A

Project Report

on

POWER BILL ANALYSIS DASHBOARD

Submitted by

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Acknowledgement

I would like to thank respected **Mr. BABJI NEELAM** for giving me such a wonderful platform to expand my knowledge for my own branch.

Firstly, I would like to thank respected **Ms. J. HARSHAVARDHINI** for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present this project. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as I went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

ABSTRACT

In this ever-evolving business world, Power BI is a powerful business analytics tool that has become increasingly important in today's data-driven world. It allows businesses to transform raw data into meaningful insights, enabling them to make data-informed decisions and gain a competitive edge. The Power Analysis Dashboard created using Power BI is a visual representation of   energy. Calculation data. It allows users to monitor and analyze energy usage in real-time, providing insights into patterns, trends, and potential areas for improvement. With Power BI's interactive features, users can drill down into specific areas or time periods to gain more detailed information. The dashboard may include various charts, graphs, maps, and other visualizations to present the data in a user-friendly and intuitive way. Through 'Power Bi' software we not only develop a visual representation of data but also learn about computer and technical skills which are very necessary in executing digital businesses.

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EXECUTIVE SUMMARY

The "Power Bill Analysis Dashboard" project was initiated by "Technical Hub" to delve into the intricacies of electricity consumption within the organization. The project's foundation was laid by generating a year's worth of synthetic data derived from ten current readings from a specific load. This data served as the basis for a thorough analysis conducted using Microsoft Fabric, leading to the development of a dynamic dashboard.

 Microsoft Fabric is a powerful business analytics Software that has become increasingly important in today's data-driven world. It allows businesses to transform raw data into meaningful insights, enabling them to make data-informed decisions and gain a competitive edge. The Power Analysis Dashboard created using Microsoft Fabric is a visual representation of energy Calculation data. It allows users to monitor and analyze energy usage in real-time, providing insights into patterns, trends, and potential areas for improvement. With Microsoft Fabric's interactive features, users can drill down into specific areas or time periods to gain more detailed information. The dashboard may include various charts, graphs, maps, and other visualizations to present the data in a user-friendly and intuitive way. Through 'Microsoft Fabric' software we not only develop a visual representation of data but also learn about computer and technical skills which are very necessary in executing digital businesses. Microsoft Fabric is important for organizations because it allows them to make data-driven decisions, gain valuable insights, and drive business success. It enables users to consolidate and analyze data from multiple sources, visualize data in interactive ways, and share insights with stakeholders.

GOALS:

1. Visualize Consumption Trends: Display total current, annual, and daily consumption clearly.

2. Monthly Breakdown: Provide detailed monthly consumption insights for better energy planning.

3. Efficiency Analysis: Track and analyze units in kw/h for identifying saving opportunities.

4. Daily Consumption Monitoring: Offer daily usage analysis for proactive management.

5. Operational Optimization: Evaluate operational unit consumption to improve efficiency.

6. Spatial Usage Insights: Map floor-wise consumption for informed infrastructure decisions.

LEARNING OBJECTIVES:

1. Understanding Microsoft Fabric: Learn the basics of Microsoft Fabric and its components, including data visualization, data analysis, and report generation.

2. Data Importation: Master the process of importing data from various sources into Power BI for analysis.

3. Data Transformation: Gain skills in transforming raw data into a more usable format using Power BI's Query Editor.

4. Data Modeling: Learn to create and understand data models that represent the relationships between different data elements.

5. Visualization Creation: Develop the ability to create insightful visualizations that effectively communicate data findings.

6. Report Designing: Learn to design comprehensive reports that summarize the analysis in an understandable format for stakeholders.

7. Analysis Techniques: Understand various analytical techniques to identify trends and patterns in power consumption data.

8. Cost Optimization: Gain insights into how to use data analysis for cost-saving strategies in power consumption.

9. Dashboard Creation: Learn to build interactive dashboards that allow users to explore data and derive their own insights.

10. Decision Making: Understand how to use the insights gained from Power BI analysis to make informed decisions regarding power usage and billing.

INTRODUCTION

In this ever-evolving business world, Microsoft Fabric is a powerful business analytics tool that has become increasingly important in today's data-driven world. It allows businesses to transform raw data into meaningful insights, enabling them to make data-informed decisions and gain a competitive edge. The Energy Calculation Dashboard created using Microsoft Fabric is a visual representation of energy Calculation data. It allows users to monitor and analyze energy usage in real-time, providing insights into patterns, trends, and potential areas for improvement. With Microsoft Fabric's interactive features, users can drill down into specific areas or time periods to gain more detailed information. The dashboard may include various charts, graphs, maps, and other visualizations to present the data in a user-friendly and intuitive way. Through 'Microsoft Fabric' software we not only develop a visual representation of data but also learn about computer and technical skills which are very necessary in executing digital businesses. Microsoft Fabric is important for organizations because it allows them to make data-driven decisions, gain valuable insights, and drive business success. It enables users to consolidate and analyze data from multiple sources, visualize data in interactive ways, and share insights with stakeholders. Microsoft Fabric promotes collaboration, enhances data exploration, and augments process optimization in various industries and sectors. It is a business analytics and data visualization tool developed by Microsoft. It is designed to provide organizations with powerful tools for data analysis, reporting, and collaboration. With Microsoft Fabric, users can connect to various data sources, transform and model data, create visually appealing dashboards, and share insights with others.

What is Microsoft Fabric?

Microsoft Fabric is an end-to-end analytics and data platform designed for enterprises that require a unified solution. It encompasses data movement, processing, ingestion, transformation, real-time event routing, and report building. It offers a comprehensive suite of services including Data Engineering, Data Factory, Data Science, Real-Time Analytics, Data Warehouse, and Databases.
With Fabric, you don't need to assemble different services from multiple vendors. Instead, it offers a seamlessly integrated, user-friendly platform that simplifies your analytics requirements. Operating on a Software as a Service (SaaS) model, Fabric brings simplicity and integration to your solutions.
Microsoft Fabric integrates separate components into a cohesive stack. Instead of relying on different databases or data warehouses, you can centralize data storage with OneLake. AI capabilities are seamlessly embedded within Fabric, eliminating the need for manual integration. With Fabric, you can easily transition your raw data into actionable insights for business users.
Unification with SaaS foundation
Microsoft Fabric is built on a foundation of Software as a Service (SaaS). It combines both new and existing components from Power BI, Azure Synapse Analytics, Azure Data Factory, and more services into a unified environment. These components are then tailored into customized user experiences.
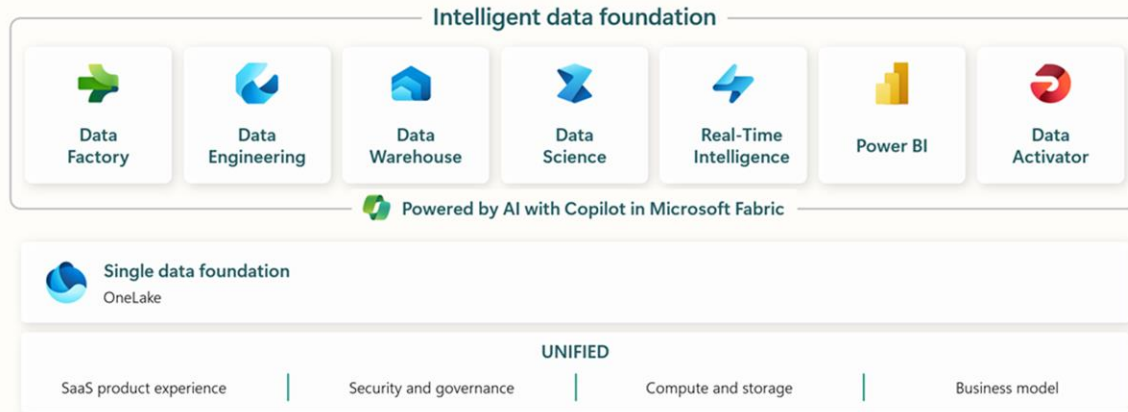
Fabric integrates workloads such as Data Engineering, Data Factory, Data Science, Data Warehouse, Real-Time Intelligence, Industry solutions, and Power BI into a shared SaaS foundation. Each of these experiences is tailored for distinct user roles like data engineers, scientists, or warehousing professionals, and they serve a specific task. The entire Fabric stack has AI integration and it accelerates the data journey. These workloads work together seamlessly and provide the following advantages:
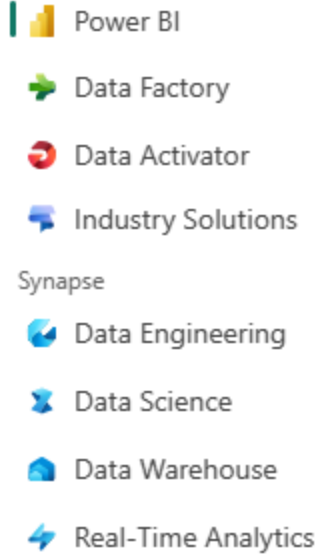
- Access to an extensive range of deeply integrated analytics in the industry.
- Shared experiences across experiences that are familiar and easy to learn.
- Easy access to, and readily reuse all assets.
- Unified data lake storage that preserves data in its original location while using your preferred analytics tools.
- Centralized administration and governance across all experiences.

Fabric seamlessly integrates data and services, enabling unified management, governance, and discovery. It ensures security for items, data, and row-level access. You can centrally configure core enterprise capabilities. Permissions are automatically applied across all the underlying services. Additionally, data sensitivity labels inherit automatically across the items in the suite. Governance is powered by Purview which is built into Fabric.

Fabric allows creators to concentrate on producing their best work, freeing them from the need to integrate, manage, or even understand the underlying infrastructure.

Components of Microsoft Fabric

Fabric offers a comprehensive set of analytics experiences designed to work together seamlessly. The platform tailors each of these experiences to a specific persona and a specific task:

Microsoft Fabric →

Power BI

Data Factory

Data Activator

Industry Solutions

Synapse

Data Engineering

Data Science

Data Warehouse

Real-Time Analytics

- **Power BI** - Power BI lets you easily connect to your data sources, visualize and discover what's important, and share that with anyone or everyone you want. This integrated experience allows business owners to access all data in Fabric quickly and intuitively and to make better decisions with data.
- **Data Factory** - Data Factory provides a modern data integration experience to ingest, prepare, and transform data from a rich set of data sources. It incorporates the simplicity of Power Query, and you can use more than 200 native connectors to connect to data sources on-premises and in the cloud.
- **Data Activator** - Data Activator is a no-code experience in Fabric that allows you to specify actions, such as email notifications and Power Automate workflows, to launch when Data Activator detects specific patterns or conditions in your changing data. It monitors data in Power BI reports and event streams; when the data hits certain thresholds or matches other patterns, it automatically takes the appropriate action.
- **Industry Solutions** - Fabric provides industry-specific data solutions that address unique industry needs and challenges, and include data management, analytics, and decision-making.
- **Real-Time Intelligence** - Real-time Intelligence is an end-to-end solution for event-driven scenarios, streaming data, and data logs. It enables the extraction of insights, visualization, and action on data in motion by handling data ingestion, transformation, storage, analytics, visualization, tracking, AI, and real-time actions. The Real-Time hub in Real-Time Intelligence provides a wide variety of no-code connectors, converging into a catalog of organizational data that is protected, governed, and integrated across Fabric.
- **Synapse Data Engineering** - Synapse Data Engineering provides a Spark platform with great authoring experiences. It enables you to create, manage, and optimize infrastructures for collecting, storing, processing, and analyzing vast data volumes. Fabric Spark's integration with Data Factory allows you to schedule and orchestrate notebooks and Spark jobs.
- **Synapse Data Science** - Synapse Data Science enables you to build, deploy, and operationalize machine learning models from Fabric. It integrates with Azure Machine Learning to provide built-in experiment tracking and model registry. Data scientists can enrich

organizational data with predictions and business analysts can integrate those predictions into their BI reports, allowing a shift from descriptive to predictive insights.

- **Synapse Data Warehouse** - Synapse Data Warehouse provides industry leading SQL performance and scale. It separates compute from storage, enabling independent scaling of both components. Additionally, it natively stores data in the open Delta Lake format.

Microsoft Fabric enables organizations and individuals to turn large and complex data repositories into actionable workloads and analytics, and is an implementation of data mesh architecture.

OneLake: The unification of Lakehouses

The Microsoft Fabric platform unifies the OneLake and Lakehouse architecture across an enterprise.

OneLake

A data lake is the foundation on which all the Fabric workloads are built. Microsoft Fabric Lake is also known as OneLake. OneLake is built into the Fabric platform and provides a unified location to store all organizational data where the workloads operate.

OneLake is built on ADLS (Azure Data Lake Storage) Gen2. It provides a single SaaS experience and a tenant-wide store for data that serves both professional and citizen developers. OneLake simplifies Fabric experiences by eliminating the need for you to understand infrastructure concepts such as resource groups, RBAC (Role-Based Access Control), Azure Resource Manager, redundancy, or regions. You don't need an Azure account to use Fabric.

OneLake eliminates data silos, which individual developers often create when they provision and configure their own isolated storage accounts. Instead, OneLake provides a single, unified storage system for all developers. It ensures easy data discovery, sharing, and uniform enforcement of policy and security settings.

OneLake and lakehouse data hierarchy

OneLake is hierarchical in nature to simplify management across your organization. Microsoft Fabric includes OneLake and there's no requirement for any up-front provisioning. There's only one OneLake per tenant and it provides a single-pane-of-glass file-system namespace that spans across users, regions, and clouds. OneLake organizes data into manageable containers for easy handling.

The tenant maps to the root of OneLake and is at the top level of the hierarchy. You can create any number of workspaces, which you can think of as folders, within a tenant.

The following image shows how Fabric stores data in various items within OneLake. As shown, you can create multiple workspaces within a tenant, and create multiple lakehouses within each workspace. A lakehouse is a collection of files, folders, and tables that represents a database over a data lake.
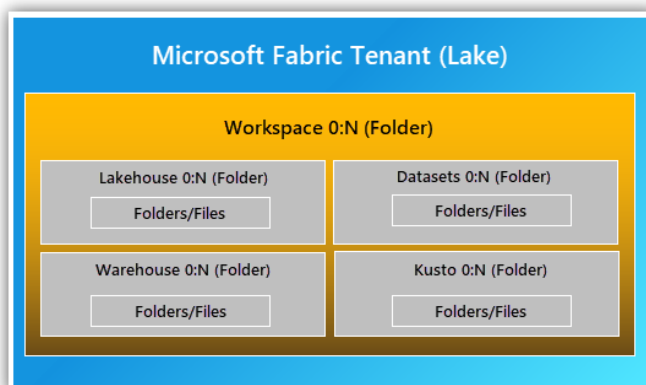
Every developer and business unit in the tenant can easily create their own workspaces in OneLake. They can ingest data into their own lakehouses, then start processing, analyzing, and collaborating on the data, just like OneDrive in Microsoft Office.

All the Microsoft Fabric compute experiences are prewired to OneLake, just like the Office applications are prewired to use the organizational OneDrive. The experiences such as Data Engineering, Data Warehouse, Data Factory, Power BI, and Real-Time Intelligence use OneLake as their native store. They don't need any extra configuration.
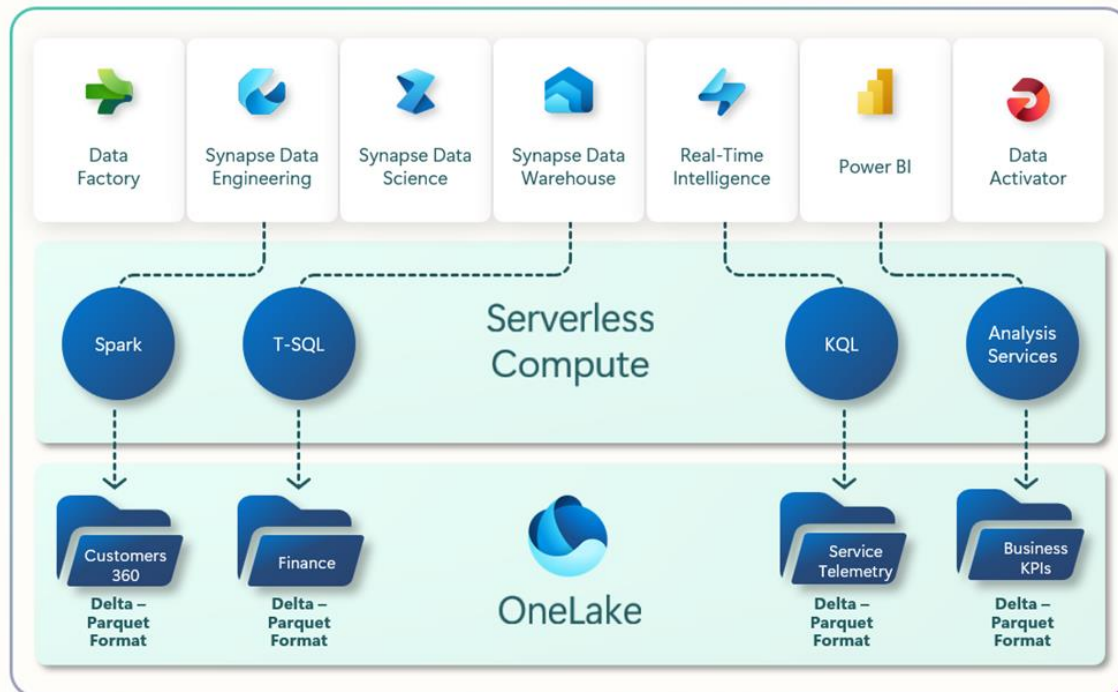
OneLake allows instant mounting of your existing Platform as a Service (PaaS) storage accounts into OneLake with the Shortcut feature. You don't need to migrate or move any of your existing data. Using shortcuts, you can access the data stored in your Azure Data Lake Storage.

Shortcuts also allow you to easily share data between users and applications without moving or duplicating information. You can create shortcuts to other storage systems, allowing you to compose and analyze data across clouds with transparent, intelligent caching that reduces egress costs and brings data closer to compute.

Real-Time hub - the unification of data streams

The Real-Time hub is a foundational location for data in motion.

The Real-Time hub provides a unified SaaS experience and tenant-wide logical place for all data-in-motion. The Real-Time hub lists all data in motion from all sources that customers can discover, ingest, manage, and consume and react upon, and contains both streams and KQL database tables. Streams includes Data streams, Microsoft sources (for example, Azure Event Hubs, Azure IoT Hub, Azure SQL DB Change Data Capture (CDC), Azure Cosmos DB CDC, and PostgreSQL DB CDC), and Fabric events (Fabric system events and external system events brought in from Azure, Microsoft 365, or other clouds).

The Real-Time hub enables users to easily discover, ingest, manage, and consume data-in-motion from a wide variety of source so that they can collaborate and develop streaming applications within one place.

Fabric solutions for ISVs

If you're an Independent Software Vendors (ISVs) looking to integrate your solutions with Microsoft Fabric, you can use one of the following paths based on your desired level of integration:

- Interop - Integrate your solution with the OneLake Foundation and establish basic connections and interoperability with Fabric.
- Develop on Fabric - Build your solution on top of the Fabric platform or seamlessly embed Fabric's functionalities into your existing applications. You can easily use Fabric capabilities with this option.
- Build a Fabric workload - Create customized workloads and experiences in Fabric tailoring your offerings to maximize their impact within the Fabric ecosystem.

Visualizations

A visualization is an image created from data. Visualizations are also called "visuals." Some examples of visuals are: pie chart, line chart, map, and KPI.

Visualization Types

Area charts: Basic (Layered) and Stacked

The basic area chart is based on the line chart with the area between the axis and line filled in. Area charts emphasize the magnitude of change over time, and can be used to draw attention to the total value across a trend. For example, data that represents profit over time can be plotted in an area chart to emphasize the total profit. On the other hand, stacked area charts display the cumulative total of multiple data series stacked on top of each other, showing how each series contributes to the total.

Bar and column charts

Total Sales Variance % by FiscalMonth

Average Selling Area Size by Store Type, Chain
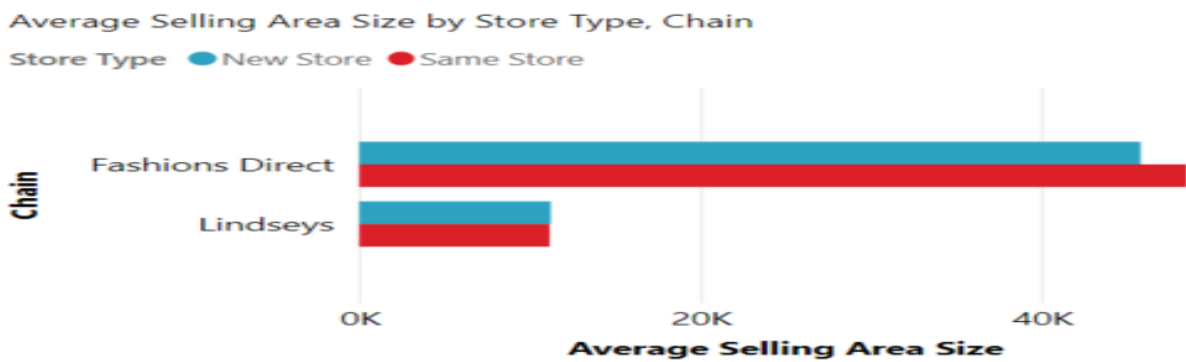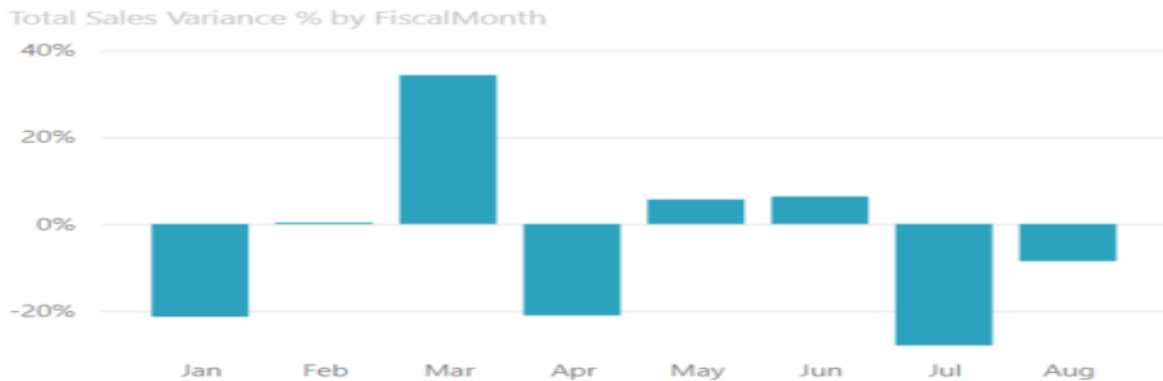
Bar charts are the standard for looking at a specific value across different categories.

Cards

Multi row

030-Kids
$5.30
Average Unit Price

Multi row cards display one or more data points, one per row.

Single number

104
Total Stores

Single number cards display a single fact, a single data point. Sometimes a single number is the most important thing you want to track in your Power BI dashboard or report, such as total sales, market share year over year, or total opportunities.

Combo charts

This Year Sales, Last Year Sales and Total Sales Variance % by Month
● This Year Sales ● Last Year Sales ● Total Sales Variance %

A combo chart combines a column chart and a line chart. Combining the two charts into one lets you make a quicker comparison of the data. Combo charts can have one or two Y axes, so be sure to look closely.

Combo charts are a great choice:

- When you have a line chart and a column chart with the same X axis.
- To compare multiple measures with different value ranges.

- To illustrate the correlation between two measures in one visual.
- To check whether one measure meets the target, which is defined by another measure.
- To conserve canvas space.

Decomposition tree
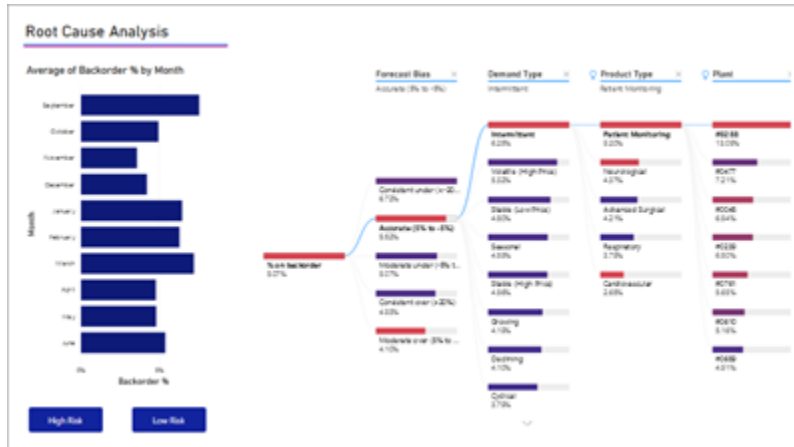
The decomposition tree visual lets you visualize data across multiple dimensions. It automatically aggregates data and enables drilling down into your dimensions in any order. It is also an artificial intelligence (AI) visualization, so you can ask it to find the next dimension to drill down into based on certain criteria. This capability makes it a valuable tool for ad hoc exploration and conducting root cause analysis.

Doughnut charts

15
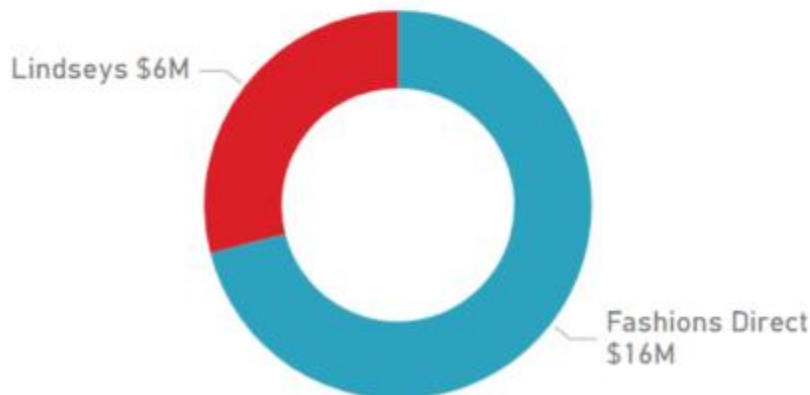
Doughnut charts are similar to pie charts. They show the relationship of parts to a whole. The only difference is that the center is blank and allows space for a label or icon.

Funnel charts

Opportunity Count by Sales Stage

	100%	
Lead	268	
Qualify	94	
Solution	74	
Proposal	37	
Finalize	14	
	5.2%	
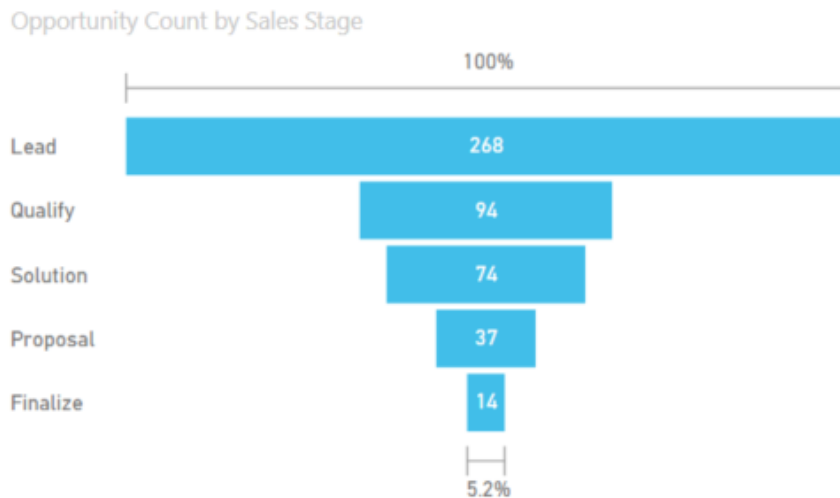
Funnels help visualize a process that has stages, and items flow sequentially from one stage to the next. One example is a sales process that starts with leads and ends with purchase fulfillment.

For example, a sales funnel that tracks customers through stages: Lead > Qualified Lead > Prospect > Contract > Close. At a glance, the shape of the funnel conveys the health of the process you're tracking. Each funnel stage represents a percentage of the total. So, in most cases, a funnel chart is shaped like a funnel -- with the first stage being the largest, and each subsequent stage smaller than its predecessor. A pear-shaped funnel is also useful -- it can identify a problem in the process. But typically, the first stage, the "intake" stage, is the largest.

Gauge charts

Average of Gross Sales
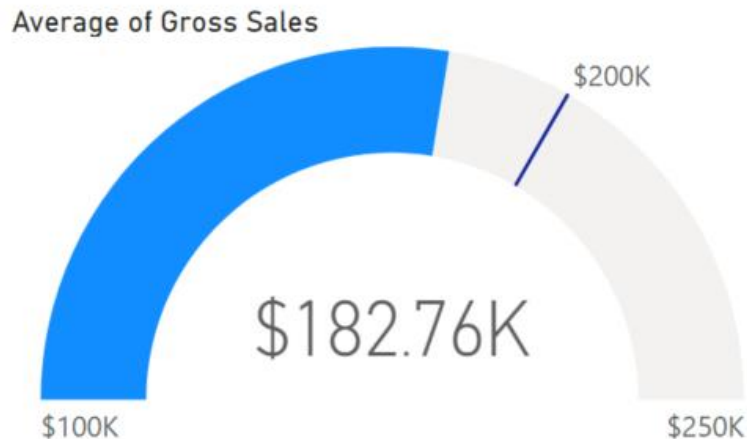
A radial gauge chart has a circular arc and displays a single value that measures progress toward a goal. The goal, or target value, is represented by the line (needle). Progress toward that goal is represented by the shading. And the value that represents that progress is shown in bold inside the arc. All possible values are spread evenly along the arc, from the minimum (left-most value) to the maximum (right-most value).

In the example, we are a car retailer, tracking our Sales team's average sales per month. Our goal is 200,000 and represented by the location of the needle. The minimum possible average sales is 100,000 and we set the maximum as 250,000. The blue shading shows that we're currently averaging approximately $180,000 this month. Luckily, we still have another week to reach our goal.

Radial gauges are a great choice to:

- Show progress toward a goal.
- Represent a percentile measure, like a KPI.
- Show the health of a single measure.
- Display information that can be quickly scanned and understood.

Key influencers chart
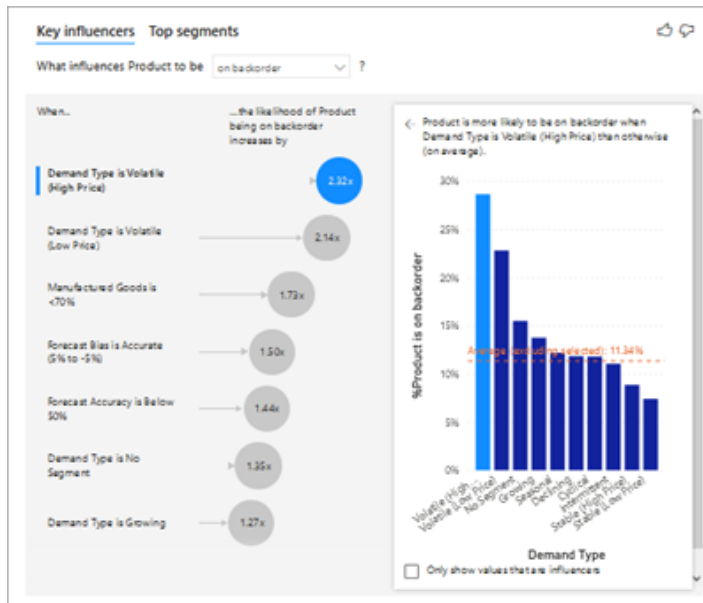
A key influencer chart displays the major contributors to a selected result or value.

Key influencers are a great choice to help you understand the factors that influence a key metric. For example, *what influences customers to place a second order* or *why were sales so high last June*.
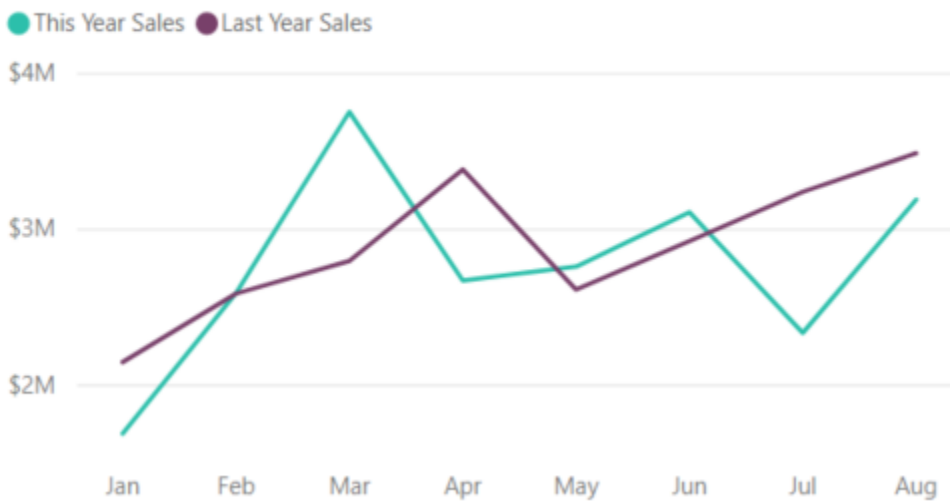
KPIs

A Key Performance Indicator (KPI) is a visual cue that communicates the amount of progress made toward a measurable goal.

KPIs are a great choice:

- To measure progress (what am I ahead or behind on?).
- To measure distance to a metric (how far ahead or behind am I?).

Line charts

This Year Sales and Last Year Sales by FiscalMonth

Line charts emphasize the overall shape of an entire series of values, usually over time.

Maps

Basic map

This Year Sales by PostalCode and Store Type
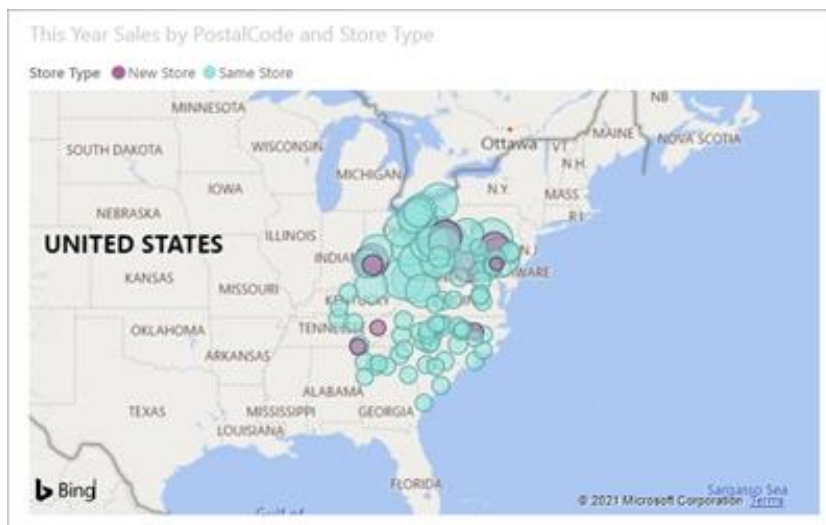
Use a basic map to associate both categorical and quantitative information with spatial locations.

ArcGIS map
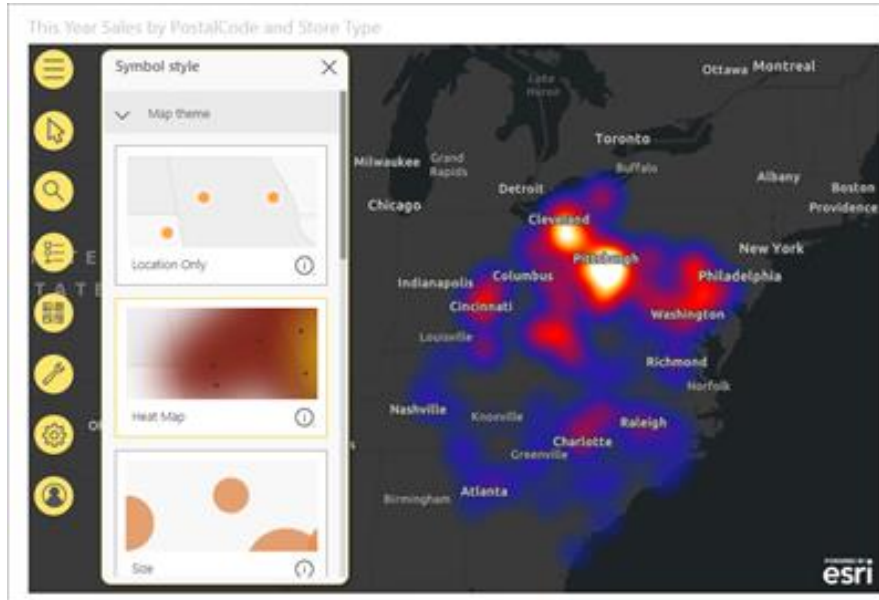
The combination of ArcGIS maps and Power BI takes mapping beyond the presentation of points on a map to a whole new level. The available options for base maps, location types, themes, symbol styles, and reference layers creates gorgeous informative map visuals. The combination of authoritative data layers (such as census data) on a map with spatial analysis conveys a deeper understanding of the data in your visual.
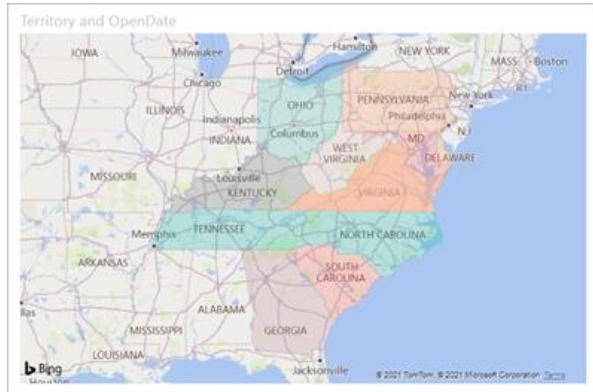
Azure map
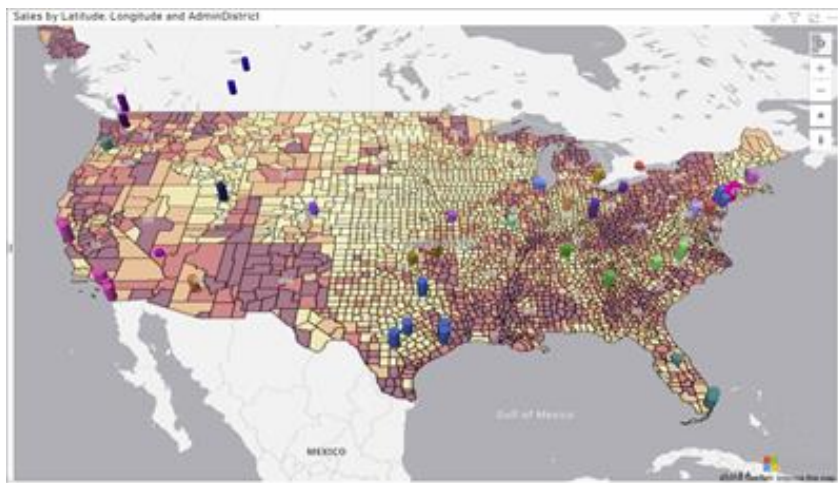
 Tip

Used to associate both categorical and quantitative information with spatial locations.

Filled map (Choropleth)

A filled map uses shading or tinting or patterns to display how a value differs in proportion across a geography or region. Quickly display these relative differences with shading that ranges from light (less-frequent/lower) to dark (more-frequent/more).

Shape map
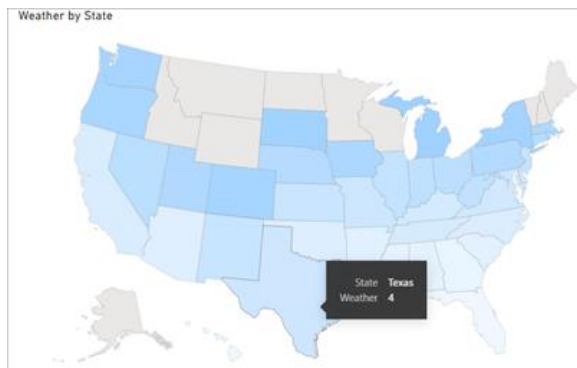
Shape maps compare regions on a map using color. A shape map can't show precise geographical locations of data points on a map. Instead, its main purpose is to show relative comparisons of regions on a map by coloring them differently.

Matrix

The matrix visual is a type of table visual (see Tables in this article) that supports a stepped layout. A table supports two dimensions, but a matrix makes it easier to display data

meaningfully across multiple dimensions. Often, report designers include matrixes in reports and dashboards to allow users to select one or more element (rows, columns, cells) in the matrix to cross-highlight other visuals on a report page.

Pie charts

This Year Sales by Chain

Chain ● Fashions Direct ● Lindseys

Pie charts show the relationship of parts to a whole.

Power Apps visual

Report designers can create a Power App and embed it into a Power BI report as a visual. Consumers can interact with that visual within the Power BI report.
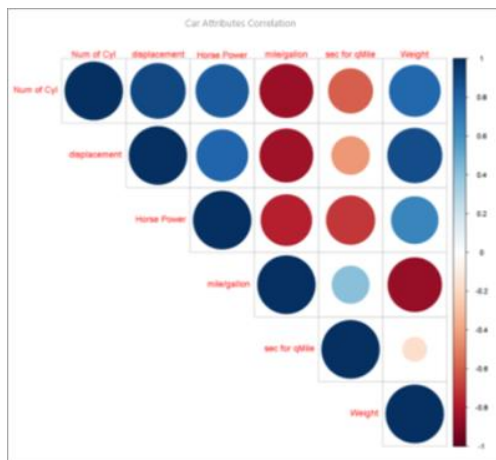
Q&A visual
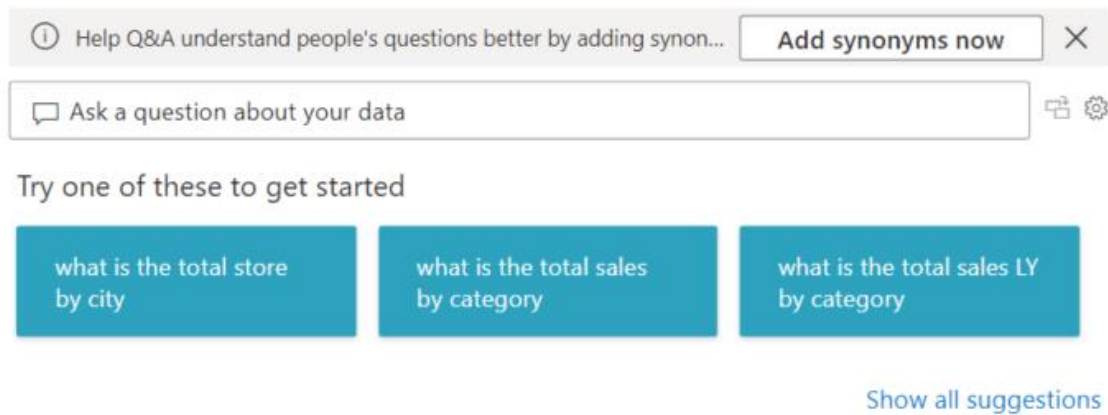
The Q&A visual provides users with a text box to query data in Power BI reports. Users can use natural language to query data, and the Q&A visual interprets the query and provides an appropriate visualization.

For example, if a user asks a question like "What were the product sales in 2019?" the Q&A visual queries the relevant data and create an appropriate visualization to display the results. This visualization can be in many different formats, such as a chart or a table.
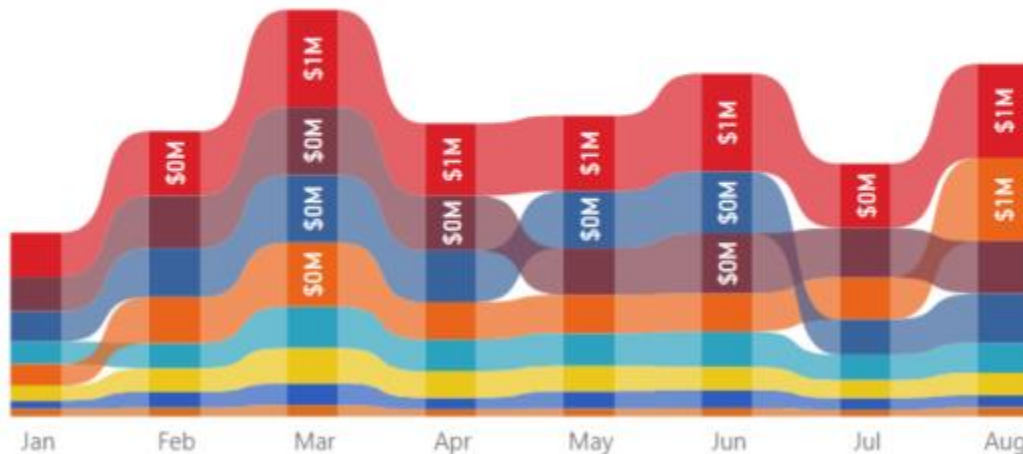
R script visuals

 Tip

Visuals created with R scripts, commonly called *R visuals*, can present advanced data shaping and analytics such as forecasting, using the rich analytics and visualization power of R. R visuals can be created in Power BI Desktop and published to the Power BI service.
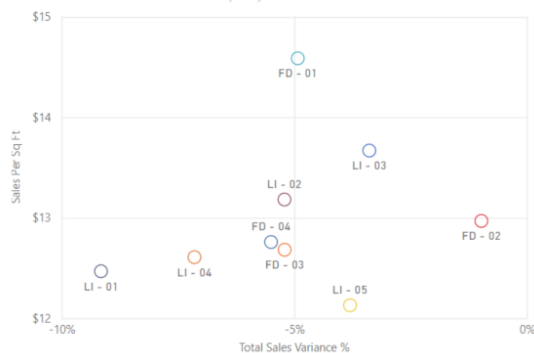
Ribbon chart

Ribbon charts show which data category has the highest rank (largest value). Ribbon charts are effective at showing rank change, with the highest range (value) always displayed on top for each time period.

Scatter

Scatter, bubble, and dot plot chart

A scatter chart always has two value axes to show one set of numerical data along a horizontal axis and another set of numerical values along a vertical axis. The chart displays points at the intersection of an x and y numerical value, combining these values into single data points. These data points might be distributed evenly or unevenly across the horizontal axis, depending on the data.

A bubble chart replaces data points with bubbles, with the bubble size representing an additional dimension of the data.

Total Sales Variance %, Sales Per Sq Ft and This Year Sales by District
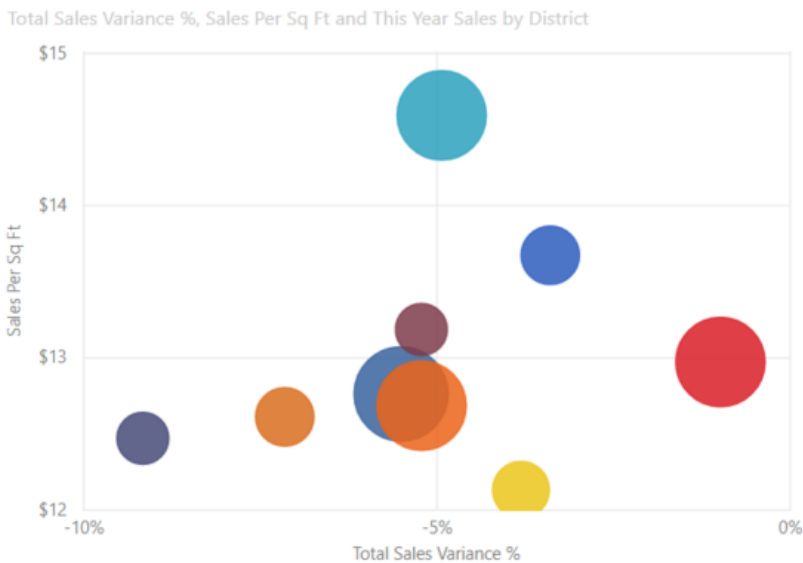
Both scatter and bubble charts can also have a play axis, which can show changes over time.

A dot plot chart is similar to a bubble chart and scatter chart except that it can plot numerical or categorical data along the X axis. This example happens to use squares instead of circles and plots sales along the X axis.

Total Sales Variance % and This Year Sales by District and District Manager
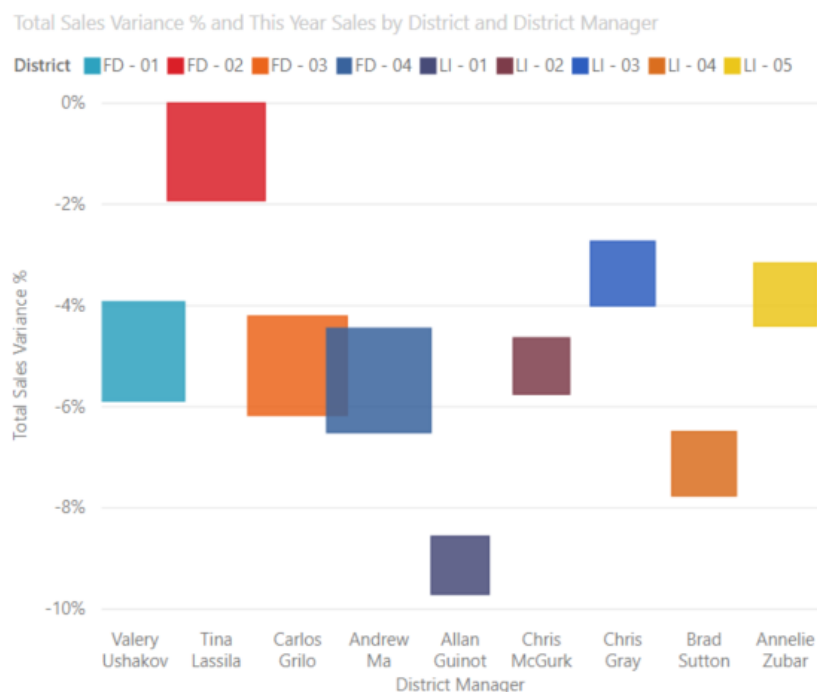
Scatter-high density

By definition, high-density data is sampled to quickly create visuals that are responsive to interactivity. High-density sampling uses an algorithm that eliminates overlapping points, and ensures that all points in the data set are represented in the visual. It doesn't just plot a representative sample of the data.
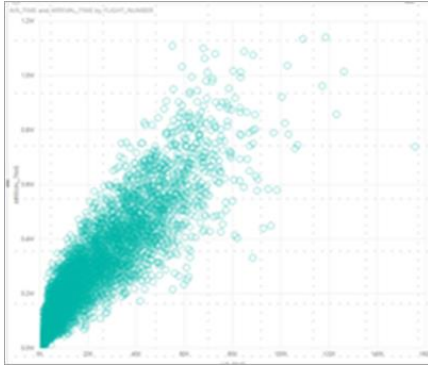
This ensures the best combination of responsiveness, representation, and clear preservation of important points in the overall data set.

Slicers

A slicer is a standalone chart that can be used to filter the other visuals on the page. Slicers come in many different formats (category, range, date, etc.) and can be formatted to allow selection of only one, many, or all of the available values.

Slicers are a great choice to:

- Display commonly used or important filters on the report canvas for easier access.
- Make it easier to see the current filtered state without having to open a drop-down list.
- Filter by columns that are unneeded and hidden in the data tables.
- Create more focused reports by putting slicers next to important visuals.

Smart narrative
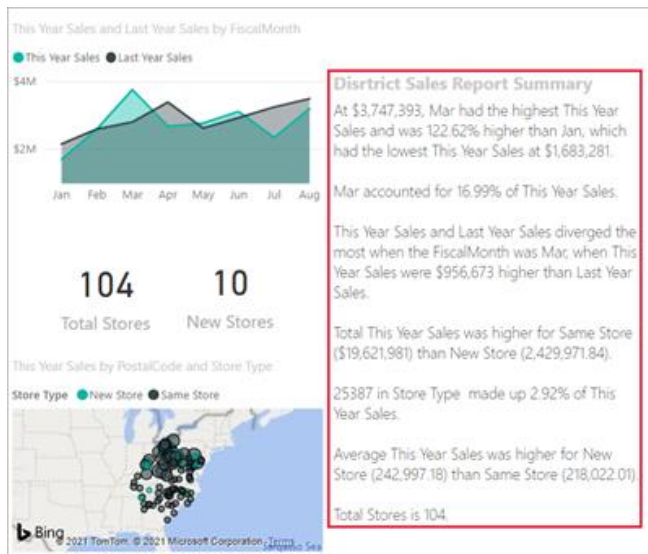
The Smart narrative adds text to reports to point out trends, key takeaways, and add explanations and context. The text helps users to understand the data and identify the important findings quickly.

Standalone images

A standalone image is a graphic that is added to a report or dashboard.

Tables

| Category	This Year Sales Status	Average Unit Price	Last Year Sales	This Year Sales	This Year Sales Goal
080-Accessories	●	$4.84	$1,273,096	$1,379,259	$1,273,096
090-Home	●	$3.93	$2,913,647	$3,053,326	$2,913,647
100-Groceries	●	$1.47	$810,176	$829,776	$810,176
020-Mens	●	$7.12	$4,453,133	$4,452,421	$4,453,133
030-Kids	●	$5.30	$2,726,892	$2,705,490	$2,726,892
050-Shoes	●	$13.84	$3,640,471	$3,574,900	$3,640,471
010-Womens	●	$7.30	$2,680,662	$1,787,958	$2,680,662
040-Juniors	●	$7.00	$3,105,550	$2,930,385	$3,105,550
060-Intimate	●	$4.28	$955,370	$852,329	$955,370
070-Hosiery	●	$3.69	$573,604	$486,106	$573,604
Total	●	$5.49	$23,132,601	$22,051,952	$23,132,601

A table is a grid that contains related data in a logical series of rows and columns. It might also contain headers and a row for totals. Tables work well with quantitative comparisons where you are looking at many values for a single category. For example, this table displays five different measures for Category.

Tables are a great choice:

- To see and compare detailed data and exact values (instead of visual representations).
- To display data in a tabular format.
- To display numerical data by categories.

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Treemaps
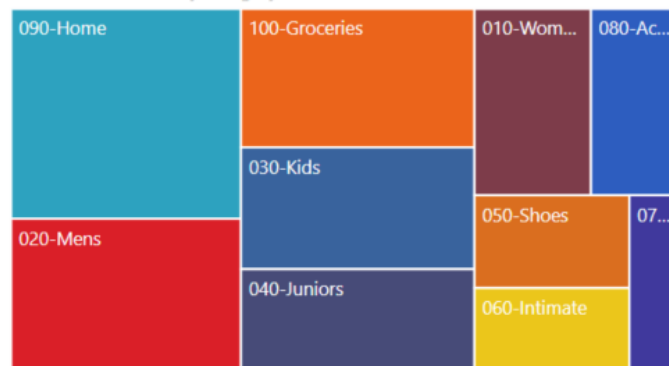
Treemaps are charts of colored rectangles, with size representing value. They can be hierarchical, with rectangles nested within the main rectangles. The space inside each rectangle is allocated based on the value being measured. And the rectangles are arranged in size from top left (largest) to bottom right (smallest).

Treemaps are a great choice:

- To display large amounts of hierarchical data.
- When a bar chart can't effectively handle the large number of values.
- To show the proportions between each part and the whole.
- To show the pattern of the distribution of the measure across each level of categories in the hierarchy.
- To show attributes using size and color coding.
- To spot patterns, outliers, most-important contributors, and exceptions.

Waterfall charts
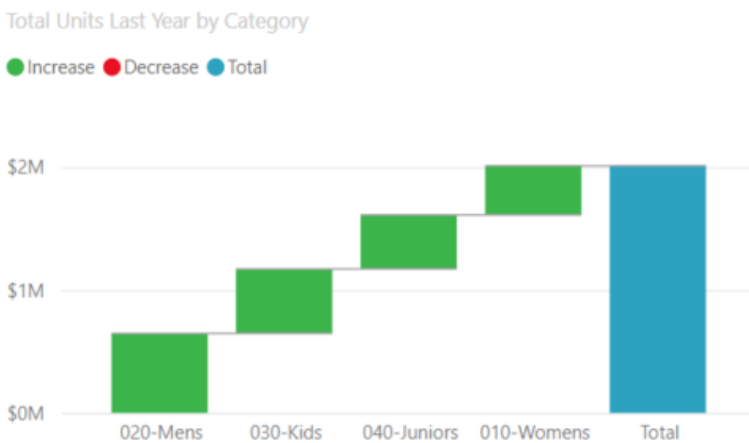
A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value (for example, net income) is affected by a series of positive and negative changes.

The columns are color coded so you can quickly tell increases and decreases. The initial and the final value columns often start on the horizontal axis, while the intermediate values are floating columns. Because of this "look", waterfall charts are also called bridge charts.

Waterfall charts are a great choice:

- When you have changes for the measure across time or across different categories.
- To audit the major changes contributing to the total value.
- To plot your company's annual profit by showing various sources of revenue and arrive at the total profit (or loss).
- To illustrate the beginning and the ending headcount for your company in a year.
- To visualize how much money you make and spend each month, and the running balance for your account.

PROJECT OVERVIEW

The "Power Bill Analysis Dashboard" project was initiated to address the need for a detailed understanding of power consumption patterns within a given infrastructure. The core objective was to synthesize and analyse power usage data to identify trends, inefficiencies, and opportunities for cost savings.

To achieve this, synthetic data representing an entire year's power usage was generated based on actual consumption metrics from a ten-day period. This data was then meticulously analysed to create an interactive dashboard that provides a granular view of energy consumption across various parameters.

Key features of the dashboard include:
- **Total Current Consumption:** A real-time view of power usage.
- **Annual and Daily Statistics:** Comparative analysis of power consumption over different time frames.
- **Monthly Consumption Breakdown**: Month-by-month insights into energy usage.
- **Units in kW/h:** Measurement of power consumed in kilowatt-hours.
- **Daily Consumption Analysis**: Day-to-day tracking to identify peak usage times.
- **Operational Unit Analysis**: Evaluation of energy usage by different operational units within the organization.
- **Floor Wise Consumption:** Insight into power usage distributed by floor levels, aiding in pinpointing specific areas of high consumption.

This project leverages the robust capabilities of Power BI to transform complex datasets into intuitive, actionable insights, enabling stakeholders to make data-driven decisions towards optimizing their power consumption.

DATA SOURCES AND PREPARATION

The foundation of the "Power Bill Analysis Dashboard" project lies in the meticulous creation and preparation of the data source. The data was synthesized to represent an entire year's power consumption, extrapolated from a carefully recorded ten-day period of actual power usage metrics.

Data Synthesis Process:
- **Selection of Base Period**: A ten-day span was chosen as the base period due to its representative mix of operational conditions.
- **Data Recording:** During this period, detailed readings of power consumption were taken at regular intervals across various operational units and floor levels.
- **Pattern Analysis:** These readings were then analysed to identify consistent usage patterns, anomalies, and fluctuations.
- **Synthetic Data Generation:** Using the insights from the pattern analysis, synthetic data for the remaining year was generated, ensuring that it reflected realistic consumption trends and seasonal variations.

Data Preparation Steps:
- **Cleaning:** The synthetic dataset underwent a cleaning process to remove any inconsistencies or errors that could skew analysis results.
- **Categorization:** Data was categorized based on different parameters such as time (daily, monthly, annual), operational units, and floor levels.
- **Conversion:** Consumption figures were standardized into kilowatt-hours (kW/h) to maintain uniformity across all visuals.
- **Integration:** The prepared dataset was then integrated into Power BI, setting the stage for dashboard development.

This rigorous approach to data source creation and preparation ensured that the resulting Power BI dashboard would be based on reliable and comprehensive information, capable of delivering meaningful insights into power consumption patterns

DASHBOARD DESIGN

The "Power Bill Analysis Dashboard" dashboard was meticulously designed to provide a comprehensive view of power consumption data through insightful and interactive visuals. The design process focused on clarity, usability, and the conveyance of meaningful insights.

Visual Components:

➢ **Total Current Consumption:** A prominent visual at the top of the dashboard displays the total current consumption, providing an immediate overview of the power usage.

➢ **Annual and Daily Consumption:** Area charts depict the annual consumption trends, while a separate visual breaks down the daily consumption patterns.

➢ **Monthly Consumption Breakdown:** Area Chart illustrates the monthly consumption, allowing for easy comparison across months.

➢ **Units in kW/h:** All consumption figures are presented in kilowatt-hours (kW/h), ensuring a standardized unit of measurement across the dashboard.

➢ **Daily Consumption Analysis:** An interactive line chart enables users to delve into daily consumption details, with filters to refine the data displayed.

➢ **Operational Unit Analysis:** It represents the distribution of power usage among different operational units, highlighting areas of high consumption.

➢ **Floor Wise Consumption:** It provides a visual representation of consumption across different floors, identifying floors with higher energy usage.

Design Considerations:

➢ **Interactivity:** Slicers and filters were incorporated to allow users to interact with the data, such as selecting specific time frames or operational units for detailed analysis.

➢ **Colour Scheme:** A consistent and intuitive colour scheme was applied to aid in data interpretation and to make the visuals aesthetically pleasing.

➢ **Layout:** The layout was strategically organized to guide the viewer's eye through the most critical data points in a logical flow.

➢ **Annotations:** Key insights and observations were annotated directly on the visuals to provide context and enhance understanding.

This carefully crafted dashboard serves as a powerful tool for analysing power consumption, enabling stakeholders to make informed decisions based on real-time data insights.

PROJECT WORKFLOW

1. **Data Collection:**
   - Gather power consumption data from various sources, including meters and sensors installed on different floors and connected to various equipment.
   - Record monthly power readings and detailed daily usage statistics.

2. **Data Processing:**
   - Use Excel to organize and clean the raw data. This involves removing any inconsistencies or errors and ensuring the data is structured appropriately for analysis.
   - Perform preliminary data analysis in Excel to compute essential metrics and prepare the data for visualization.

3. **Dashboard Creation:**
   - Utilize Microsoft Fabric to create an interactive and visually appealing dashboard. This involves designing the layout, integrating various charts and graphs, and ensuring the dashboard is user-friendly and informative.
   - Configure data connections and set up data refresh options to ensure the dashboard displays the most up-to-date information.

4. **Analysis and Interpretation:**
   - Analyse the visual data presented in the dashboard to identify high consumption areas and periods.

Derive actionable insights to optimize power usage and implement cost-saving measures.

TOOLS USED

- **Microsoft Fabric**:
  - A powerful tool for creating dynamic dashboards and visualizing data effectively.
  - Features include a range of visualizations, interactive elements, and data connection options.
  - **Data Refresh Options**:
    - **Scheduled Refresh**: Automatically updates the dashboard with new data at predefined intervals (e.g., daily, weekly). This ensures the dashboard always reflects the latest data without manual intervention.
    - **Manual Refresh**: Allows users to manually refresh the data on demand. This is useful for instances where immediate updates are required outside of the scheduled refresh times.
    - **Real-Time Data**: For scenarios that require up-to-the-minute data, real-time data refresh can be set up. This ensures the dashboard is continuously updated as new data comes in, providing the most current insights.

- **Excel**:
  - Essential for data organization, processing, and preliminary analysis.
  - Functions used include data cleaning, calculation of key metrics, and preparation of data for visualization.
  - Excel's robust data manipulation capabilities make it an ideal tool for handling the initial stages of data analysis.

ADVANTAGES OF THE PROJECT

- **Enhanced Visibility**:
  - o Provides clear and comprehensive visualization of power usage trends.
  - o Simplifies complex data into understandable and actionable formats, making it easier for stakeholders to grasp and act upon the information.
- **Data-Driven Decision Making**:
  - o Empowers stakeholders to make informed decisions based on accurate and timely data.
  - o Supports strategic planning and resource allocation for energy management initiatives.
- **Operational Efficiency**:
  - o Identifies areas for operational improvements and efficiency gains.
  - o Helps in optimizing the use of resources and reducing operational costs.

USE CASES

- **Facility Management**:
  - o Facility managers can use the dashboard to monitor and control power usage across different floors and equipment.
  - o Helps in planning maintenance schedules based on usage patterns and identifying equipment that may require servicing or replacement.
- **Energy Audits**:
  - o Useful for conducting energy audits and identifying inefficiencies in power consumption.
  - o Assists in ensuring compliance with energy regulations and standards, and in achieving certifications for energy efficiency.
- **Sustainability Initiatives**:
  - o Supports sustainability initiatives by promoting energy conservation and reducing the carbon footprint.
  - o Helps in achieving green building certifications and demonstrating a commitment to environmental responsibility.
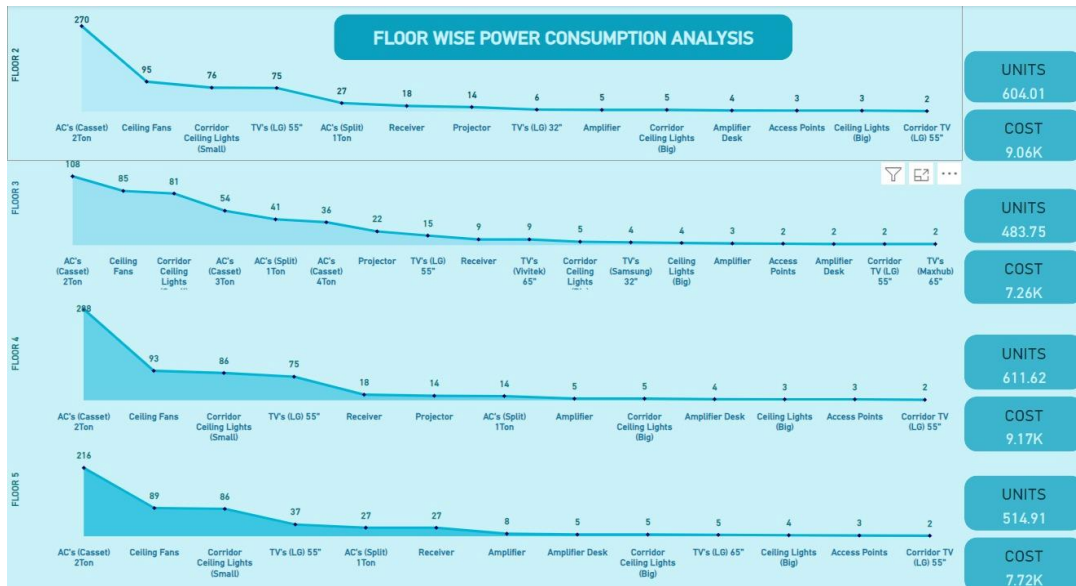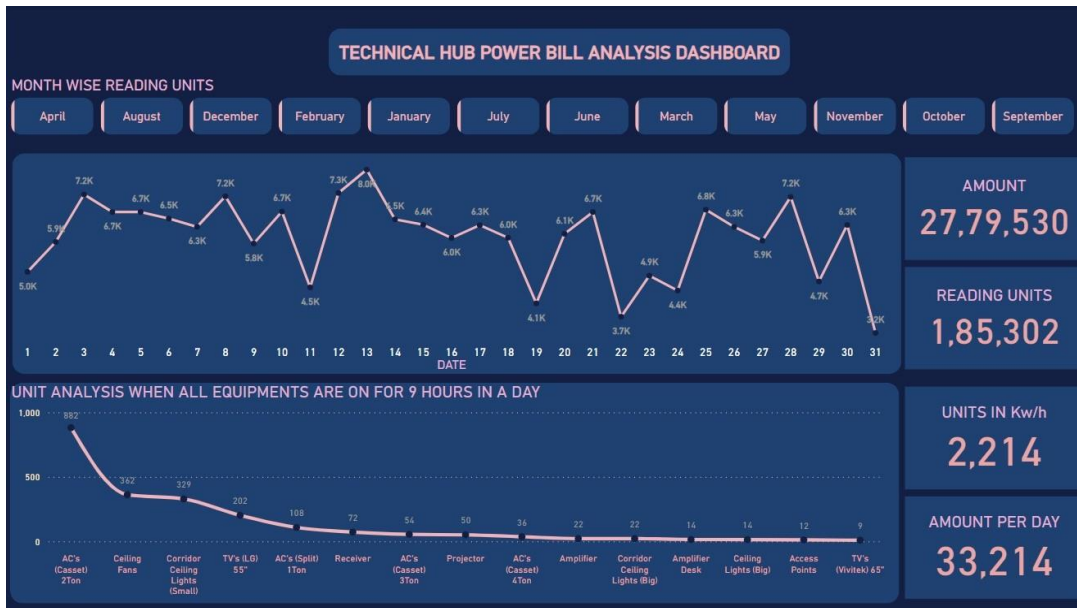
OUTPUT

Fig: *The above images are the dashboard's that shows the analysis of the power consumption.*

CONCLUSION

The power consumption analysis dashboard project showcases the effective use of Microsoft Fabric and Excel in transforming raw data into actionable insights. By providing detailed visualization and analysis of power usage, this project aids in energy management, cost savings, and operational efficiency. The comprehensive data presented in an easy-to-understand format ensures that stakeholders can make informed decisions to optimize power consumption and enhance sustainability efforts.

The inclusion of data refresh options in Microsoft Fabric, such as scheduled refresh, manual refresh, and real-time data capabilities, significantly enhances the usability and reliability of the dashboard. These features ensure that the dashboard always presents the most current and accurate information, making it a powerful tool for ongoing energy management and optimization. This project not only contributes to cost savings and efficiency improvements but also supports broader sustainability and environmental goals.