ENERGY CONSUMPTION TREND ANALYSIS USING POWER BI

Name : Sahana Priya G
AICTE Student ID: STU672101c3f06251730216387
Email : sahanacseai@gmail.com

Learning Objectives

1. **Understand Data Analytics**: Learn how data analytics helps in finding patterns and trends.

2. **Prepare and Clean Data**: Gain skills in importing, cleaning, and organizing data for analysis.

3. **Build Data Models**: Learn to connect tables and create Relationships between tables.

4. **Create Visualizations**: Understand how to use charts and graphs to show data clearly.

5. **Analyze Trends**: Identify patterns in energy use and prices over time.

Tools and Technology used

1. Power BI:
For data visualization, creating dashboards, and performing interactive analysis.

2. Microsoft Excel:
For initial data preparation, cleaning, and formatting .

3. DAX (Data Analysis Expressions):
To create custom calculations and measures in Power BI.

4. Power Query:
For data transformation, including unpivoting columns and extracting required fields.

Methodology

1. Requirements: Define project goals like analyzing trends, peak periods, and costs.

2.Collect Data: Gather datasets such as **Building Master**, **Energy Consumption**, and **Rates**.

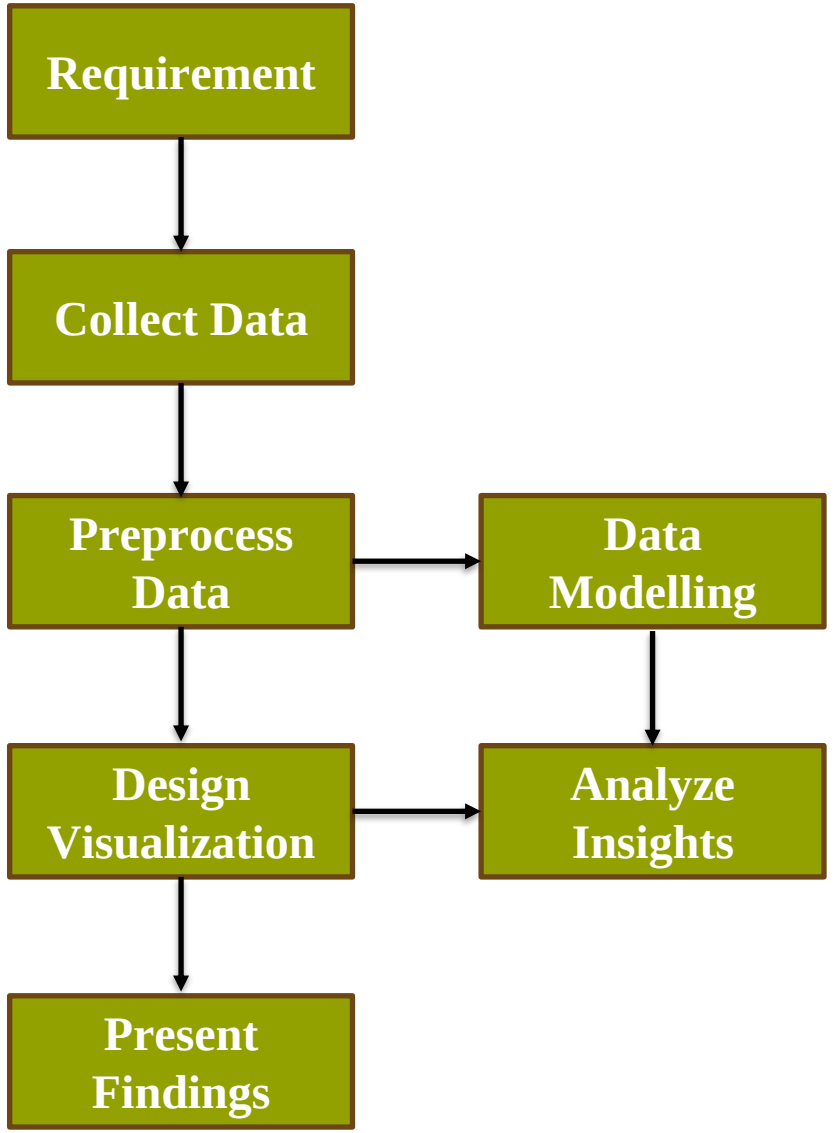
3.Preprocess Data: Clean, format, and transform data by unpivoting energy types and extracting year/month fields.

4.Model Data: Link tables, create relationships, and use DAX for calculations like total consumption and costs.

5.Design Visualizations: Use charts (bar, line, stacked) and interactive filters for clear insights.

6.Analyze Insights: Compare usage across buildings, identify peak periods, and calculate total costs.

7.Present Findings: Build a Power BI dashboard and document key insights for decision-making.



Problem Statement:

Managing energy consumption efficiently is crucial for cost optimization and sustainability. However, the lack of a centralized and visualized system makes it challenging to:

1.Compare energy usage (water, electricity, and gas) across multiple buildings.

2.Identify peak consumption periods for better resource planning.

3.Analyze yearly and monthly trends in energy consumption and pricing.

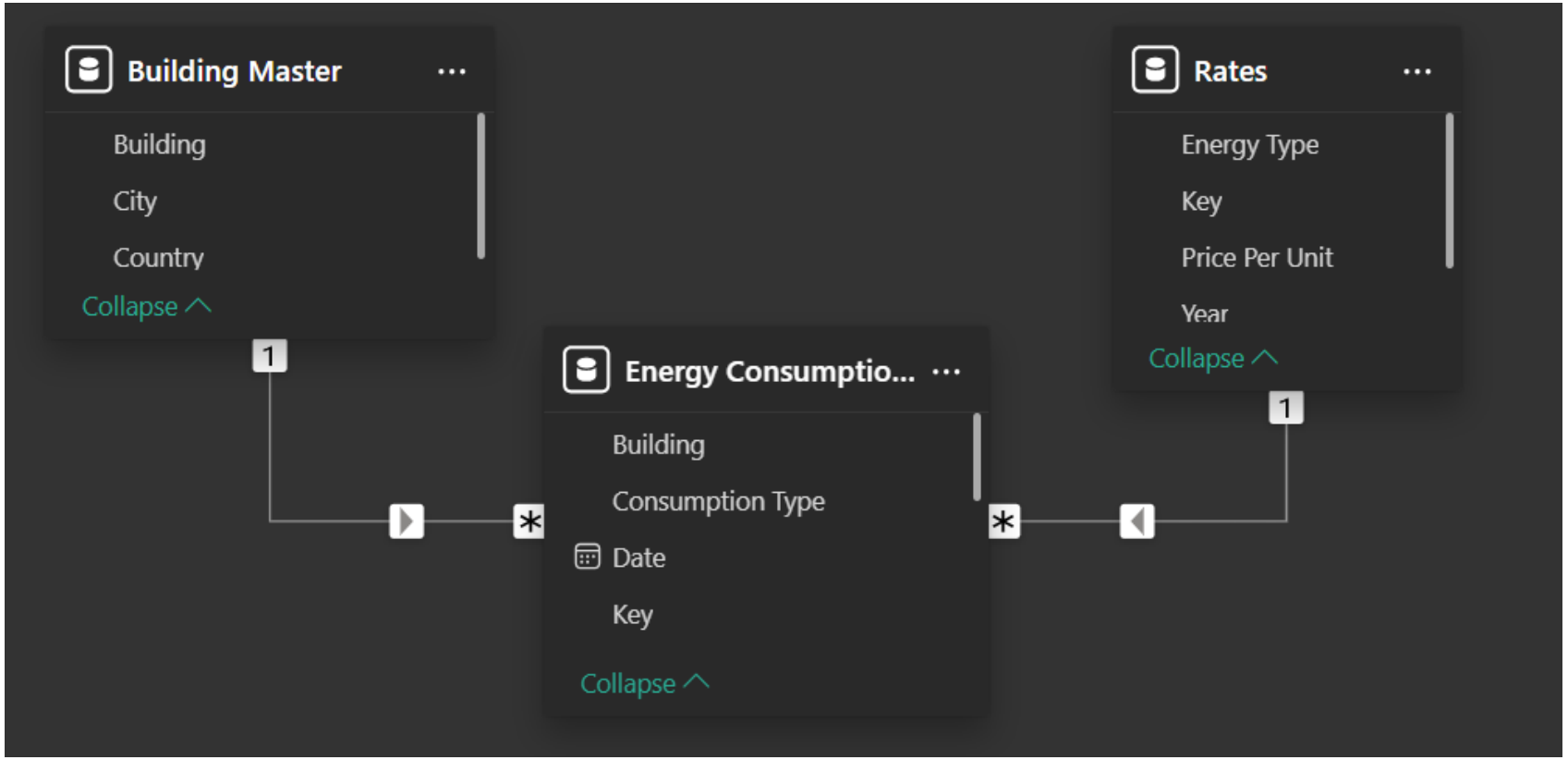
4.Calculate total energy costs using consumption and rate data.

5.Highlight inefficiencies and opportunities for cost savings.

Solution:

Centralized Data and Relationships:

- Combine **Building Master**, **Energy Consumption**, and **Rates** tables.
- Establish relationships for seamless analysis



Energy Consumption Dashboard:

- Visualize water, electricity, and gas consumption trends.
- Adding slicers to filter by building, year, and energy type.

Key Metrics Cards:

- Display total consumption and total cost for each resource (Water, Electricity, Gas).
- Measures:

    - Total Cost = SUMX('Energy Consumptions', 'Energy Consumptions'[Unit] * RELATED(Rates[Price Per Unit]))
    - Unit Consumed = SUM('Energy Consumptions'[Unit])
    - Average Consumption = AVERAGE('Energy Consumptions'[Unit])
    - Max Consumption = MAX('Energy Consumptions'[Unit])
    - Min Consumption = MIN('Energy Consumptions'[Unit])
    - Price Trend = AVERAGE('Rates'[Price Per Unit])

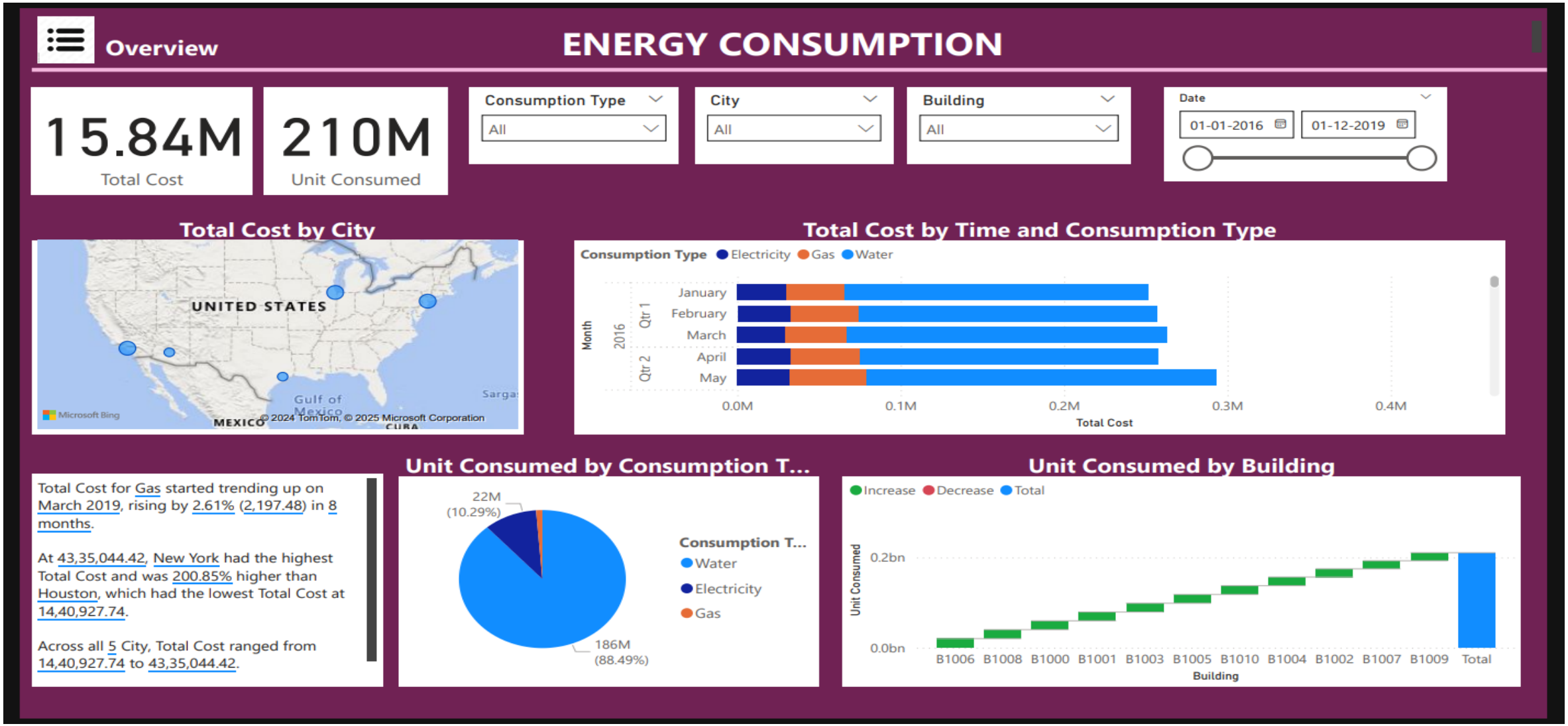


Fig 1 Energy Consumption Dashboard (Overview)

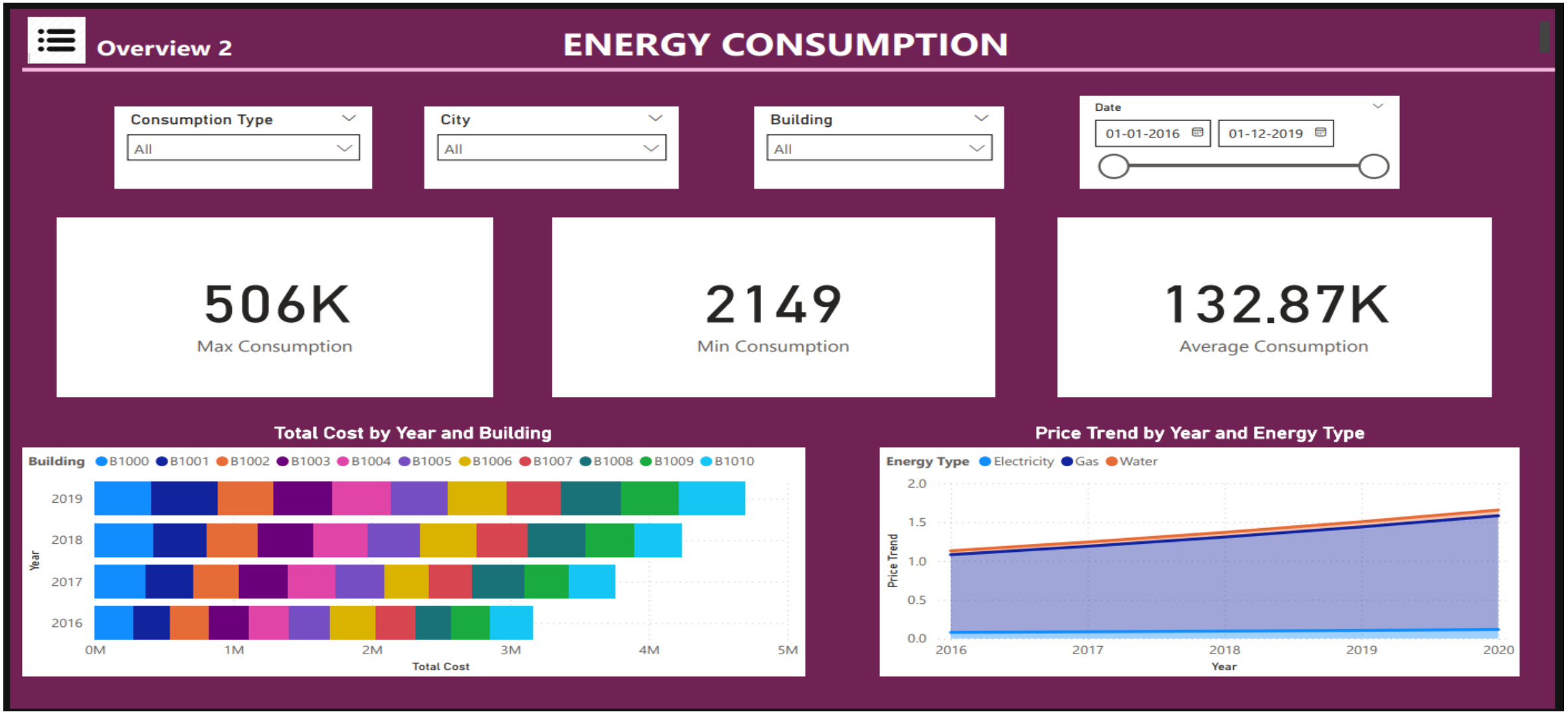


Fig 2 Energy Consumption Dashboard (Overview) - 2

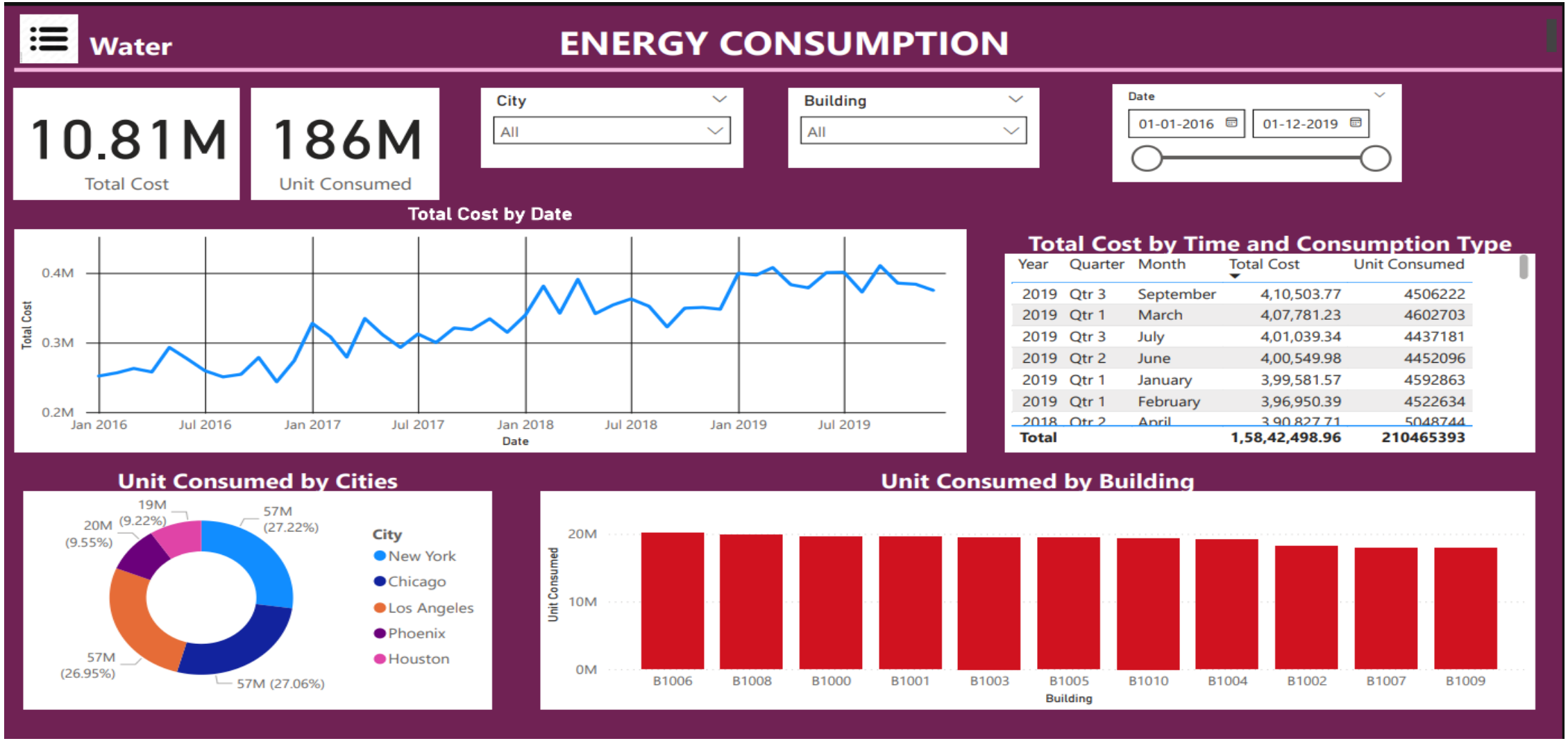


Fig 3 Energy Consumption Dashboard (water)

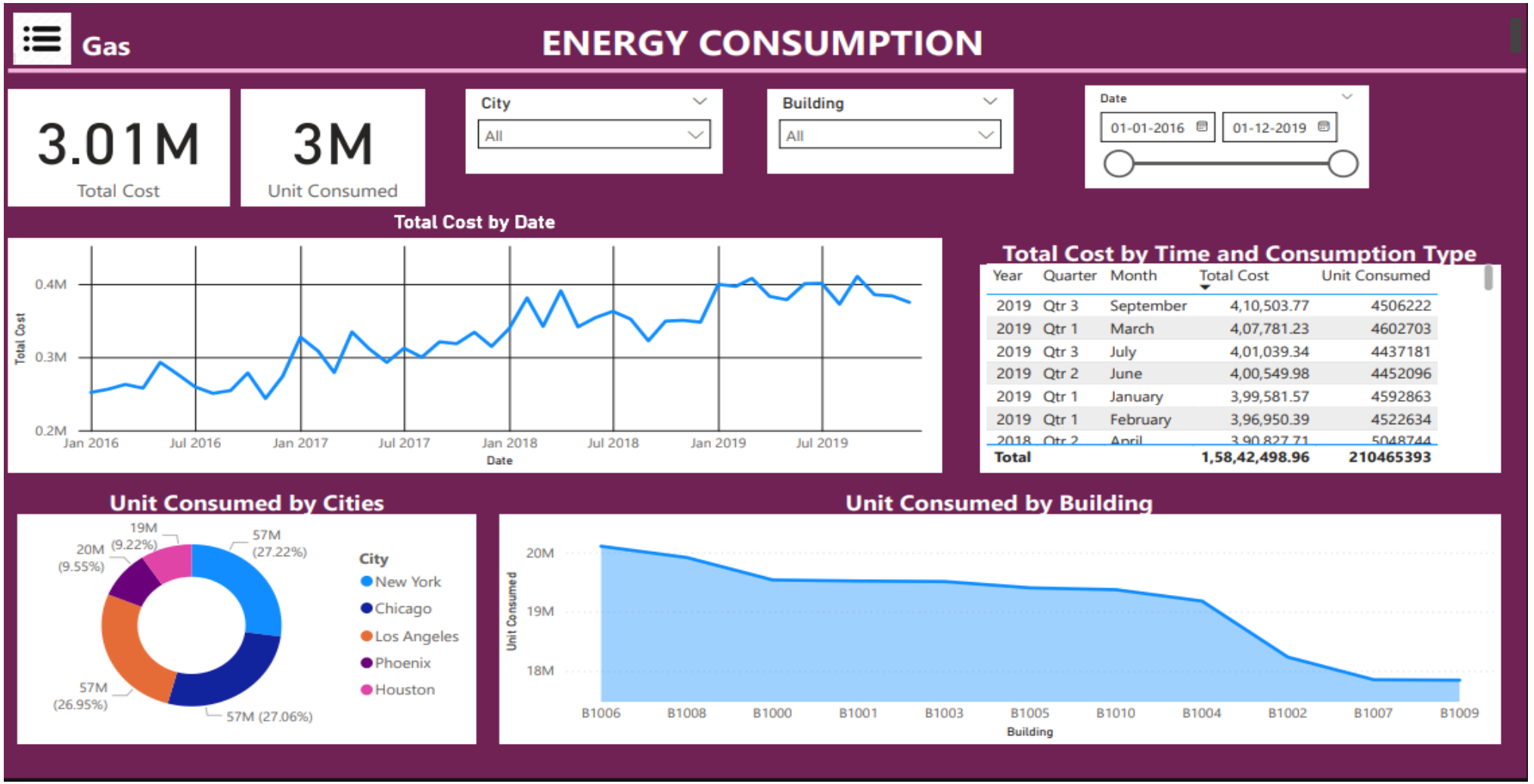


Fig 4 Energy Consumption Dashboard (Gas)

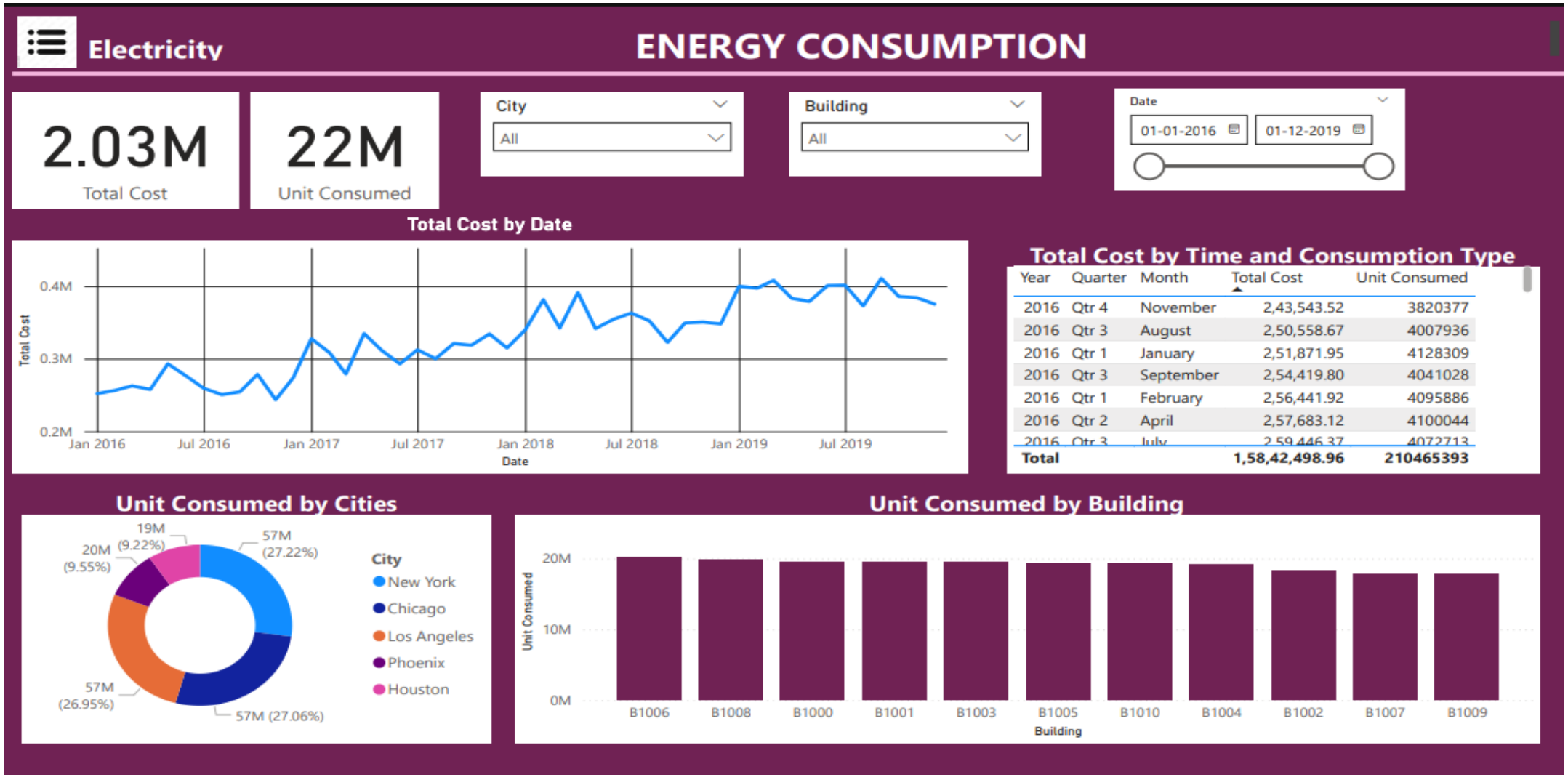


Fig 5 Energy Consumption Dashboard (Electricity)

Conclusion

This project shows how Power BI can be used to analyze and visualize energy usage across different buildings. The dashboards give a clear overview of water, electricity, and gas consumption, making it easy to see trends and peak usage times. By analyzing yearly and monthly data, the project helps identify patterns that can improve how resources are managed. Calculating energy costs based on usage and rates also helps find opportunities to save money. Overall, this project helps make better decisions about energy use, making buildings more efficient and cost-effective.