for commercial electricity consumption in Indian states is significant, driven by various factors such as economic growth, urbanization industrialization, and technological advancements. With increasing demand for commercial spaces, offices, retail outlets, and efficient electricity supply will continue to grow. Additionally, as businesses embrace digitalization automation, there will be a surge in power requirements for data centers, IT infrastructure, and other technology-driven facilities. Policymakers ,businesses, and energy provides will need to collaborate to ensure sustainable and resilient electricity supply for commercial activities ,fostering economic development and prosperity.

REFERENCES

<https://vedas.sac.gov.in/energymap/view/energyDataTbl.jsp>

LINK

<https://github.com/ananthisundari/Arumugasundari>

