

DATA ANALYTICS WITH POWER BI

# " ANALYSIS OF COMMERCIAL ELECTRICITY CONSUMPTION IN INDIAN STATES"

MANONMANIAM SUNDARANAR UNIVERSITY,  
RANI ANNA GOVERNMENT COLLEGE FOR WOMEN,  
TIRUNELVELI.

NM ID	NAME
3D2EBB3868C9364A9D04557705F81822	DEVI SATHYA M

## ABSTRACT

Energy has been universally recongnized as one of the most important input for economic growth and human development. This study examines the variability in commercial electricity consumption across different states in India. Using comprehensive data on commercial electricity usage and socio-economic indicators, the analysis aims to identify key factors influencing consumption

patterns. Methodologies such as regression analysis and data visualization techniques will be employed to explore the relationships between commercial electricity consumption and various factors such as GDP growth, urbanization rates, industrial activity, and policy frameworks. The findings of this study will contribute to a better understanding of the drivers behind commercial electricity demand in Indian states, offering valuable insights for policymakers, energy planners, and stakeholders in the commercial sector. Additionally, the results will inform strategies for sustainable energy management and resource allocation, ultimately supporting India's goals for economic development and energy efficiency.

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## CHAPTER 1

### INTRODUCTION

- **Problem Statement**

The commercial sector plays a crucial role in electricity consumption patterns, yet there is limited understanding of the factors influencing consumption disparities across Indian states. This study aims to address this gap by investigating the

variability in commercial electricity usage among different states. The key objectives include identifying the drivers behind these consumption patterns, assessing the impact of socio-economic factors and policy frameworks, and proposing strategies for efficient energy management. By analyzing commercial electricity consumption at a state level, this research seeks to provide insights that can inform policy decisions, promote sustainable energy practices, and support India's efforts towards economic development and energy security.

- **Proposed Solution**

Data collection of gather data on commercials aired in various Indian states across different platforms (TV, radio, digital platforms). Use tools like media monitoring software, surveys, and market research reports to collect comprehensive data.

Analyze the content of commercials to identify products, brands, messaging, and target demographics. Categorize commercials based on product type (e.g., FMCG, electronics, apparel) and themes (e.g., family-oriented, youth-centric). Assess the impact of commercials on consumer behaviour, brand perception, and sales. Use metrics like brand awareness, purchase intent, and market share to measure the effectiveness of advertising campaigns. Use predictive modeling techniques to forecast future consumption trends based on historical data and current advertising trends. Anticipate shifts in consumer preferences and market dynamics.

- **Feature**

### **1. Socio-Economic Factors Analysis:**

Evaluate socio-economic indicators such as GDP per capita, population density, urbanization rates, industrial growth, and commercial activity to understand their impact on electricity demand

## 2. Temporal Analysis:

Examine temporal patterns in commercial electricity consumption, including daily, weekly, seasonal, and annual fluctuations, to develop targeted strategies for demand management.

## 3. Energy Efficiency Metrics:

Develop energy efficiency metrics and benchmarks for commercial sectors to track progress, identify energy-saving opportunities, and incentivize efficiency improvements.

By incorporating these features into the analysis of commercial electricity consumption in Indian states, stakeholders can gain deeper insights, develop targeted interventions, and optimize energy management practices to support sustainable economic growth and energy security.

- **Advantages**

- \*Data Gathering and Analysis

- \*Socio-Economic Factors Analysis

- \*Sector-wise Analysis

- \*Regional Variation Assessment

- \*Temporal Analysis

- \*Socio-economic Factors Integration

- \*Policy and Regulatory Impact

- \*Technology Adoption Assessment

- \*Load Profile Analysis

\*Energy Efficiency Metrics

\*Customer Behavior Modeling

\*Environmental Impact Evaluation

By incorporating these features into the analysis of commercial electricity consumption in Indian states, stakeholders can gain deeper insights, develop targeted interventions, and optimize energy management practices to support sustainable economic growth and energy security.

## **SCOPE**

1. Data-Driven Decision Making: By analyzing commercial electricity consumption data, policymakers and energy planners can make informed decisions based on evidence and trends rather than assumptions or anecdotal
2. Energy Efficiency Promotion: Analysis of consumption data enables the identification of energy-efficient practices and technologies, encouraging their adoption among commercial establishments to reduce overall energy
3. Sectoral Focus: The primary focus will be on the commercial sector, including retail, hospitality, manufacturing, services.

The scope of the analysis is comprehensive, aiming to provide valuable insights and recommendations for stakeholders to optimize commercial electricity consumption in Indian states while promoting economic growth and environmental sustainability.

## **CHAPTER 2**

## **SERVICES AND TOOLS REQUIRED**

### **2.1 Services Used**

- **Data Collection and Storage Services:** To collect and store the data of commercial electricity consumption in indian states. This could be achieved form various staes usage of electricity in INDIA. Gather data from selected sources using appropriate methods. This may involve accessing databases, downloading reports, conducting surveys, or utilizing APIs for real-time data retrieval.
- **Data Processing Services:** Cloud-based platform where users can publish, share, and collaborate on Power BI reports and dashboards. It provides features such as data refresh scheduling, sharing and collaboration tools, and access control through integration with Azure Active Directory.
- **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:**

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

Power BI Desktop is a free desktop application that enables users to create interactive reports and dashboards using data from multiple sources. It provides a range of data transformation, modeling, and visualization capabilities.

- **Power Query:** Users can import data from one or multiple sources into Excel or Power BI using Power Query. The data import process is intuitive and can be customized based on specific requirements.

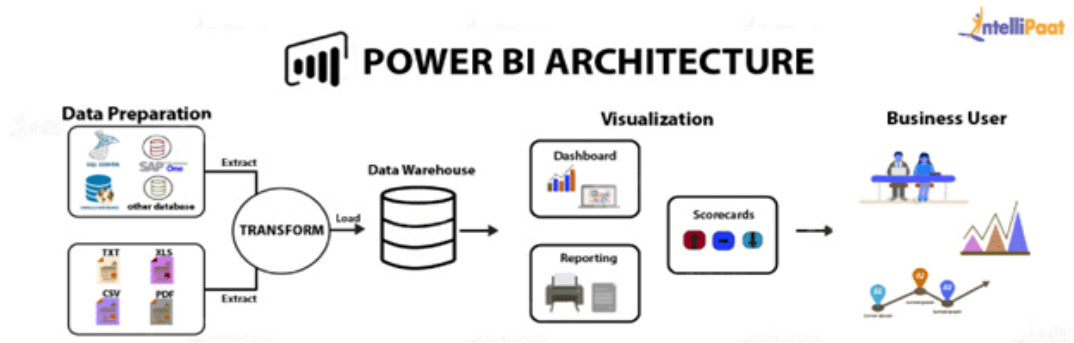
#### **Software Requirements:**

- **PowerBI Desktop:** Power BI Desktop is a versatile and user-friendly tool for creating powerful reports and dashboards from diverse data sources, enabling users to derive insights and make data-driven decisions.
- **PowerBI Service:** Power BI Service provides a scalable and flexible platform for sharing, collaborating, and consuming Power BI content, enabling organizations to derive insights and make data-driven decisions across their entire enterprise.
- **PowerBI Mobile:** This is a mobile application that you can use to access your reports and dashboards on the go.

## **CHAPTER 3**

### **PROJECT ARCHITECTURE**

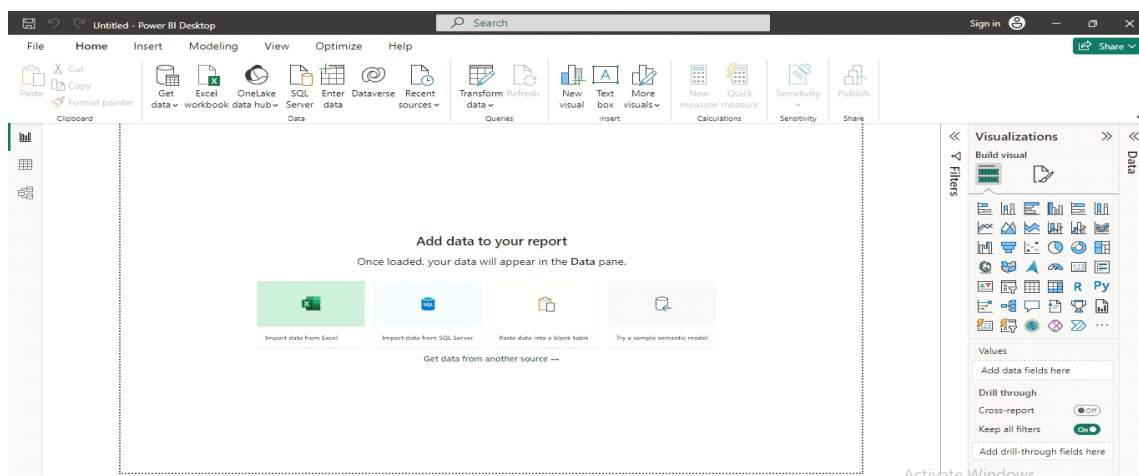
#### **3.1 Architecture**



- **Data Collection:** Real-time data of electricity is collected from various sources of electricity from various states in India. Gather data from selected sources using appropriate methods. This may involve accessing databases, downloading reports, conducting surveys, or utilizing APIs for real-time data retrieval.

Analysis of Commercial Electricity Consumption 3/19/2024 9:21 PM File folder

- **Data Storage:** Choose a suitable storage solution for your data. Power BI supports various data storage options, including:
  - **Excel:** Store data in Excel spreadsheets and import them directly into Power BI.
  - **CSV/Text Files:** Save data in CSV or text file.



- **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 SageMaker. These models can help in predicting customer behavior, detecting fraud, etc.
- **Data Visualization:** Power BI offers a wide range of visualization options, including bar charts, line charts, pie charts, maps, gauges, and more. Users can customize the appearance and formatting of visualizations and create interactive dashboards for data exploration.
- **Data Access:** By providing multiple options for data access, Power BI enables users to connect to a wide range of data sources and leverage their data for insightful analysis and visualization.

## CHAPTER 4

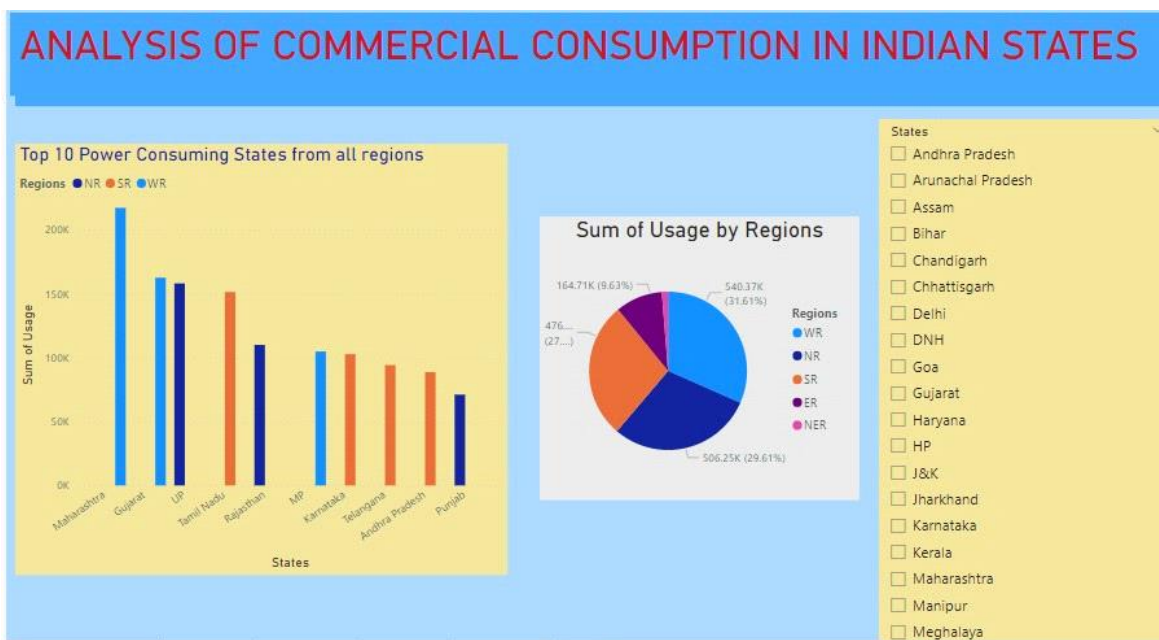
### DATA WITH RESULT

#### The usage of electricity in state wise data:

States	Regions	latitude	longitude	Dates	Usage
Punjab	NR	31.51997398	75.98000281	1/2/2019 12:00:00 AM	119.9
Haryana	NR	28.45000633	77.01999101	1/2/2019 12:00:00 AM	130.3
Rajasthan	NR	26.44999921	74.63998124	1/2/2019 12:00:00 AM	234.1
Delhi	NR	28.6699929	77.23000403	1/2/2019 12:00:00 AM	85.8
UP	NR	27.59998069	78.05000565	1/2/2019 12:00:00 AM	313.9
Uttarakhand	NR	30.32040895	78.05000565	1/2/2019 12:00:00 AM	40.7
HP	NR	31.10002545	77.16659704	1/2/2019 12:00:00 AM	30
J&K	NR	33.45	76.24	1/2/2019 12:00:00 AM	52.5
Chandigarh	NR	30.71999697	76.78000565	1/2/2019 12:00:00 AM	5
Chhattisgarh	WR	22.09042035	82.15998734	1/2/2019 12:00:00 AM	78.7
Gujarat	WR	22.2587	71.1924	1/2/2019 12:00:00 AM	319.5
MP	WR	21.30039105	76.13001949	1/2/2019 12:00:00 AM	253
Maharashtra	WR	19.25023195	73.16017493	1/2/2019 12:00:00 AM	428.6
Goa	WR	15.491997	73.81800065	1/2/2019 12:00:00 AM	12.8
DNH	WR	20.26657819	73.0166178	1/2/2019 12:00:00 AM	18.6
Andhra Pradesh	SR	14.7504291	78.57002559	1/2/2019 12:00:00 AM	164.6
Telangana	SR	18.1124	79.0193	1/2/2019 12:00:00 AM	204.2
Karnataka	SR	12.57038129	76.91999711	1/2/2019 12:00:00 AM	206.3
Kerala	SR	8.900372741	76.56999263	1/2/2019 12:00:00 AM	72.7
Tamil Nadu	SR	12.92038576	79.15004187	1/2/2019 12:00:00 AM	268.3
Pondy	SR	11.93499371	79.83000037	1/2/2019 12:00:00 AM	6.3
Bihar	ER	25.78541445	87.4799727	1/2/2019 12:00:00 AM	82.3
Jharkhand	ER	23.80039349	86.41998572	1/2/2019 12:00:00 AM	24.8
Odisha	ER	19.82042971	85.90001746	1/2/2019 12:00:00 AM	70.2

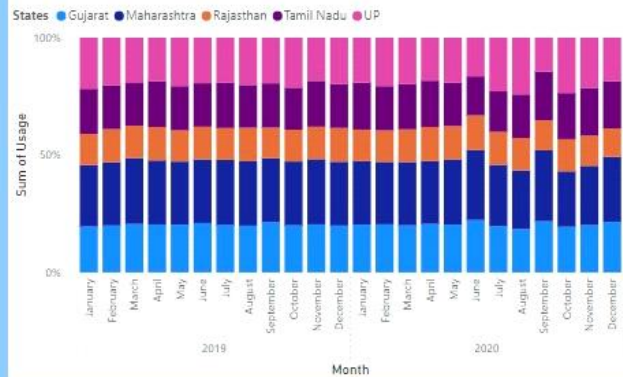
Column1	Punjab	Haryana	Rajasthan	Delhi	UP
1/2/2019 12:00:00 AM	119.9	130.3	234.1	85.8	313.9
1/3/2019 12:00:00 AM	121.9	133.5	240.2	85.5	311.8
1/4/2019 12:00:00 AM	118.8	128.2	239.8	83.5	320.7
1/5/2019 12:00:00 AM	121	127.5	239.1	79.2	299
1/6/2019 12:00:00 AM	121.4	132.6	240.4	76.6	286.8
1/7/2019 12:00:00 AM	118	132.1	241.9	71.1	294.2
1/8/2019 12:00:00 AM	107.5	121.4	237.2	69	289.4
1/9/2019 12:00:00 AM	132.5	148.2	197	89.2	258.6
1/10/2019 12:00:00 AM	131.5	157	199.9	92.8	284.2
1/11/2019 12:00:00 AM	130.3	145.3	187.7	79.5	281.4
1/12/2019 12:00:00 AM	137.9	151.9	189.9	92.6	298.6
1/13/2019 12:00:00 AM	135.8	141.4	186.9	89.4	310
1/14/2019 12:00:00 AM	139.3	143.8	195.2	82.2	319.5
1/15/2019 12:00:00 AM	141.1	142.9	185.4	77.8	326.7

## Dashboard

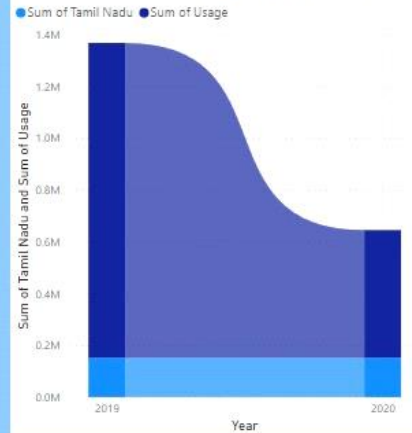


## ANALYSIS OF COMMERCIAL CONSUMPTION IN INDIAN STATES

### YEAR AND MONTH WISE USAGE BY TOP 5 STATES

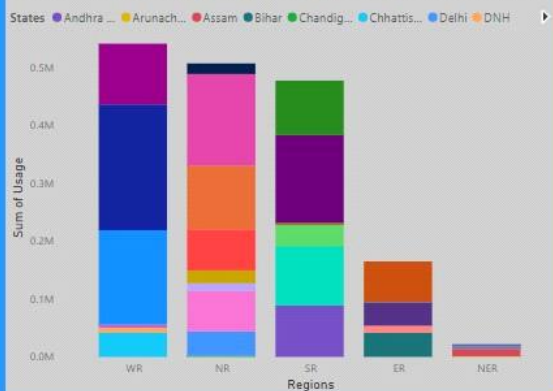


### USAGE OF ELECTRICITY IN TAMIL NADU

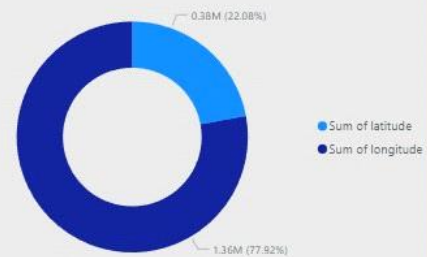


## ANALYSIS OF COMMERCIAL CONSUMPTION IN INDIAN STATES

### Sum of Usage by Regions and States



### Sum of latitude and Sum of longitude



## **CONCLUSION**

The conclusion for commercial electricity consumption in Indian states depends on the analysis of various factors such as economic growth, industrial development, government policies, and infrastructure. However, without specific data or analysis provided, a general conclusion could be that commercial electricity consumption varies significantly among Indian states due to differences in economic activities, industrialization levels, and infrastructure development. 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. Further research and analysis would be needed to draw more precise conclusions regarding commercial electricity consumption patterns across different Indian states.

## **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. Future scope for the analysis of commercial electricity consumption in Indian states includes longitudinal studies, sector-specific analyses, geospatial mapping, energy efficiency assessments, impact evaluations of digitalization, policy assessments, consumer behavior analysis, consideration of socio-economic factors, scenario planning, and collaborative research efforts. These endeavors aim

to provide comprehensive insights, inform evidence-based decision-making, promote energy efficiency, and foster sustainable development across Indian states. The future scope involves continued research in areas such as longitudinal studies, sector-specific analyses, geospatial mapping, consumer behavior studies, and policy evaluations, ensuring ongoing improvement and refinement of strategies to address evolving energy challenges.

**LINK**

