DATA ANALYTICS WITH POWER BI

"ANALYSIS OF COMMERCIAL ELECTRICITY IN INDIAN STATES"

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ABSTRACT

In the digital age, data has become an invaluable asset for commercial sectors . The proposed project , "Analysis of Commercial Electricity in Indian States"aims to leverage Power BI, a leading commercial intelligence tool to analysis and visualize commercial electricity consumption in Indian States. India is one of the fastest developing country in the world. To sustain this growth energy and electricity demands will increase. Models were tested on data from previous year and adjusted accordingly. On the electricity production side, all scenarios stress the role of coal renewable and nuclear source.

INDEX

CHAPTER I

INTRODUCTION

Electricity infrastructure and production are important for a developing economy like that of India with which a population of 1.2 billion and area of 329 million km^2 is the seventh largest country in the world. From several scenarios we decided to introduce two possibilities, i.e., a scenario using high energy saving in all sector and a scenario counting on a high industrial growth not supported by an equal increase of electricity saving.

Problem Statement:

Historically, inadequate generation capacity was the key contributor to power defect. However, generation capacity has improved in the last few years due to high participation by the private sector. 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 reason for the low utilization of generation capacity are storage of fuel, especially, coal and unviable power purchase agreements.

Proposed Solution:

Planning and policy reforms involving scarcity management to one of flexible resiliency. Need to introduce feedback loops in ecosystem incentives to achieve or exceed complaints, but repercussions if they don't. Policy focus must be on long term structural solutions addressing distribution financial viability coupled with Robust mechanism for resource planning. India should enhance investments in clean coal technologies deployment through- out coal value chain.

Advantages:

Good power density of 3 phase ac power networks. Power on demand that functionally draws only the power required by the load from the sources. Self testand monitoring easy to implement. Easy dynamic re-configuration of the power path for supplying users.

CHAPTER:II

SERVICE AND TOOLS REQUIRED

Services Used:

Software tools like excel, Python with libraries such as Pandas or specialized energies analytical platforms to process and analysis the electricity usage data. These tools can help in statistical analysis, trend identification and visualization of data. GIS software can be helpful for spatial analysis, mapping electricity consumption, patterns across different regions within the state and identifying areas with high or low consumption rates.

Tools and Software Used:

Tools

Power BI: The main tool for this project is Power BI, which will be used to create interactive dash boards for commercial data visualization.

Power Query: This is the data connection technology that enable us to discover, connect, combine and refine data across the wide variety of sources.

Software Requirements

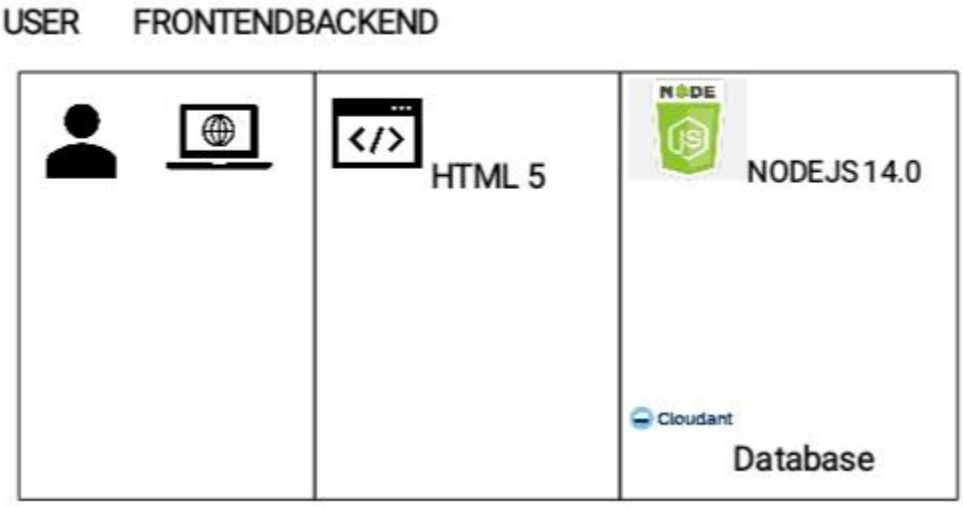
Power BI Desktop: This is the windows application that we can use create reports and publish them to Power BI.

Power BI Service: This is an online SaaS service that we use to publish reports, create dash boards and share insights.

Power BI Mobile: This is a mobile application that we can use to assess our reports and dash boards on the go.

CHAPTER III

PROJECT ARCHITECTURE



Data Collection:

Gathering data on electricity consumption, demand patterns, pricing structures and distribution network.

Data Processing:

Processing the collected data to identify trends, consumption patterns and demand-supply gap.

GIS Mapping:

Utilizing GIS tool map distribution network, identify areas with high consumption and assess infrastructure requirements.

Demand Forecasting:

Employing statistical models and machines, learning algorithms to forecast electricity demands based on historical data, economical indicators and seasonal variations.

Cost-Benefit Analysis:

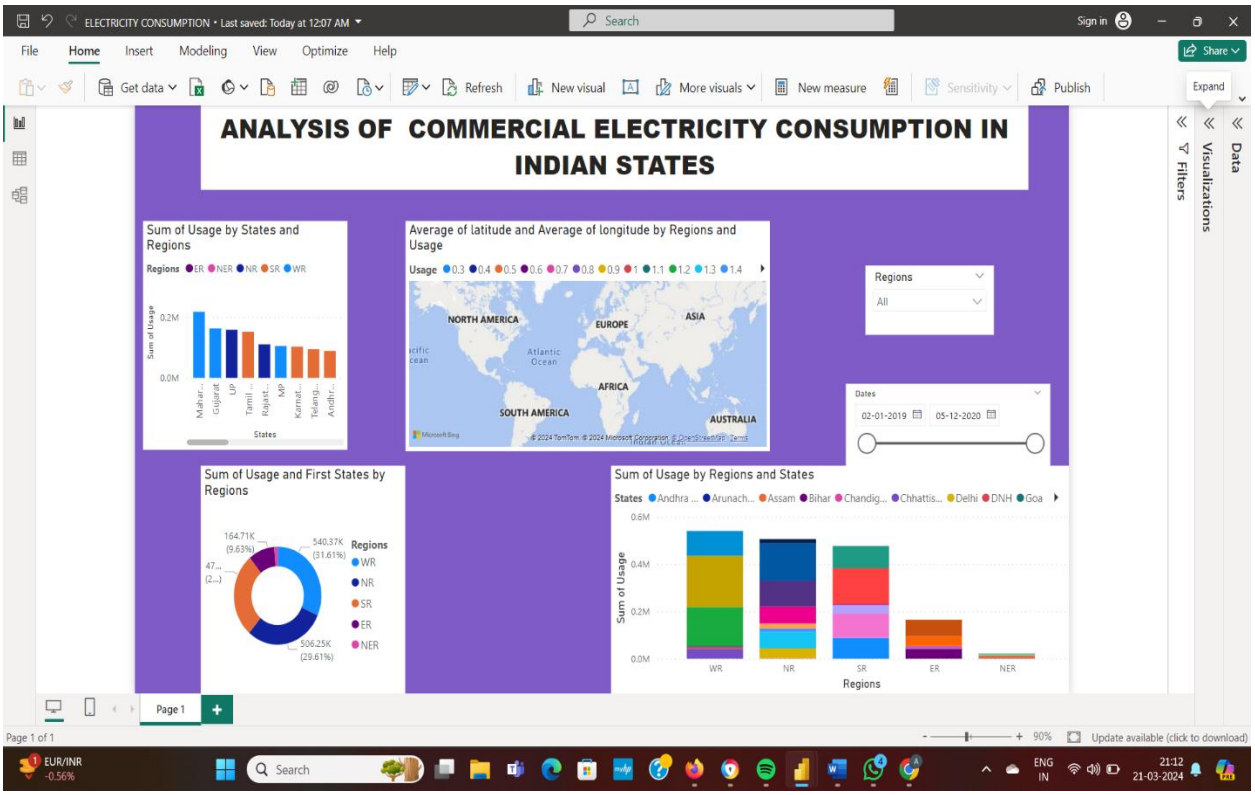
Conducting a cost benefit analysis of various strategies for improving electricity supply, including infrastructure investments, renewable energy integration and demand-side management programs

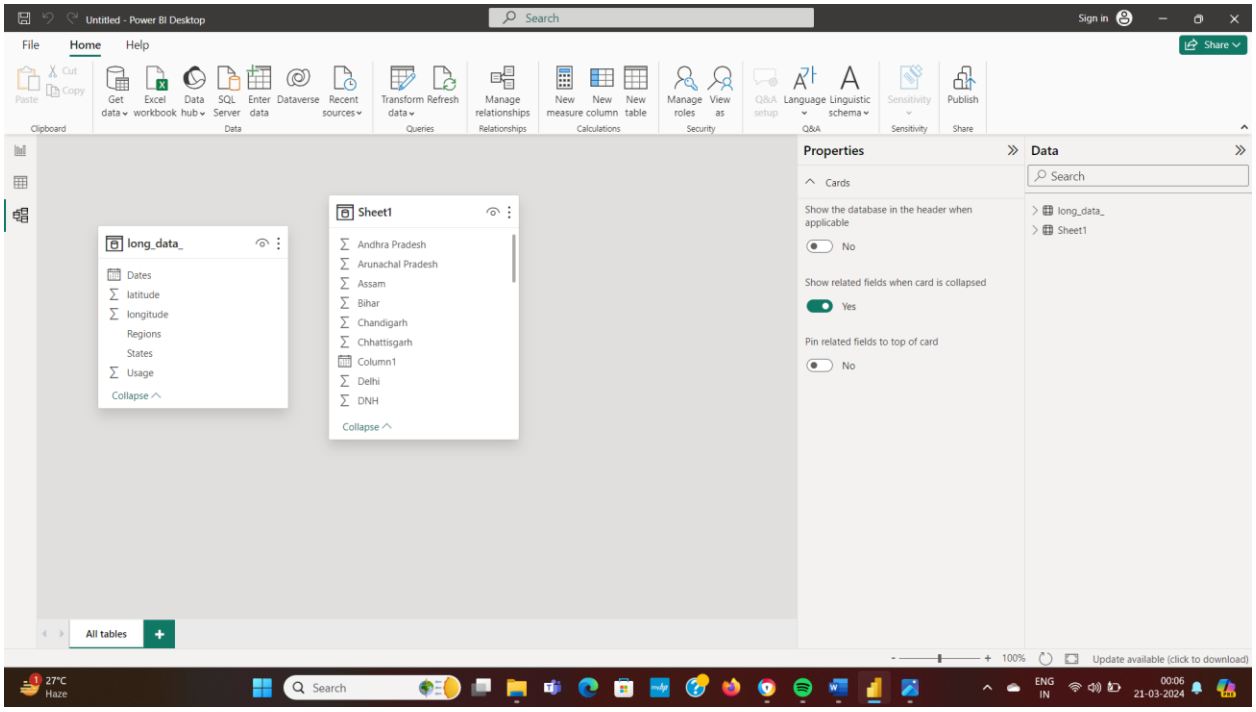
This architecture provides a comprehensive solution for commercial electricity consumption in Indian States.

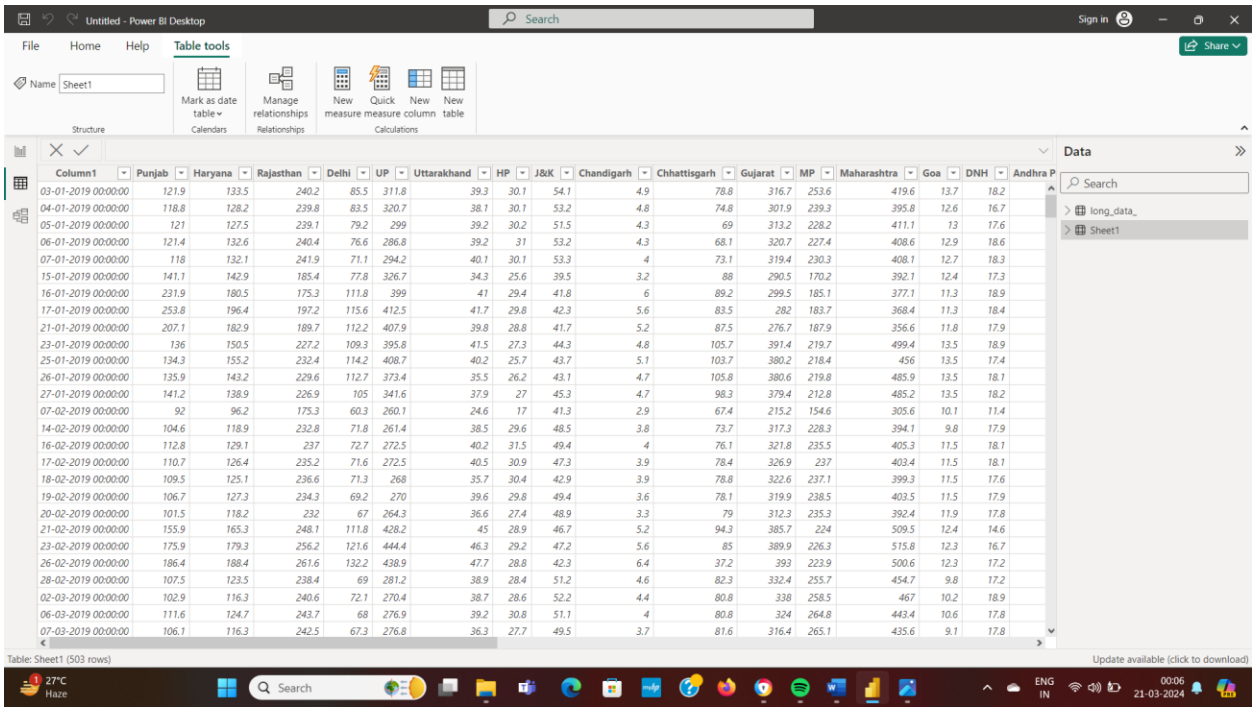
CHAPTER IV

MODELLING AND RESULT

The disp file will be used as the main connector as it contains most key identifier which can be used to 8 data files together. The district file is used to link the client profile geographically with district ID.


ELECTRICITY CONSUMPTION • Last saved: Today at 12:07 AM
Search
Sign in
File
Home
Insert
Modeling
View
Optimize
Help
Share
Get data
Refresh
New visual
More visuals
New measure
Sensitivity
Publish
Expand
ANALYSIS OF COMMERCIAL ELECTRICITY CONSUMPTION IN INDIAN STATES
Sum of Usage by States and Regions
Regions ER NER NR SR WR
Sum of Usage
0.2M
0.0M
Maha...
Gujarat
UP
Tamil ...
Rajast...
MP
Karnat...
Telang...
Andhr...
States
Average of latitude and Average of longitude by Regions and Usage
Usage 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4
NORTH AMERICA
EUROPE
ASIA
Atlantic Ocean
AFRICA
SOUTH AMERICA
AUSTRALIA
Regions
All
Dates
02-01-2019
05-12-2020
Sum of Usage and First States by Regions
164.71K (9.63%)
540.37K (31.61%)
47... (2...)
506.25K (29.61%)
Regions
WR
NR
SR
ER
NER
Sum of Usage by Regions and States
States Andhra ... Arunach... Assam Bihar Chandig... Chhattis... Delhi DNH Goa
0.6M
0.4M
0.2M
0.0M
Sum of Usage
WR
NR
SR
ER
NER
Regions
Filters
Visualizations
Data
Page 1
Page 1 of 1
90%
Update available (click to download)
EUR/INR -0.56%
Search
ENG IN
21:12
21-03-2024


Untitled - Power BI Desktop
Search
Sign in
File
Home
Help
Share
Paste
Cut
Copy
Get data
Excel workbook
Data hub
SQL Server
Enter data
Dataverse
Recent sources
Transform data
Refresh
Manage relationships
New measure
New column
New table
Manage roles
View as
Q&A setup
Language
Linguistic schema
Sensitivity
Publish
Clipboard
Data
Queries
Relationships
Calculations
Security
Q&A
Sensitivity
Share
long_data_
Dates
latitude
longitude
Regions
States
Usage
Collapse
Sheet1
Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chandigarh
Chhattisgarh
Column1
Delhi
DNH
Collapse
Properties
Cards
Show the database in the header when applicable
No
Show related fields when card is collapsed
Yes
Pin related fields to top of card
No
Data
Search
long_data_
Sheet1
All tables
100%
Update available (click to download)
27°C Haze
Search
ENG IN
00:06
21-03-2024



Column1	Punjab	Haryana	Rajasthan	Delhi	UP	Uttarakhand	HP	J&K	Chandigarh	Chhattisgarh	Gujarat	MP	Maharashtra	Goa	DNH	Andhra P
03-01-2019 00:00:00	121.9	133.5	240.2	85.5	311.8	39.3	30.1	54.1	4.9	78.8	316.7	253.6	419.6	13.7	18.2	
04-01-2019 00:00:00	118.8	128.2	239.8	83.5	320.7	38.1	30.1	53.2	4.8	74.8	301.9	239.3	395.8	12.6	16.7	
05-01-2019 00:00:00	121	127.5	239.1	79.2	299	39.2	30.2	51.5	4.3	69	313.2	228.2	411.1	13	17.6	
06-01-2019 00:00:00	121.4	132.6	240.4	76.6	286.8	39.2	31	53.2	4.3	68.1	320.7	227.4	408.6	12.9	18.6	
07-01-2019 00:00:00	118	132.1	241.9	71.1	294.2	40.1	30.1	53.3	4	73.1	319.4	230.3	408.1	12.7	18.3	
15-01-2019 00:00:00	141.1	142.9	185.4	77.8	326.7	34.3	25.6	39.5	3.2	88	290.5	170.2	392.1	12.4	17.3	
16-01-2019 00:00:00	231.9	180.5	175.3	111.8	399	41	29.4	41.8	6	89.2	299.5	185.1	377.1	11.3	18.9	
17-01-2019 00:00:00	253.8	196.4	197.2	115.6	412.5	41.7	29.8	42.3	5.6	83.5	282	183.7	368.4	11.3	18.4	
21-01-2019 00:00:00	207.1	182.9	189.7	112.2	407.9	39.8	28.8	41.7	5.2	87.5	276.7	187.9	356.6	11.8	17.9	
23-01-2019 00:00:00	136	150.5	227.2	109.3	395.8	41.5	27.3	44.3	4.8	105.7	391.4	219.7	499.4	13.5	18.9	
25-01-2019 00:00:00	134.3	155.2	232.4	114.2	408.7	40.2	25.7	43.7	5.1	103.7	380.2	218.4	456	13.5	17.4	
26-01-2019 00:00:00	135.9	143.2	229.6	112.7	373.4	35.5	26.2	43.1	4.7	105.8	380.6	219.8	485.9	13.5	18.1	
27-01-2019 00:00:00	141.2	138.9	226.9	105	341.6	37.9	27	45.3	4.7	98.3	379.4	212.8	485.2	13.5	18.2	
07-02-2019 00:00:00	92	96.2	175.3	60.3	260.1	24.6	17	41.3	2.9	67.4	215.2	154.6	305.6	10.1	11.4	
14-02-2019 00:00:00	104.6	118.9	232.8	71.8	261.4	38.5	29.6	48.5	3.8	73.7	317.3	228.3	394.1	9.8	17.9	
16-02-2019 00:00:00	112.8	129.1	237	72.7	272.5	40.2	31.5	49.4	4	76.1	321.8	235.5	405.3	11.5	18.1	
17-02-2019 00:00:00	110.7	126.4	235.2	71.6	272.5	40.5	30.9	47.3	3.9	78.4	326.9	237	403.4	11.5	18.1	
18-02-2019 00:00:00	109.5	125.1	236.6	71.3	268	35.7	30.4	42.9	3.9	78.8	322.6	237.1	399.3	11.5	17.6	
19-02-2019 00:00:00	106.7	127.3	234.3	69.2	270	39.6	29.8	49.4	3.6	78.1	319.9	238.5	403.5	11.5	17.9	
20-02-2019 00:00:00	101.5	118.2	232	67	264.3	36.6	27.4	48.9	3.3	79	312.3	235.3	392.4	11.9	17.8	
21-02-2019 00:00:00	155.9	165.3	248.1	111.8	428.2	45	28.9	46.7	5.2	94.3	385.7	224	509.5	12.4	14.6	
23-02-2019 00:00:00	175.9	179.3	256.2	121.6	444.4	46.3	29.2	47.2	5.6	85	389.9	226.3	515.8	12.3	16.7	
26-02-2019 00:00:00	186.4	188.4	261.6	132.2	438.9	47.7	28.8	42.3	6.4	37.2	393	223.9	500.6	12.3	17.2	
28-02-2019 00:00:00	107.5	123.5	238.4	69	281.2	38.9	28.4	51.2	4.6	82.3	332.4	255.7	454.7	9.8	17.2	
02-03-2019 00:00:00	102.9	116.3	240.6	72.1	270.4	38.7	28.6	52.2	4.4	80.8	338	258.5	467	10.2	18.9	
06-03-2019 00:00:00	111.6	124.7	243.7	68	276.9	39.2	30.8	51.1	4	80.8	324	264.8	443.4	10.6	17.8	
07-03-2019 00:00:00	106.1	116.3	242.5	67.3	276.8	36.3	27.7	49.5	3.7	81.6	316.4	265.1	435.6	9.1	17.8	

CONCLUSION

The project "Analysis of Commercial Electricity in Indian States" using Power BI has successfully demonstrated the potential of data analytics in the commercial electricity sector. The analysis of customer data has provided valuable insights into customer behavior, preferences and trends, thereby facilitating informed decision-making. The interactive dashboard and reports have offered a comprehensive view of customer data, enabling the identification of patterns and correlations. This has not only improved the efficiency of data analysis but also enhanced the nation's ability to provide personalized services to its customers. The project has also highlighted the importance of data visualization in making complex data more understandable and accessible.

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. Leveraging power BI's analytics capabilities to identify operational inefficiencies, optimize asset performance, and streamline processes across the commercial electricity value chain, leading to cost savings and improved service delivery. By harnessing power BI's advanced analytics, visualization, and reporting features, stakeholders in the commercial electricity sector of Indian states can gain valuable insights, drive data-driven decision-making,and navigate the evolving energy landscape with confidence and agility.

Reference:

https://powermin.gov.in/en/content/power-sector-glance-all-india