



# Energy Consumption Trend Analysis Using PowerBI

## Learning Objectives

- To understand how to design and develop dynamic dashboards for energy consumption analysis.
- To learn the application of Power BI features such as slicers, charts, and KPI cards for data interaction.
- To explore energy usage trends across cities and buildings.
- To enhance skills in data preprocessing and applying DAX formulas.
- To practice creating comprehensive, multi-tab dashboards for detailed data insights.



## Tools and Technology used

- **Microsoft Power BI:** Used for building interactive dashboards and performing data visualization.
- **DAX (Data Analysis Expressions):** Applied to calculate and format measures (e.g., total cost and consumption trends).
- **Power Query:** Utilized for data preprocessing and transformation.
- **Data Source:** Likely imported data from Excel sheets, databases, or APIs for the project.

## Methodology

- Data Collection:** Energy consumption data was collected for various cities, buildings, and time periods (electricity, gas, and water usage).
- Data Cleaning:** The data was preprocessed to handle inconsistencies, missing values, and standardize formats.
- Visualization Design:** Dashboards were structured with key metrics, such as total cost and units consumed, displayed as cards, line charts, bar graphs, and pie charts for better comprehension.
- Dashboard Development:** Interactive visualizations and filters were implemented in Power BI to allow users to explore data by consumption type, building, city, and time.

## **Problem Statement:**

- 1. Identifying the Highest Energy-Consuming City or Building**
- 2. Lack of Visibility into Energy Trends Over Time**
- 3. Difficulty in Comparing Electricity, Gas, and Water Consumption**
- 4. Limited Flexibility in Analyzing Data Across Dimensions**
- 5. Static Reports Lacked Engagement and Insights**
- 6. Inconsistent Electricity Usage Patterns Across Buildings**

## **Solution:**

### **1. Identifying the Highest Energy-Consuming City or Building**

Interactive slicers and bar graphs were added to filter and display energy consumption data by city and building, enabling users to easily identify the highest consumers.

### **2. Lack of Visibility into Energy Trends Over Time**

Line charts were implemented to visualize energy consumption trends across months and years, helping stakeholders identify seasonal or temporal patterns.

### **3. Difficulty in Comparing Electricity, Gas, and Water Consumption**

Pie charts and bar graphs were added to show the proportion of each energy type in total consumption, allowing for a clear comparison.



## **Solution:**

### **4. Limited Flexibility in Analyzing Data Across Dimensions**

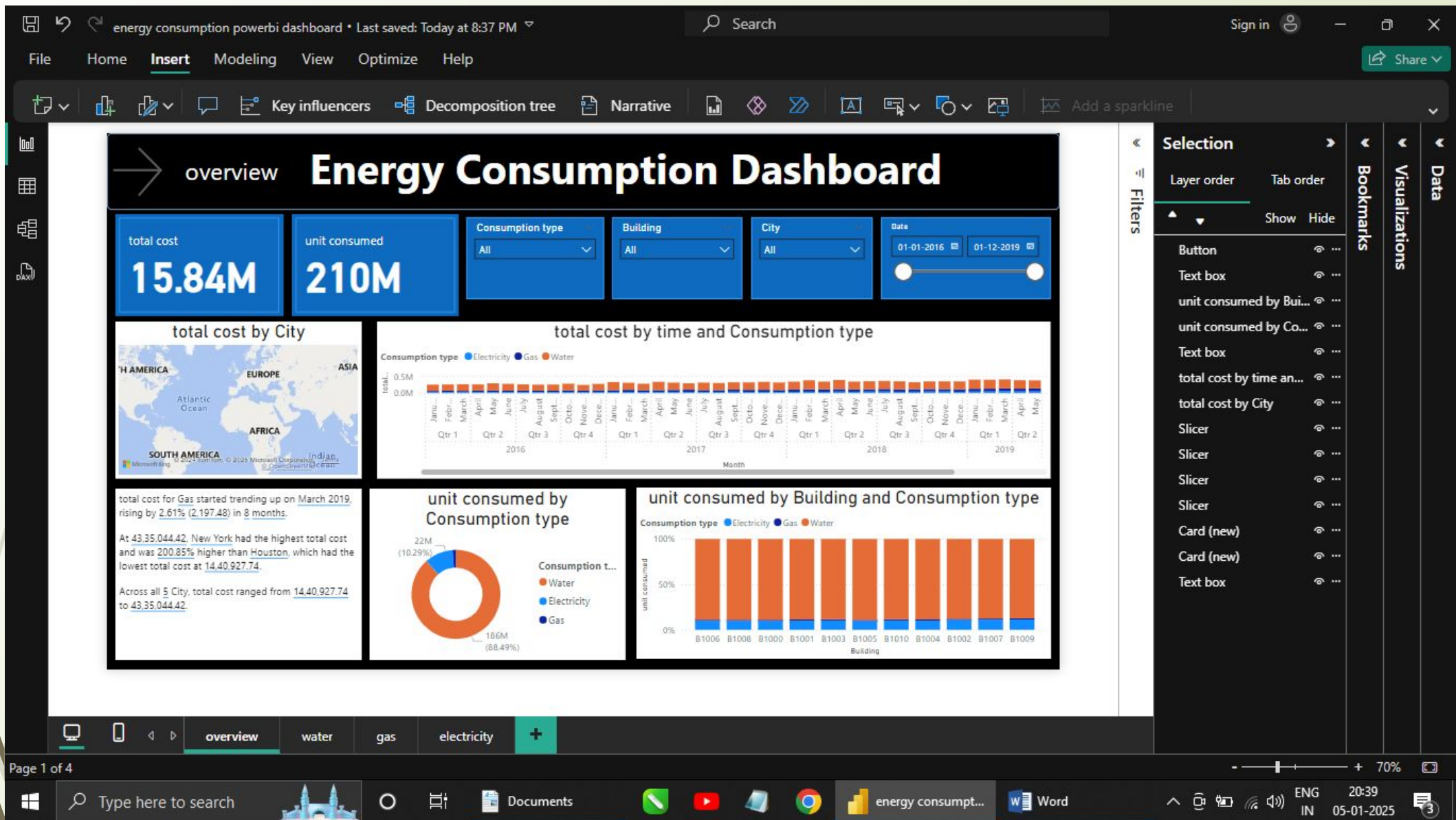
Slicers for consumption type, building, city, and time range were included, enabling users to dynamically filter data and gain multidimensional insights.

### **5. Static Reports Lacked Engagement and Insights**

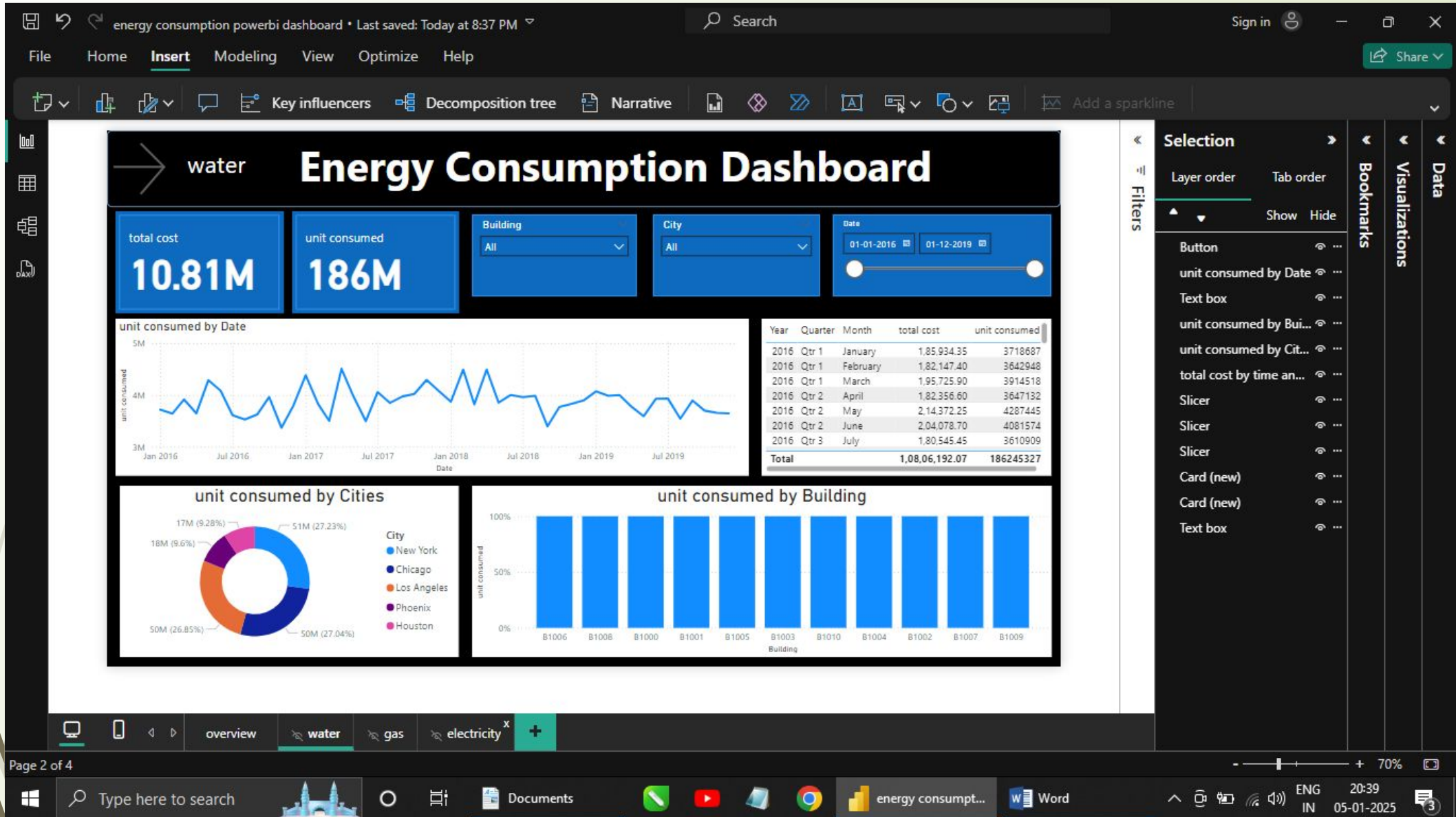
Interactive dashboards with drill-through capabilities and dynamic filters were developed, offering users an engaging way to analyze data and derive actionable insights.

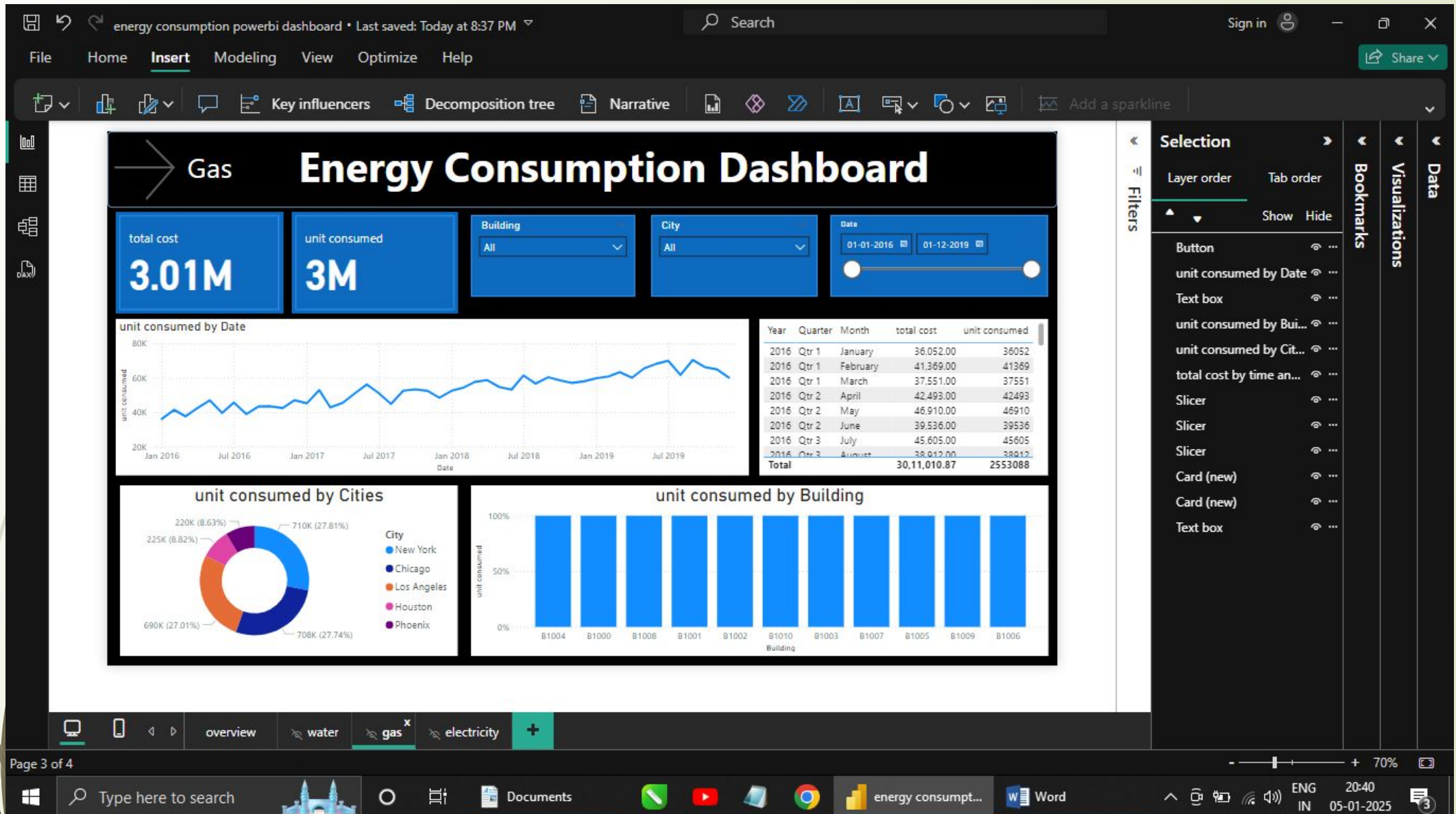
### **6. Inconsistent Electricity Usage Patterns Across Buildings**

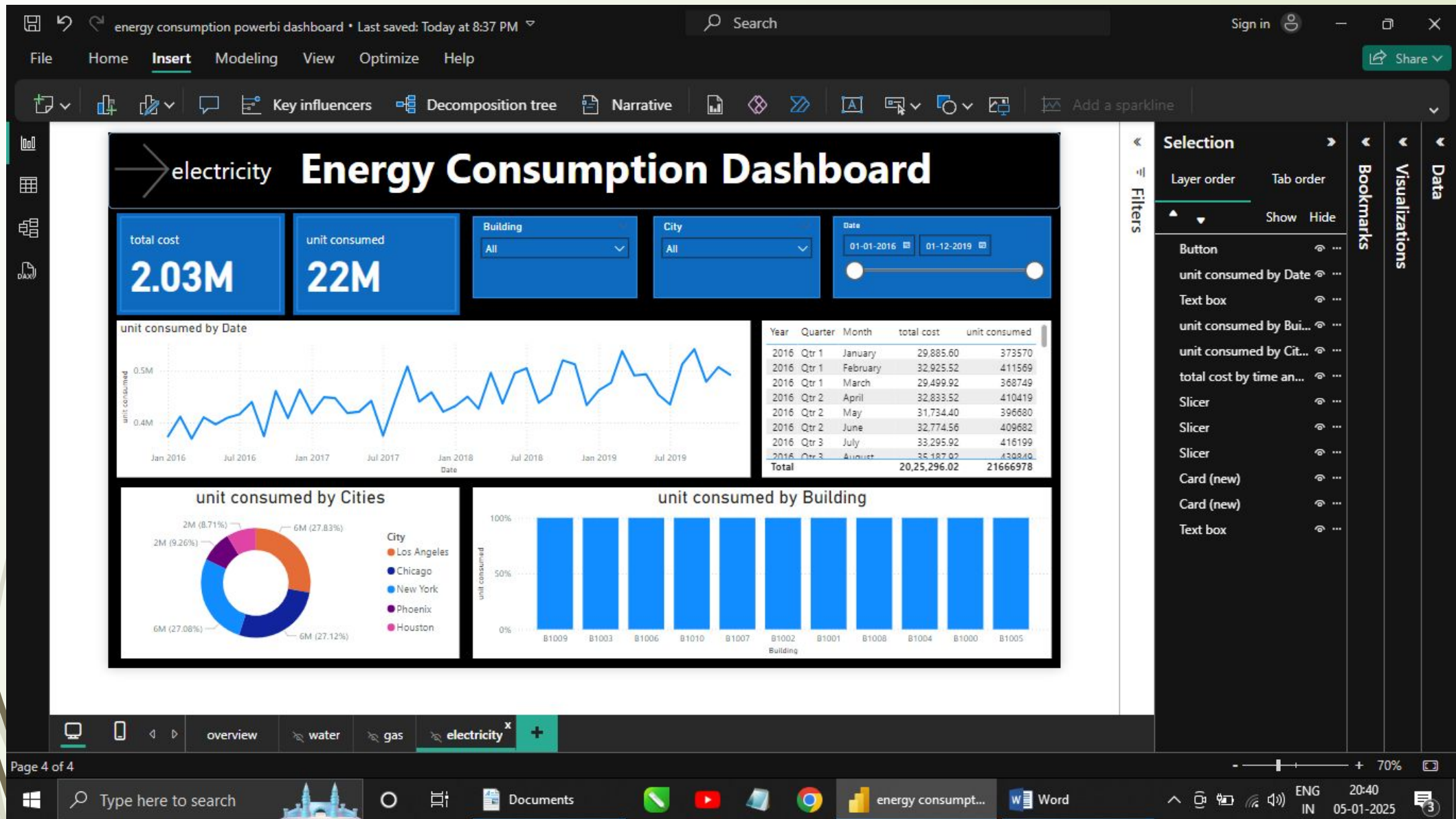
A bar chart was added to display electricity consumption by building, and a line chart was implemented to track trends over time. These visualizations made it easier to identify anomalies and peak usage periods, facilitating better energy management.











## Conclusion:

- The Energy Consumption Dashboard project successfully demonstrates the effective use of Power BI for energy data visualization.
- By providing an interactive and user-friendly platform, stakeholders can analyze energy consumption patterns, identify cost-saving opportunities, and make informed decisions.
- This project highlights the importance of integrating advanced visualization tools in energy management systems.