# Tech Saksham

Case Study Report

## Data Analytics with Power BI

# "Analysis of Commercial Electricity Consumption in Indian State"

**Sivanthi Arts and Science College for Women**

| NM ID | NAME |
|---|---|
| C423550A429CDC9A83B4F8AA4FDB40A9 | S. KANMANI |

**Trainer Name:R. UMAMAHESWARI**

**Master Trainer:R. UMAMAHESWARI**

# ABSTRACT

**Energy has been universally recognized as one of the most 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 the are highly consumes among public and 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.**

# INDEX


| Sr. No. | Table of Contents | Page No. |
|---|---|---|
| 1 | Chapter 1: Introduction | 4 |
| 2 | Chapter 2: Services and Tools Required | 6 |
| 3 | Chapter 3: Project Architecture | 7 |
| 4 | Chapter 4: Modeling and Result | 9 |
| 5 | Conclusion | 18 |
| 6 | Future Scope | 19 |
| 7 | References | 20 |
| 8 | Links | 21 |

# CHAPTER 1

# INTRODUCTION

## 1.1 Problem Statement

**Over the years, the capacity to generate electricity has increased, however the actual generation of electricity has not been commensurate with this increased capacity. Key reasons for the low utilisation of generation capacity are: (1) shortage of fuel, especially coal, and (2) unviable Power Purchase Agreements.**

## 1.2 Proposed Solution

**Based on the engraved statistical inferences pertained to commercial energy consumption in India has been fluctuating that resulted from found growth rate therein but 2014th result shows that begin to get develop compare to 2013th growth rate. While consider the total consumption of commercial energy, that has been mounting up year and found at 5.48 percentin compound annual growth rate result. Consumption trends of Natural gas shows from 2008 onwards fluctuating status but 2011th result brought high 51.25 consumption ratio the reason for this result is, price of natural gas is inversely related to petroleum and coal price. While these price increase demand for natural gas also will be increased because country India has lack of sources to produce for fulfill it domestic needs. For decline its consumption only because of necessities of alternative energy like coal, LPG and kerosene.**

## 1.3 Feature

- **Data Connectivity:** Power BI prowess begins with its remarkable data connectivity capabilities. With over 100 connectors, ranging from popular databases like MySQL to cloud-based services such as Google Analytics, Power BI ensures that your data sources are never out of reach. This connectivity versatility empowers users to consolidate data from diverse sources into a unified view.
- **Data Transformation and Modeling:** Explore the capabilities of the Power Query Editor, a robust tool designed for seamless data cleaning, shaping, and transformation.
- **Interactive Dashboards:** Uncover the art of creating captivating dashboards that go beyond static reports. Power BI provides a rich set of visualization tools, from basic charts to sophisticated custom visuals.

## 1.3 Advantages

- **Energy Savings:** Perhaps the most obvious benefit of a commercial energy consumption analysis lies in its potential to protect your bottom line. By analyzing a buildings energy from the inside out, using the latest technologies and innovative solutions, a comprehensive energy analysis can significantly reduce utility bills.
- **Operational Improvements:** Its also result in operations benefits. Through building system upgrades, organizations can experience:
  (1) Increased operational efficiency
  (2) Improved equipment reliability and longevity
  (3) Reduced downtime due to equipment malfunctions.

## 1.4 Scope

**India seeks greater energy efficiency and there is a growing market for technology and services that can help deliver it. Energy is one India's most dynamic consumptions and opportunities will evolve rapidly in renewables, energy technologies and power infrastructure. Energy conversation can be achieved in two different ways that include reducing the amount of primary energy consumed to supply the useful energy requrement (energy efficiency), and Reducing the end point use of nonessential energy.**

# CHAPTER 2

# SERVICES AND TOOLS REQUIRED

## 2.1 Services Used

- **Data Collection and Storage Services:** Electricity Department 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:

- **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:

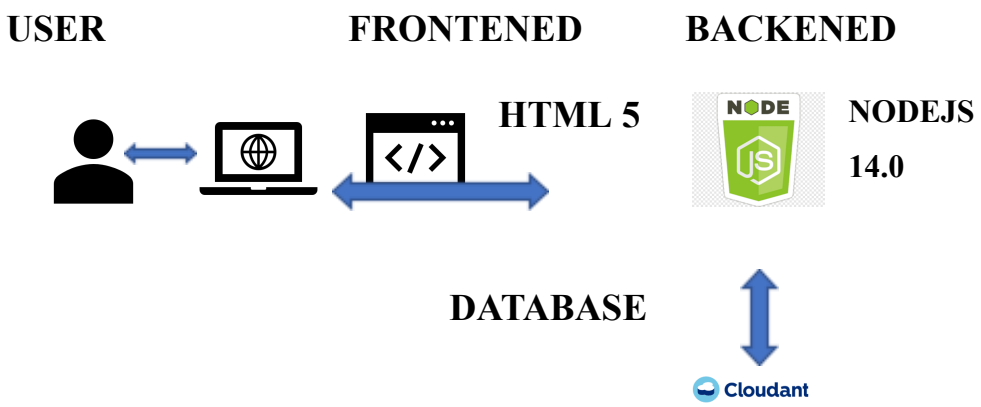
- **PowerBI Desktop: This is a Windows application that you can use to create reports and publish them to PowerBI.**
- **PowerBI Service: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.**
- **PowerBI Mobile: This is a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

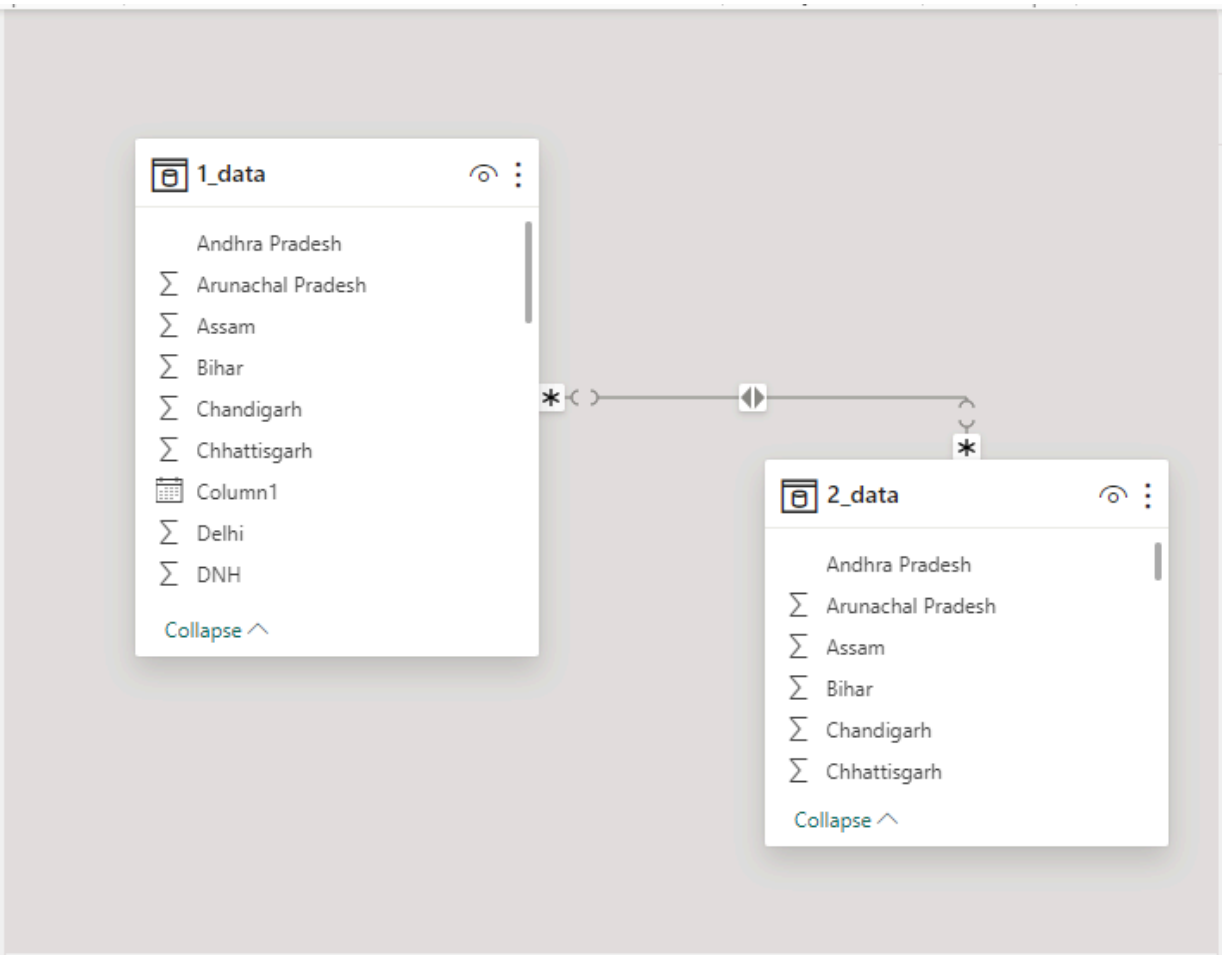
 

# CHAPTER 4

# MODELING AND RESULT

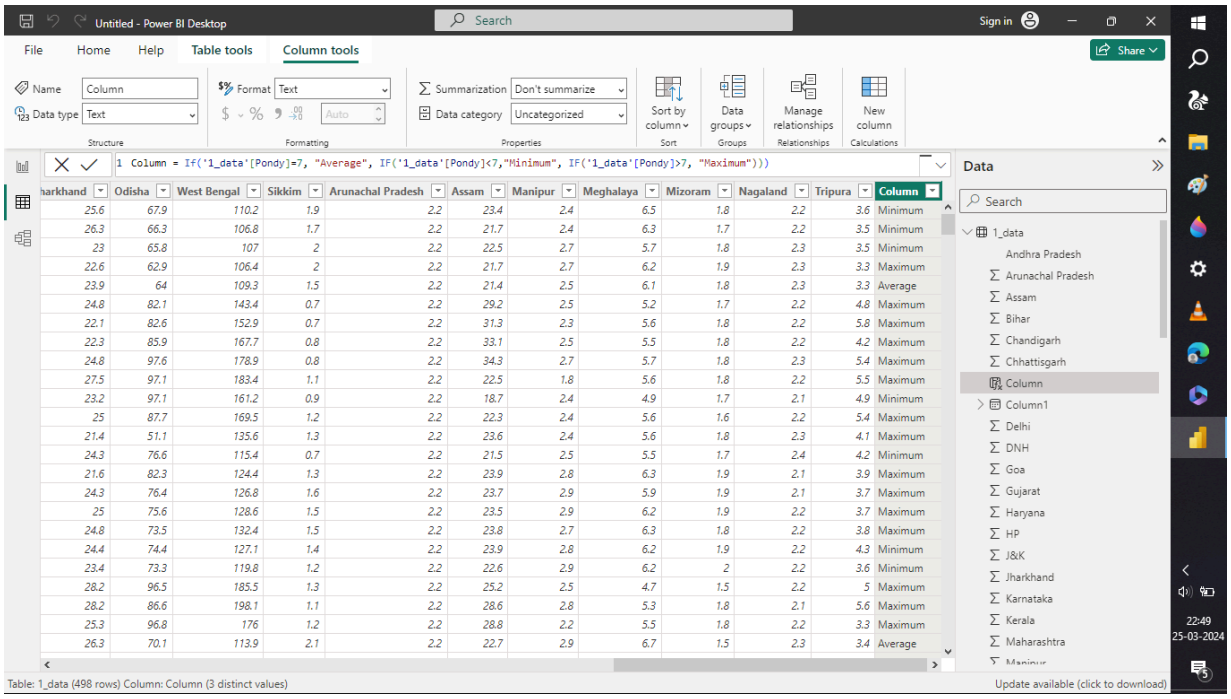
## Manage relationship

**The "long 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 Sheet 1 data file is use to link the client profile geographically with states.**

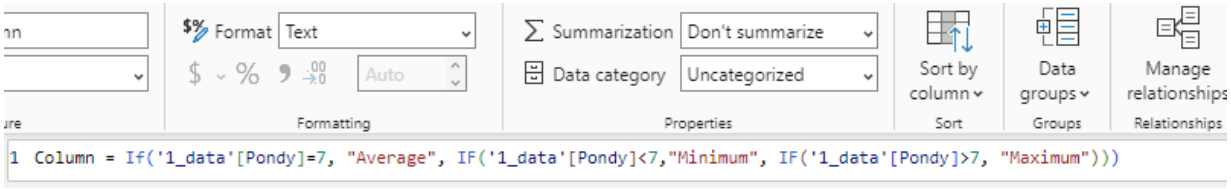


**In the above map there is a relationship between the states like Arunachal Pradesh and Bihar,etc.**



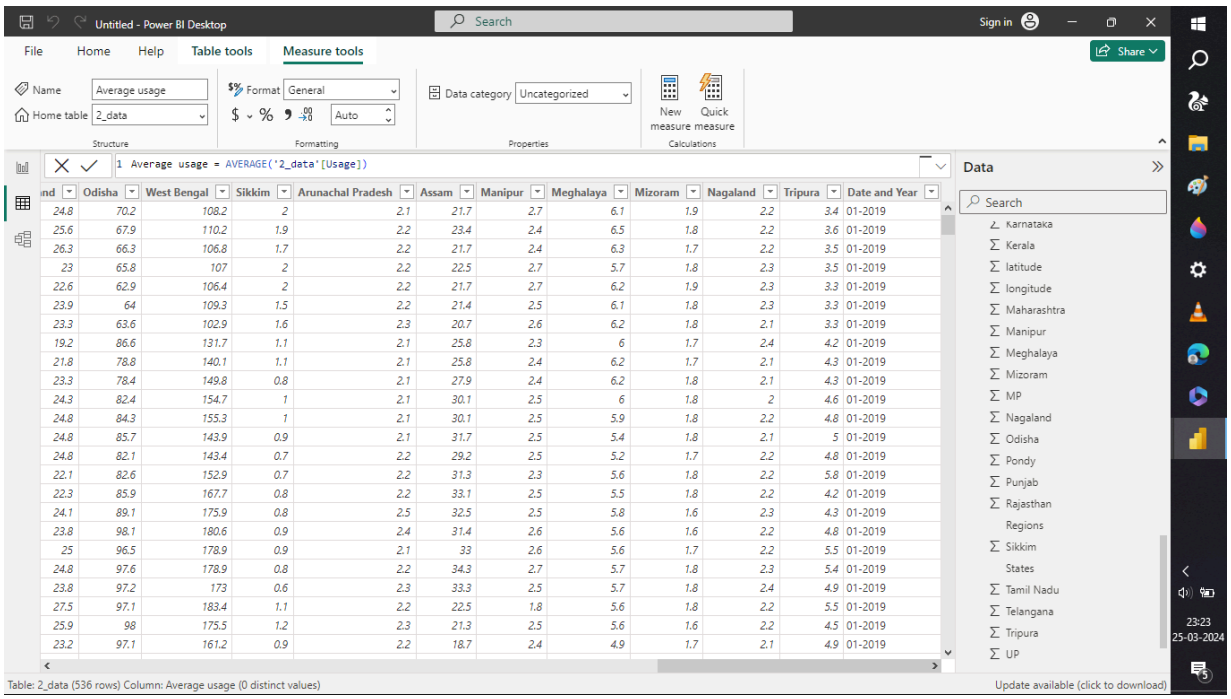

**Adding a new column by the state Pondy and for that giving the formula as**



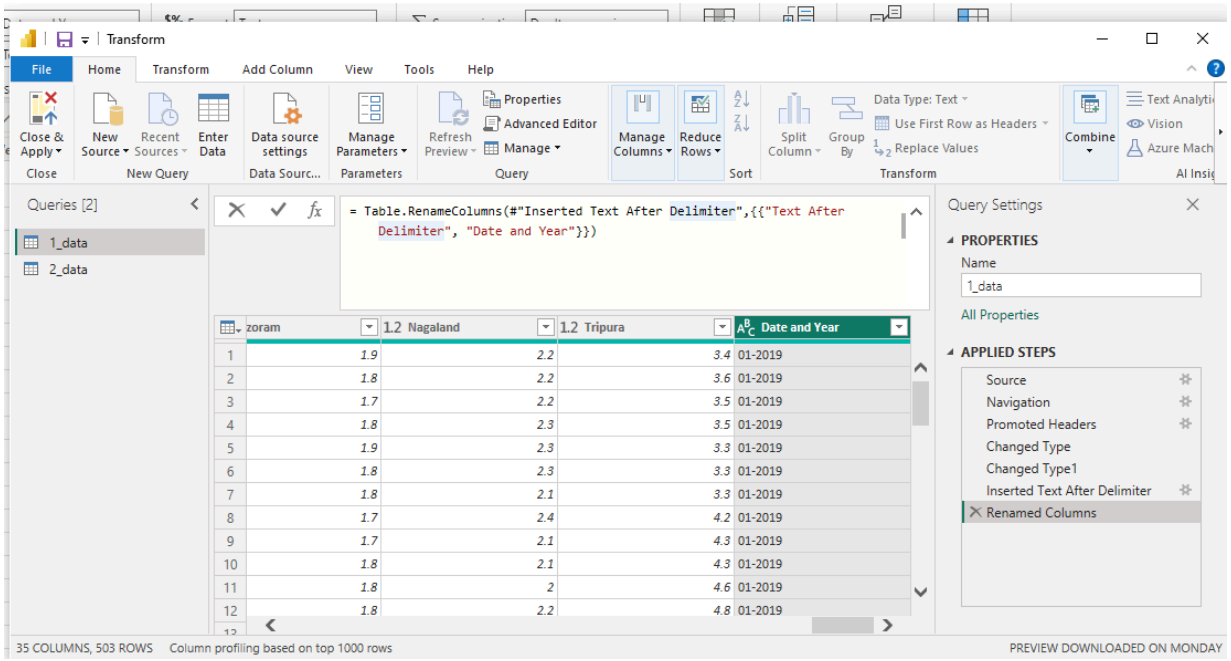

**then we get a new column with the new values.**

**Next, we have to change the column with dates and time to dates only in the power query editor. Then we have to extract the date as date and year in the last column.**




**and the formula for the extraction of the table is given by**



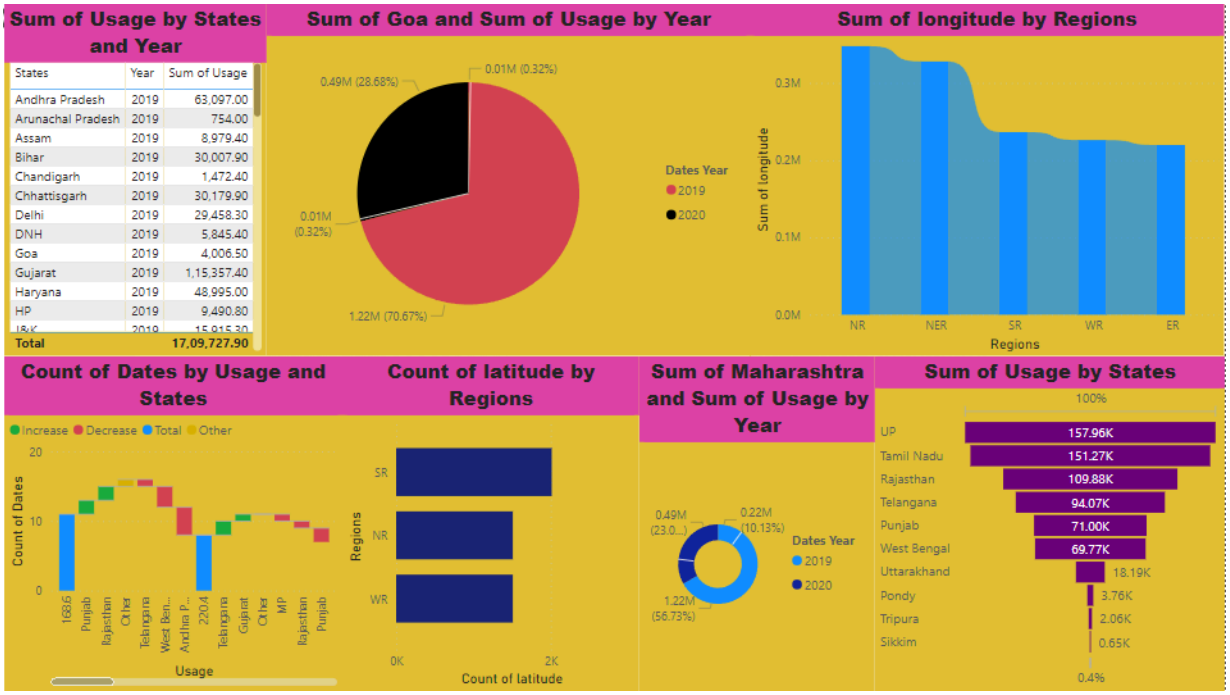

 

## Modeling for Sum of Usage data:

**For the sum of usage by states graph, we drag the sum of usage data in the x-axis and dragging the states data in the y-axis.**

**Applying the filter to the sum of usage for the graph we get the top ten states which has been using the most of the electricity.**

## Dashboard



## CONCLUSION

**The present study has described pertaining to energy consumption in the aspect of classified commercial type energy with the reference of India different sectorial energy consumption. Energy conditions of the country with past data promoted us to analysis present and future requires of energy also used. Examines of commercial energies and its affections among the people entitled here specifically and subsequently, consumption and demand pattern of energy with the causes of variations also included. Mainly, the causes fr dynamic changes on energy consumption from non-commercial to commercial energy also engraved for the findings of present existing scarce in renewable sources for resolve it.**

## FUTURE SCOPE

**Utilities in india have a mandate to supply power which becomes increasingly difficult through the centralised grid and is technically and economically challenging for more remote places. Utilities India have a mandate to supply power. Despite the union governments electrification spree, the availability of quality electricity is a far-fetched dream in rural areas. Supply of electricity through centrailised grid becomes increasingly difficult and technically and economically. Challenging for more remote places. Local, self-controlled electric systems capable of producing power are, thus, a way out. Electricity is one of the greatest gifts to mankind. But the supply in India has its shortcomings in terms of equity-economic, ecological, qualitative and quantitative which are much desired, said pavan publish reports, create new dashboards, and share insights.**

# REFERENCES

https://www.researchgate.net/publication/354401757_A_Study_on_Major_Commercial_Energy_Consumption_in_India

# LINKS