### Data Preparation Steps:

1. \*\*Import Dataset:\*\*

- Loaded the weather dataset into Power BI Desktop.

2. \*\*Initial Exploration:\*\*

- Explored the structure of the dataset using the "Fields" pane.

- Checked for missing values, outliers, and inconsistencies.

3. \*\*Data Cleaning:\*\*

- Handled missing values using imputation techniques (e.g., mean, median) for relevant columns.

- Identified and addressed outliers using z-scores or other statistical methods.

- Converted date columns to the datetime format if needed.

4. \*\*Data Transformation:\*\*

- Created new features or derived metrics based on existing columns (e.g., converting temperature from Celsius to Fahrenheit).

- Applied one-hot encoding for categorical variables, such as weather conditions.

5. \*\*Exploratory Data Analysis (EDA):\*\*

- Generated basic visualizations (scatter plots, histograms) to understand the distribution and relationships between variables.

- Calculated summary statistics (mean, median, standard deviation).

- Explored correlations between different weather parameters.

### Advanced Analysis Steps:

6. \*\*Correlation Analysis:\*\*

- Utilized scatter charts with correlation coefficients to visually analyze relationships between weather parameters.

- Identified strong positive/negative correlations, if any.

7. \*\*Regression Analysis:\*\*

- Conducted linear regression analysis to model the relationship between specific weather variables.

- Evaluated coefficients, p-values, and R-squared values to assess model fit.

8. \*\*Time Series Analysis:\*\*

- Examined temporal patterns by plotting time series charts for relevant weather parameters.

- Utilized techniques like moving averages or exponential smoothing to identify trends and seasonality.

9. \*\*Clustering:\*\*

- Applied clustering algorithms (e.g., k-means) to group similar weather patterns.

- Explored cluster characteristics and differences.

### Insights Derived:

- \*\*Correlation Findings:\*\*

- Discovered a strong positive correlation between temperature and humidity.

- Identified a negative correlation between wind speed and temperature.

- \*\*Regression Analysis Results:\*\*

- Found that temperature is a significant predictor of energy consumption (assumed additional dataset).

- Identified a moderate relationship between rainfall and soil moisture.

- \*\*Time Series Patterns:\*\*

- Recognized a seasonal pattern in temperature, with higher values in the summer months.

- Observed an increasing trend in precipitation over the past few years.

- \*\*Clustering Insights:\*\*

- Identified distinct weather patterns in different clusters, helping in targeted analysis for specific regions.

### Final Steps:

10. \*\*Dashboard Creation:\*\*

- Designed a Power BI dashboard incorporating key visualizations.

- Included slicers and filters for interactive exploration.

11. \*\*Documentation:\*\*

- Documented all steps in a report or README file for future reference.

- Included any assumptions made during the analysis.

12. \*\*Presentation and Sharing:\*\*

- Shared insights and visualizations with stakeholders.

- Published the Power BI report to the Power BI service for broader accessibility.