



The University of Jordan

Business Intelligence (1904371)

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Power BI Student Lab Guide



Power BI

Power BI Student Lab Guide

Strategic Plan and Dashboard



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Introducing Power BI

Setup:

Downloading Power BI

1. Go to <https://powerbi.microsoft.com/en-us/downloads/>
2. Complete the download either through the Microsoft Store or download manually by clicking Advanced download options and following the prompts in the wizard.

What is Power BI

Power BI is a suite of business analytics tools which connects to different data sources to analyze data and share insights throughout your organization.



Parts of Power BI

There are 3 Parts of Power BI.

1. Power BI Desktop
2. Power BI Service
3. Power BI Mobile

Power BI Desktop: It is a Windows desktop application (Report Authoring Tool) which Lets you build queries, models and reports that visualize data.

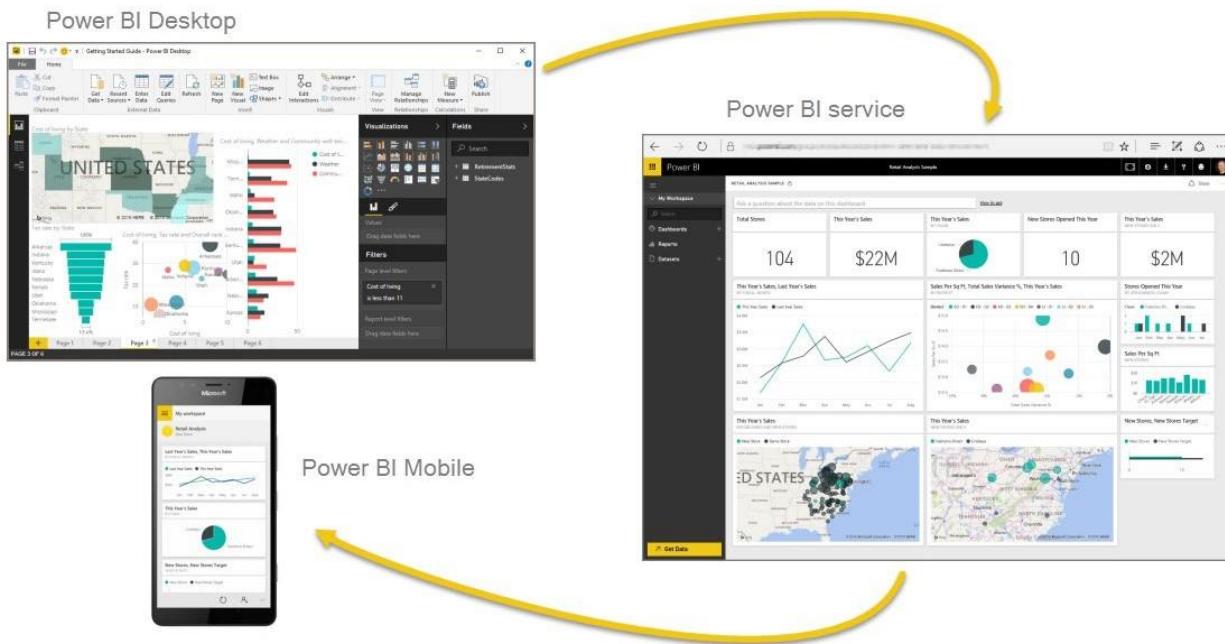
Power BI Service: Power BI Service is cloud based Software as Service Application which allows us to create dashboards, Setup schedule data refreshes, Share the reports securely in the organization.

Power BI Mobile: It is an application (App) on mobile devices which allows you to interact with the reports and dashboard from Power BI Service.

The flow of work in Power BI

A common flow of work in Power BI begins in **Power BI Desktop**, where a report is created. That report is then published to the **Power BI service**, and then shared so users of **Power BI Mobile** apps can consume the information.

It doesn't always happen that way, and that's okay, but we'll use that flow to help you learn the various parts of Power BI, and how they complement one another.



Power BI Desktop:

Power BI Desktop is report authoring tool that allows you to create reports, queries, Extract Transform and Load the data from data sources and model the queries.

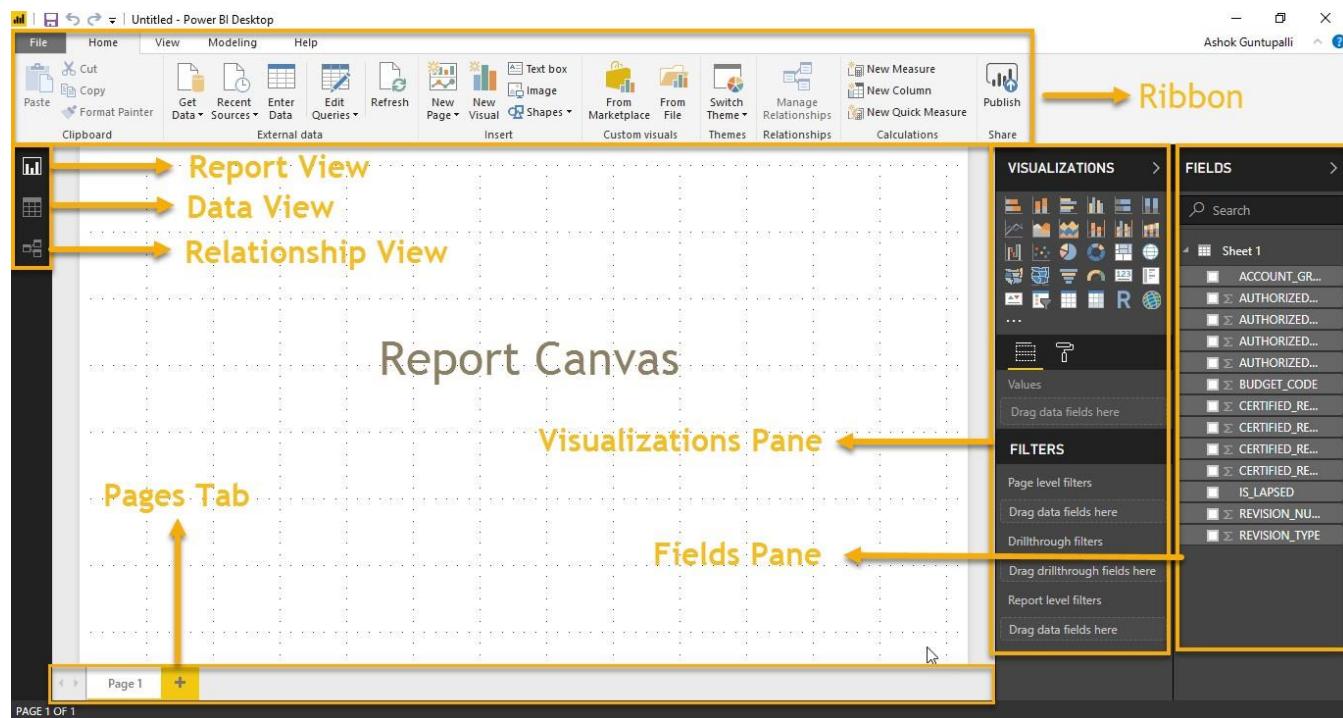
Power BI Desktop Interface:

Power BI Basic Features

1. Side panes allow you to apply filters and create new visuals.
2. Toolbars give you access to new data sources and the Power Query Editor.
3. The Data view allows you to see the tables in your dataset.
4. The Modeling view allows you to create relationships between entities.
5. The Power Query Editor is where you can transform, merge, and append your data based on report needs.

The Report has five main areas:

1. **Ribbon:** The **Ribbon** displays common tasks associated with reports and visualizations;
2. **Pages:** The **Pages** tab area along the bottom allows you to select or add a report page;
3. **Visualizations:** The **Visualizations** pane allows you to change visualizations, customize colors or axes, apply filters, drag fields, and more;
4. **Fields:** The **Fields** pane, allows you to drag and drop query elements and filters onto the **Report** view, or drag to the **Filters** area of the **Visualizations** pane;
5. **Views Pane:** There are three types of views in the views pane
 - **Reports View** – allows you to create any number of report pages with visualizations.
 - **Data View** – allows you to inspect, explore, and understand data in your Power BI Desktop model.
 - **Relationship or Model view** – allows you to show all of the tables, columns, and relationships in your model.



Querying Data from CSV

Query Editor

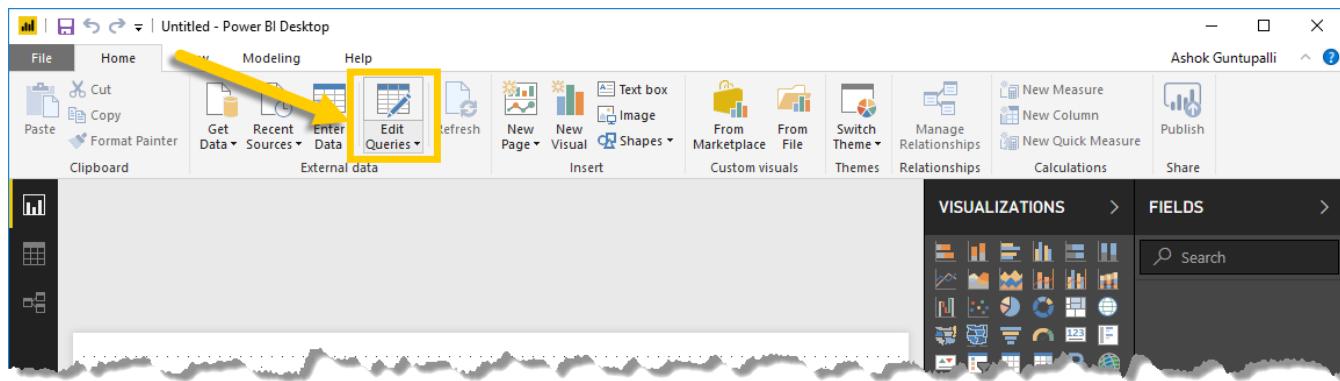
You can import and clean data from Oracle while working in Power BI.

Query Editor, allows you to connect to one or many data sources, shape and transform the data to meet your business needs, then load the queries into the model into Power BI Desktop

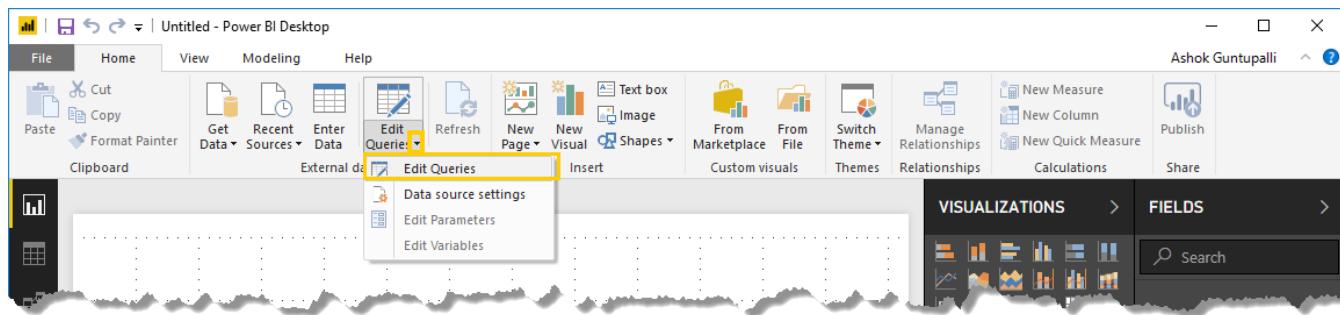
This below step provides an overview of the work with data as well as connecting to data sources, shaping the data in **Query Editor**

Exercise 1: Get Started with Query Editor

1. To get to Query Editor, select Edit Queries from the Home tab of Power BI Desktop.

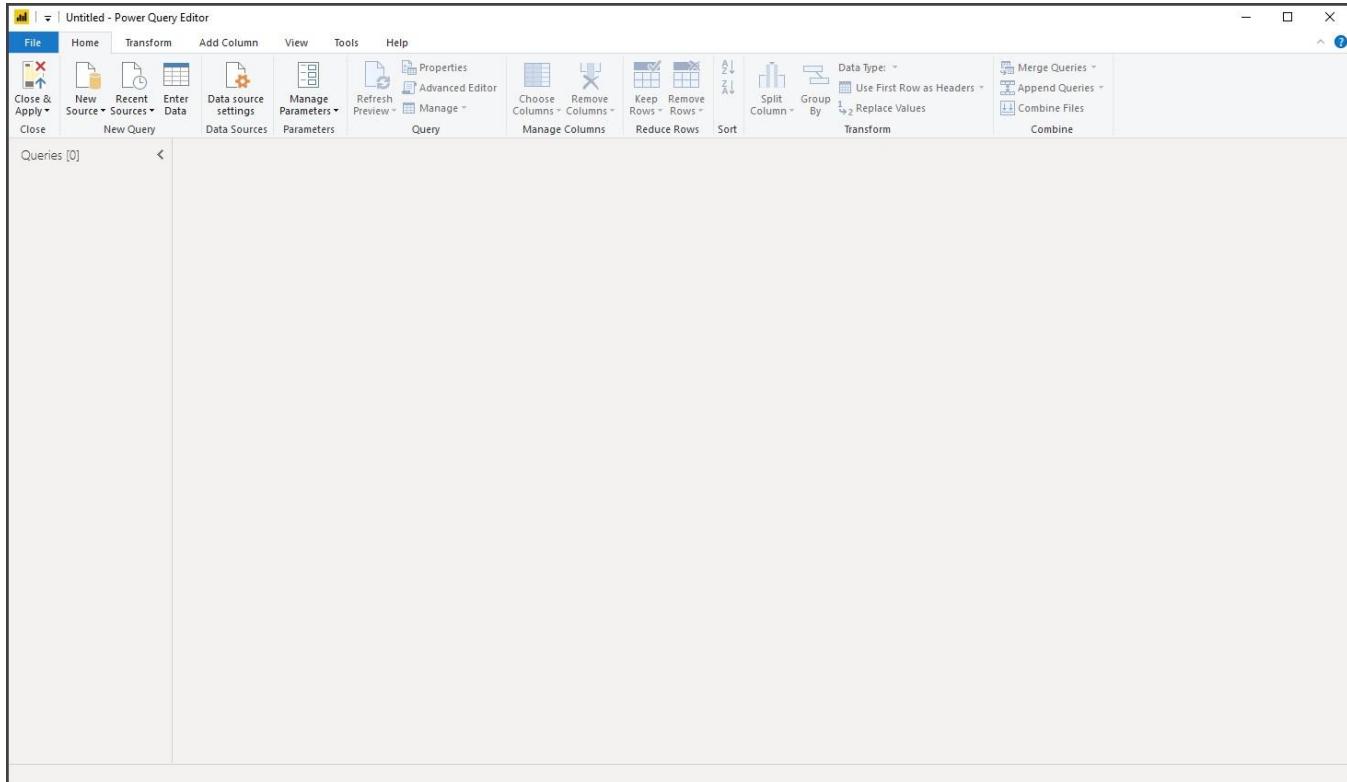


2. Click on the drop down of the Edit Queries on the bottom right corner, click on Edit Queries



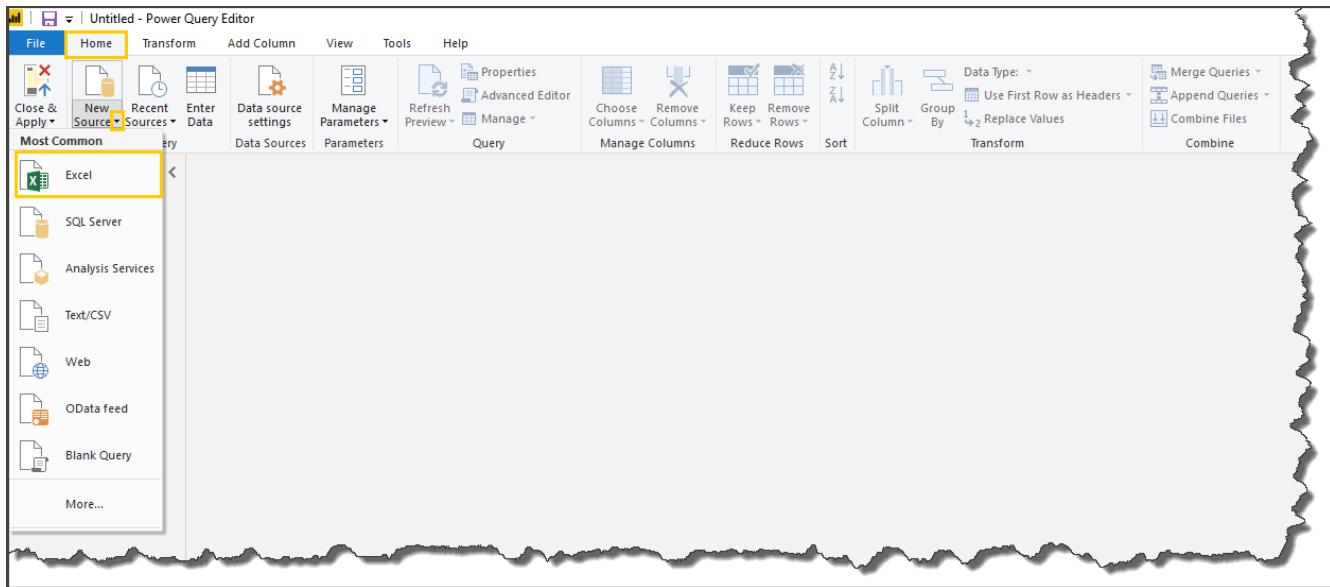
Note: With no data connections, **Query Editor** appears as a blank pane, ready for data.

Below image shows the interface of the Query Editor



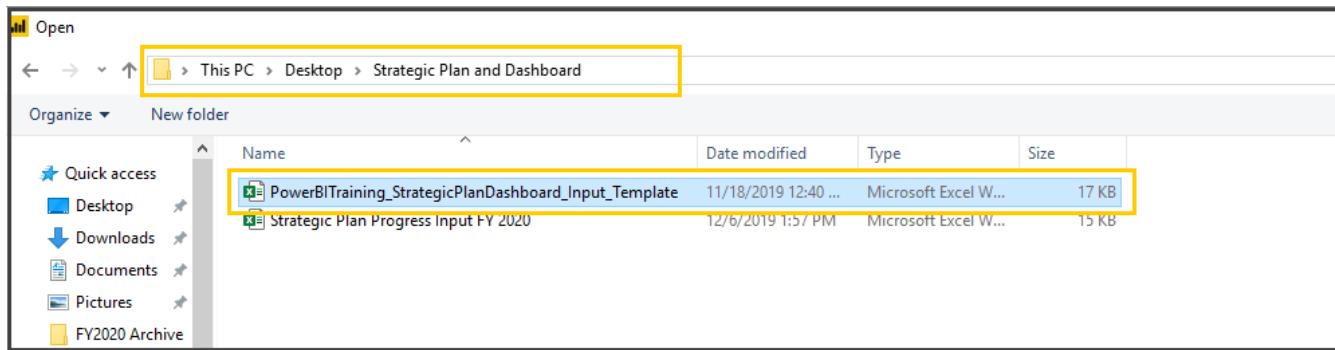
Exercise 2: Connecting the data from the Excel Source

3. From Home tab > New Source > Choose Excel



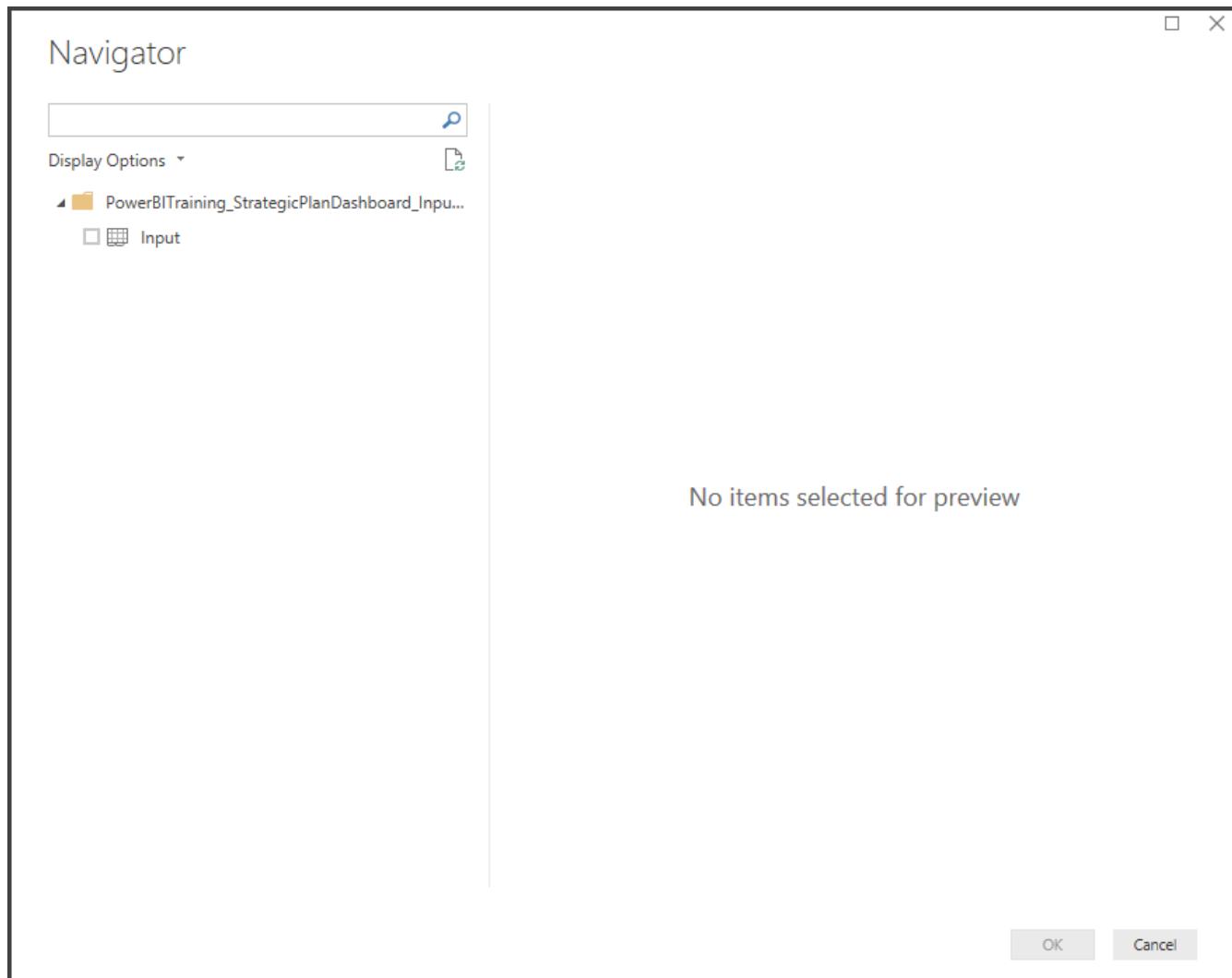


4. Navigate to the Strategic Plan and Dashboard Folder and Choose
PowerBITraining_StrategicPlanDashboard_Input_Template Excel File



5. Click on Open () at the bottom of the screen

You can see a navigator screen to select the sheets on the Excel Workbook. In our case, we have one sheet named as Input



6. Select Input sheet from the available list

The screenshot shows the 'Navigator' window with the 'Input' sheet selected. The 'Input' sheet contains the following data:

Goal	Goal Detail	Objective
Goal 1	Goal 1-Position NC to create new jobs and grown workers' paychecks	
Goal 1	Goal 1-Position NC to create new jobs and grown workers' paychecks	
Goal 1	Goal 1-Position NC to create new jobs and grown workers' paychecks	
Goal 1	Goal 1-Position NC to create new jobs and grown workers' paychecks	
Goal 2	Goal 2- Make NC a top ten educated state	
Goal 2	Goal 2- Make NC a top ten educated state	

7. Click OK () at the bottom of the screen

Interface of Query Editor

Query Editor consists of 4 Parts

1. Query Ribbon

2. Left Pane

3. Center (Data) Pane

4. Query Settings

The screenshot shows the Power Query Editor interface with the following numbered labels:

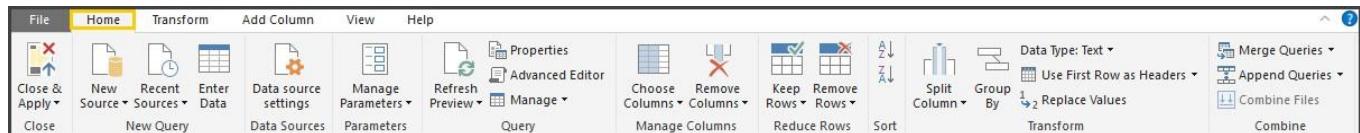
- 1.** Query Ribbon: Shows the ribbon menu with various options like File, Home, Transform, Add Column, View, Tools, and Help.
- 2.** Left Pane: Shows the 'Queries [1]' pane with the 'Input' query selected.
- 3.** Center (Data) Pane: Shows the data grid with columns 'Goal', 'Goal Detail', and 'Objective'. The 'Goal' column has a dropdown showing 'Valid' (93%), 'Error' (0%), and 'Empty' (7%). The 'Objective' column also shows similar percentages. The formula bar at the top shows the query: `= Table.TransformColumnTypes(#"Promoted Headers",{{"Goal", type text}, {"Goal Detail", type text}, {"Objective", type text}})`.
- 4.** Query Settings: Shows the 'Properties' and 'Applied Steps' sections. The 'Properties' section shows the name 'Input'. The 'Applied Steps' section lists the steps taken: Source, Navigation, Promoted Headers, and Changed Type.

The Query Ribbon

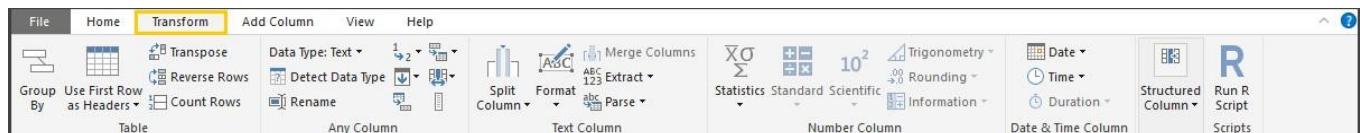
The Ribbon in **Query Editor** consists of four tabs

- **Home**
- **Transform**
- **Add Column**
- **View**

Home Tab: The **Home** tab contains the common query tasks, including the first step in any query, which is **Get Data**.



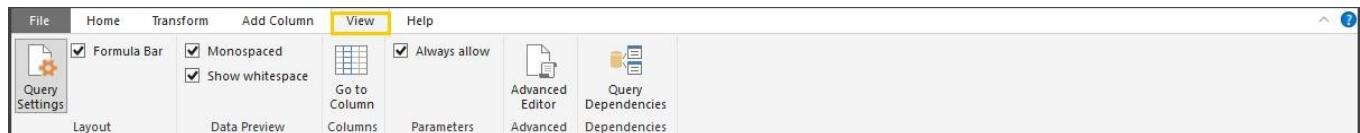
Transform: The **Transform** tab provides access to common data transformation tasks, such as adding or removing columns, changing data types, splitting columns, and other data-driven tasks.



Add Column: The **Add Column** tab provides additional tasks associated with adding a column, formatting column data, and adding custom columns. The following image shows the **Add Column** tab.



View Tab: The **View** tab on the ribbon is used to toggle whether certain panes or windows are displayed. It's also used to display the Advanced Editor. The following image shows the **View** tab.



The Left pane:

The **left pane** displays the number of active queries, as well as the name of the query. When you select a query from the left pane, its data is displayed in the center pane, where you can shape and transform the data to meet your needs.

This screenshot shows the Query Editor interface. The left pane displays a list of queries, with "Input" selected. The center pane shows the data for the "Goal" column, with a table below it showing "Valid" and "Error" counts for "Goal Detail".

Category	Detail	Count
Valid	Goal Detail	93%
Error	Goal Detail	0%



The center (data) pane:

In the **Center pane, or Data pane**, data from the selected query is displayed. This is where much of the work of the Query view is accomplished.

The screenshot shows the Power Query Editor interface. The top ribbon has tabs: File, Home, Transform, Add Column, View, Tools, Help. The Home tab is selected. The ribbon also includes Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Split Column, Group By, Data Type: Text, Use First Row as Headers, Replace Values, and Combine. The left sidebar shows 'Queries [1]' and 'Input'. The main area displays a table with columns 'A' and 'B'. The first column is labeled 'Goal' and the second is 'Goal Detail'. The table contains four rows, each labeled 'Goal 1'. The right side features a 'Query Settings' pane with sections for 'PROPERTIES' (Name: Input, All Properties) and 'APPLIED STEPS' (Source, Navigation, Promoted Headers, Changed Type).

The Query settings pane:

The **Query Settings pane** is where all steps associated with a query are displayed.

This screenshot is similar to the previous one but highlights the 'Query Settings' pane on the right. The 'APPLIED STEPS' section is expanded, showing the steps: Source, Navigation, Promoted Headers, and the newly added 'Changed Type' step.

Exercise 3: Clean, Transform the data (Removing Nulls)

Removing the unwanted rows in the query.

8. Home Tab > Reduce Rows section > Remove Rows > Remove Blank Rows

The screenshot shows the Power Query Editor with the 'Home' tab selected. The ribbon includes Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Split Column, Group By, Data Type: Text, Use First Row as Headers, Replace Values, and Combine. The left sidebar shows 'Queries [1]' and 'Input'. The main area displays a table with columns 'A' and 'B'. The first column is labeled 'Goal' and the second is 'Goal Detail'. The table contains seven rows, each labeled 'Goal 1' or 'Goal 2'. The right side features a 'Query Settings' pane with sections for 'PROPERTIES' (Name: Input, All Properties) and 'APPLIED STEPS' (Source, Navigation, Promoted Headers, Changed Type). The 'Remove Rows' section in the ribbon is highlighted, and the 'Remove Blank Rows' step is highlighted in the list of steps.

Notice that null records are eliminated, and new steps is added for the transformation you applied to the query in the query settings pane of the selected query.



The screenshot shows the Power Query Editor interface with the 'Applied Steps' pane open. The pane lists the steps taken during the query's creation, specifically highlighting the 'Removed Blank Rows' step.

Applied Steps:

- Source
- Navigation
- Promoted Headers
- Changed Type**
- Removed Blank Rows**

Note: Each step, you do in the Query Editor is recorded in Applied Steps of Query Settings pane.

9. From Home Ribbon > Click on Close & Apply

The screenshot shows the Power Query Editor interface with the 'Home' ribbon tab selected. The 'Applied Steps' pane is visible on the right, showing the recorded steps.

Applied Steps:

- Source
- Navigation
- Promoted Headers
- Changed Type**
- Removed Blank Rows**

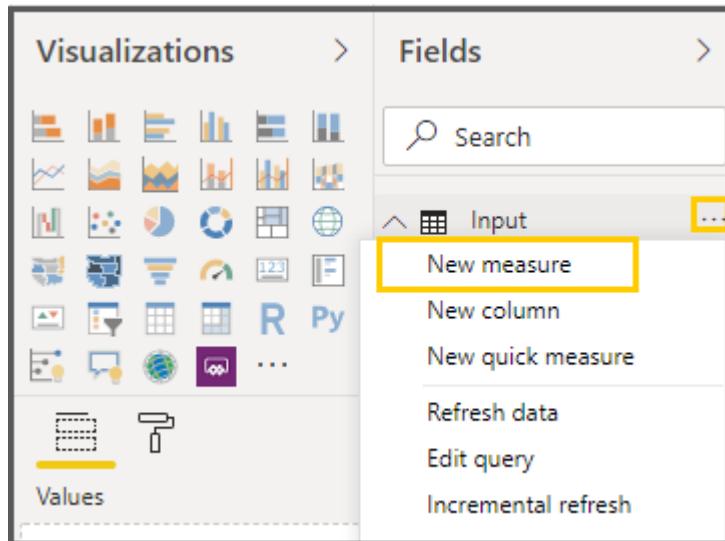
Note: After Close & Apply the query is added to the model for report development.

Calculated Measures Using DAX

In general, **Measures** are used to **calculate aggregates**, such as the **sum or average** of a column. **Measures are calculated at the time of your query**, which means that they **aren't stored in your database**, but use **processing power to execute a query at the time of your request**.

Exercise 4: Creating of the Measures using DAX

- Be on the Report view, From the Fields Pane, click on the Ellipses (More options) of the Input Query, Click on New Measure.



- In the Expression Bar, Type in

Overall Completion% = sum (Input[Completion%]) / (COUNTRROWS(Input)*100)

- Click on Commit to validate the Expression

Note: After you commit, if there are any errors in the expression, the expression will be highlighted with red curly line.

The screenshot shows the Power BI Desktop interface with the formula bar at the top. The formula is: `1 Overall Completion% = sum (Input[Completion%]) / (COUNTRROWS(Input) * 100)`. The number '100' is highlighted with a red box, indicating an error in the formula.

Exercise 5: Change the format of the Measures

13. Expand Input query under Fields pane, Select Overall Completion % , and from the Modeling ribbon, Click on the Format under the formatting section and select Percentage.

The screenshot shows the Power BI Desktop interface with the 'Formatting' dropdown menu open for the 'Overall completion%' measure. The 'Percentage' option is selected and highlighted with a yellow box. The 'Fields' pane on the right shows the 'Input' table expanded, with the 'Overall Completion%' measure selected.

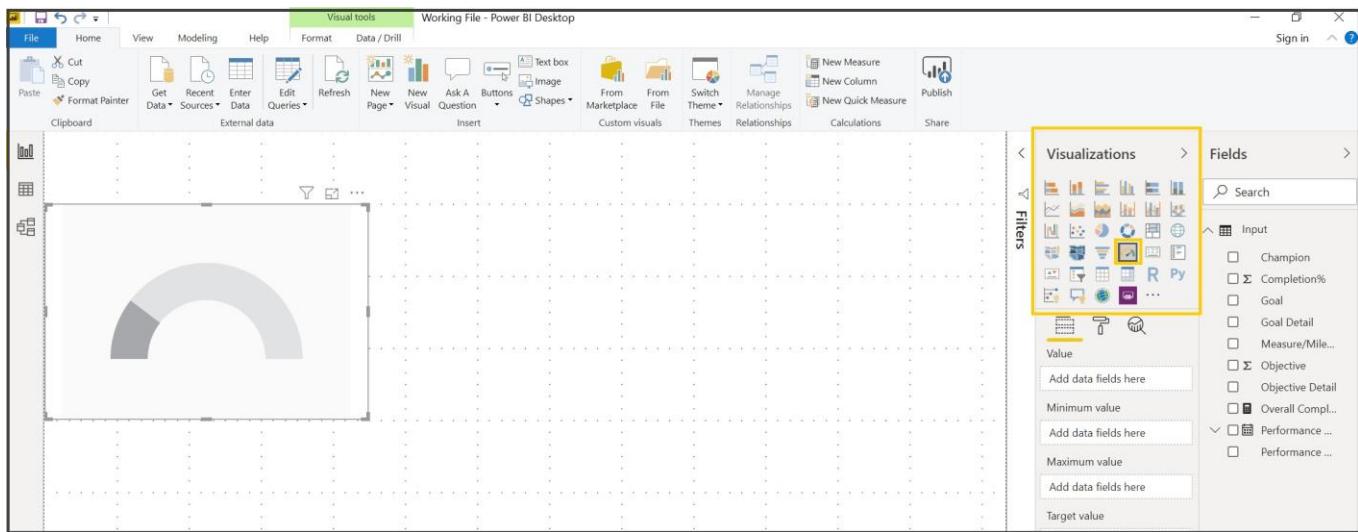
14. Make the decimal points to Zero of the Overall Completion % measure under formatting section.

The screenshot shows the Power BI Desktop interface with the decimal separator set to a dot ('.') in the 'Formatting' dropdown menu for the 'Overall completion%' measure. The 'Fields' pane on the right shows the 'Input' table expanded, with the 'Overall Completion%' measure selected.

Creating Reports & Visualizations

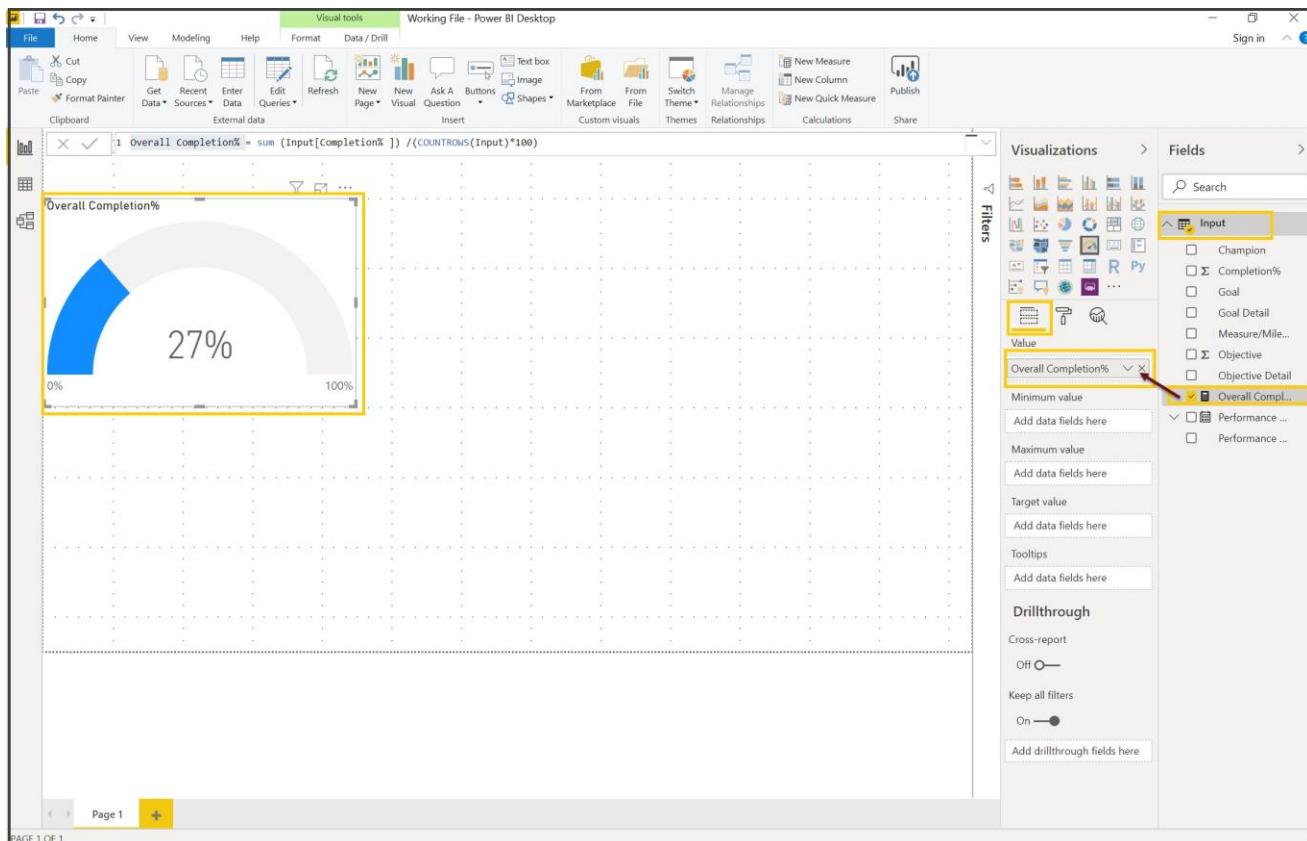
Exercise 6: Creating your first visualization (Completion % of All Goals) Gauge Chart

15. Click on Visualizations Pane and Click on Gauge Chart



Note: Make sure the Visualization is selected before dropping the fields.

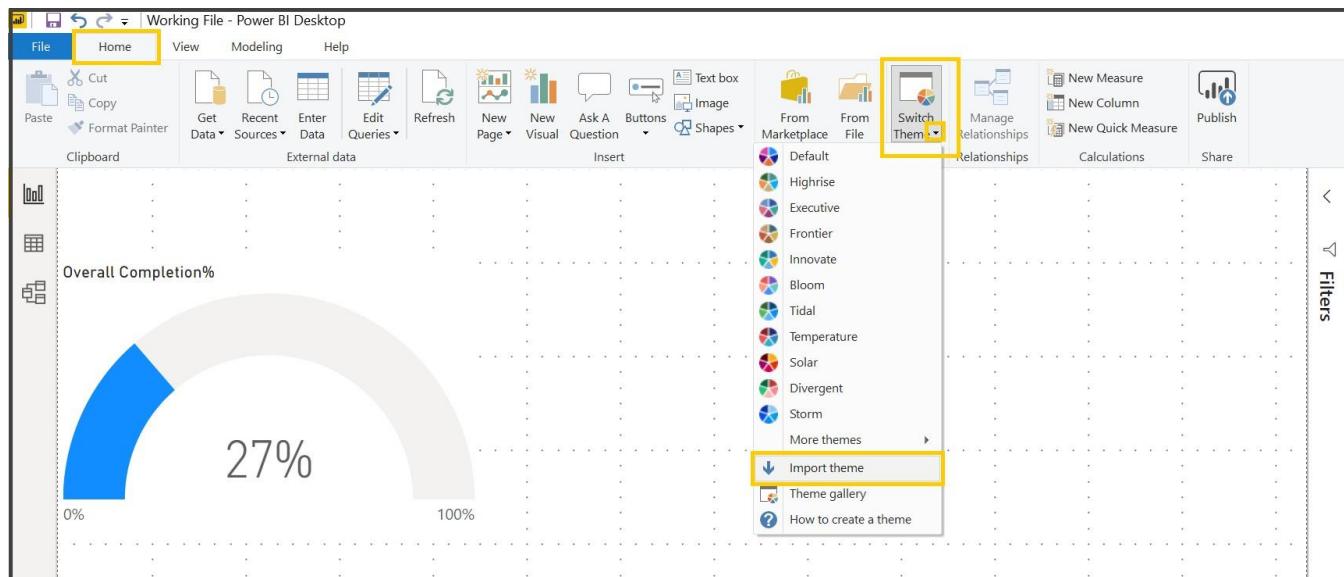
16. Expand Input Query, Drag Overall Completion% to the Value section of the Fields pane of the gauge Visual



Exercise 7: Importing a Theme to a Power BI Desktop File.

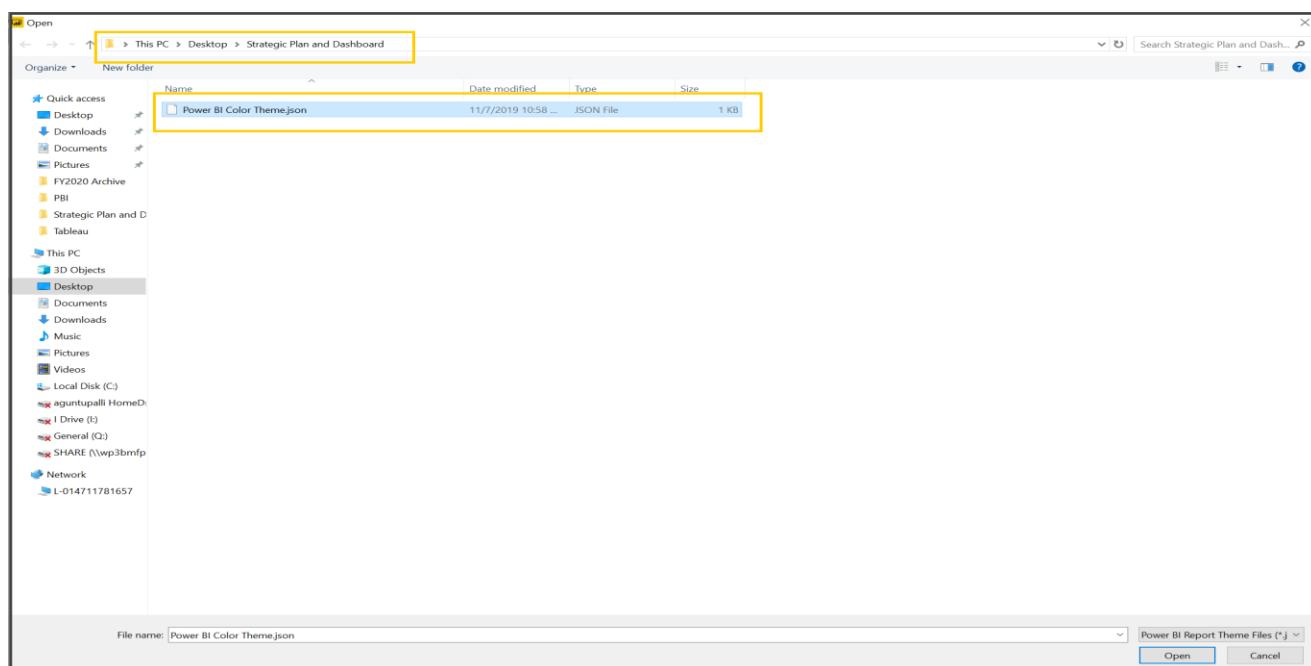
With **Report Themes** you can apply design changes to your entire report, such as using corporate colors, changing icon sets, or applying new default visual formatting. When you apply a **Report Theme**, all visuals in your report use the colors and formatting from your selected theme.

- From the Home Ribbon of the Report view, click on the drop down of the Switch Theme under Themes section and select Import from the file. Drag **Overall Completion%** to the Value section of the Fields pane of the gauge Visual

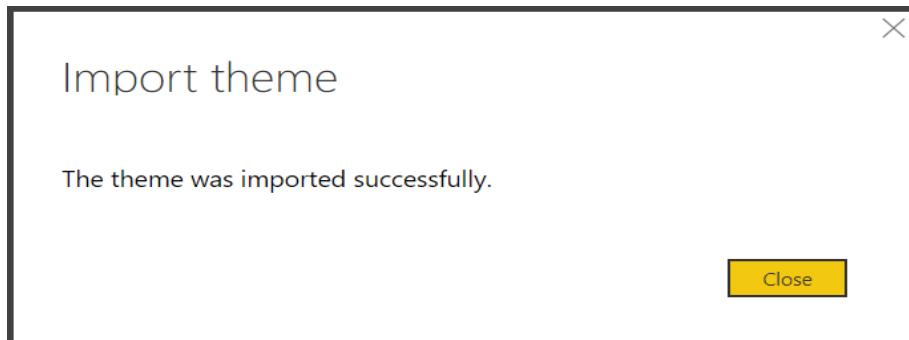


A window appears that lets you browse to the location of the JSON theme file

- Navigate to the Strategic Plan and Dashboard folder o the Desktop and select Power BI Color Theme.Json file



19. Click on Open () at the bottom of the screen

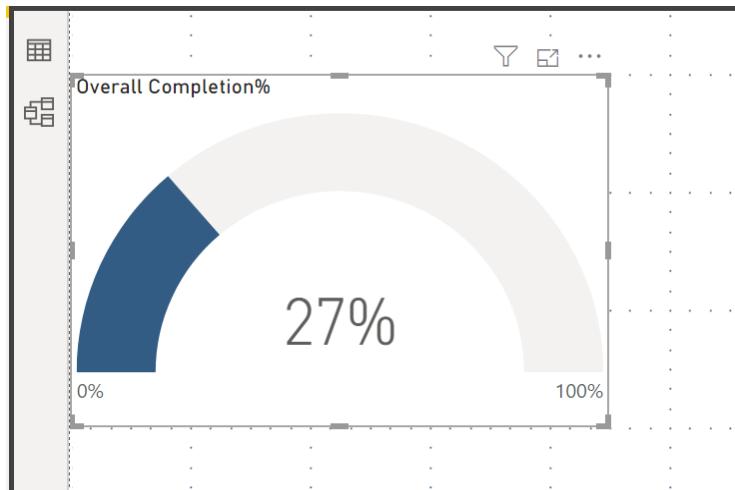


You will get a success message once the theme is imported successfully.

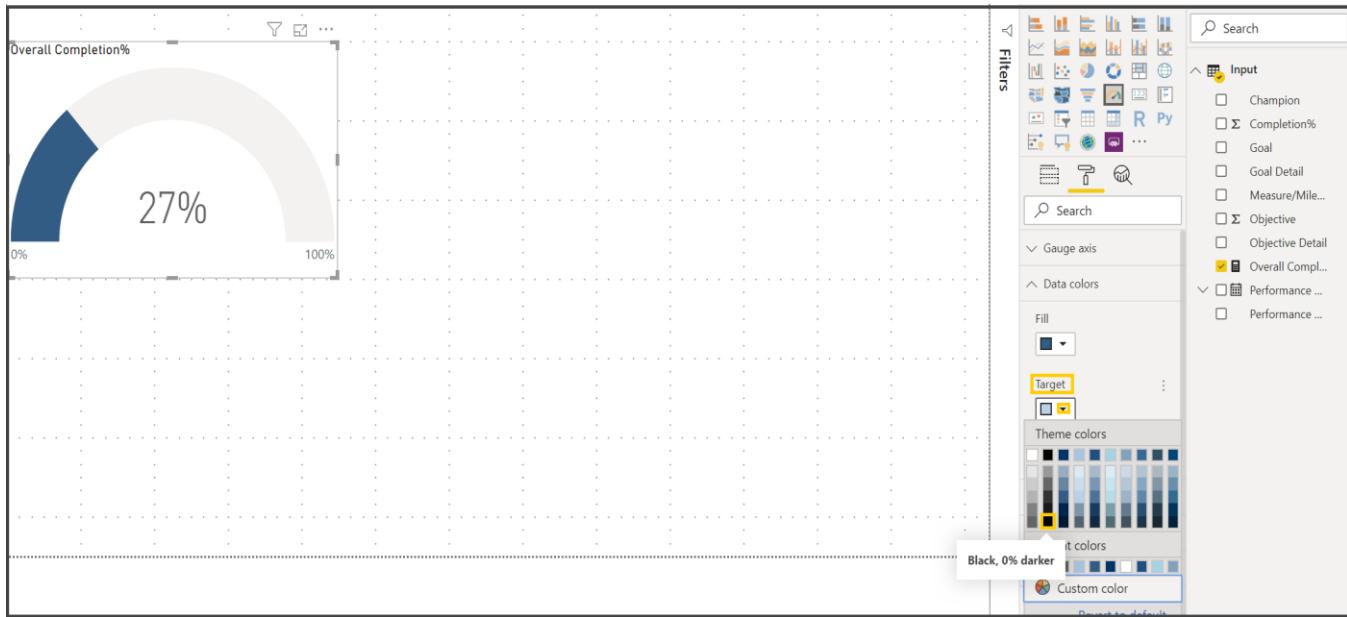
Exercise 8: Changing the Color of the Gauge.

20. Select the Gauge Chart and Click on the Format of the Gauge Chart, Expand Data Colors properties, click on the drop down of Fill property and select light blue color

After the changing the color the gauge chart looks like the one below.

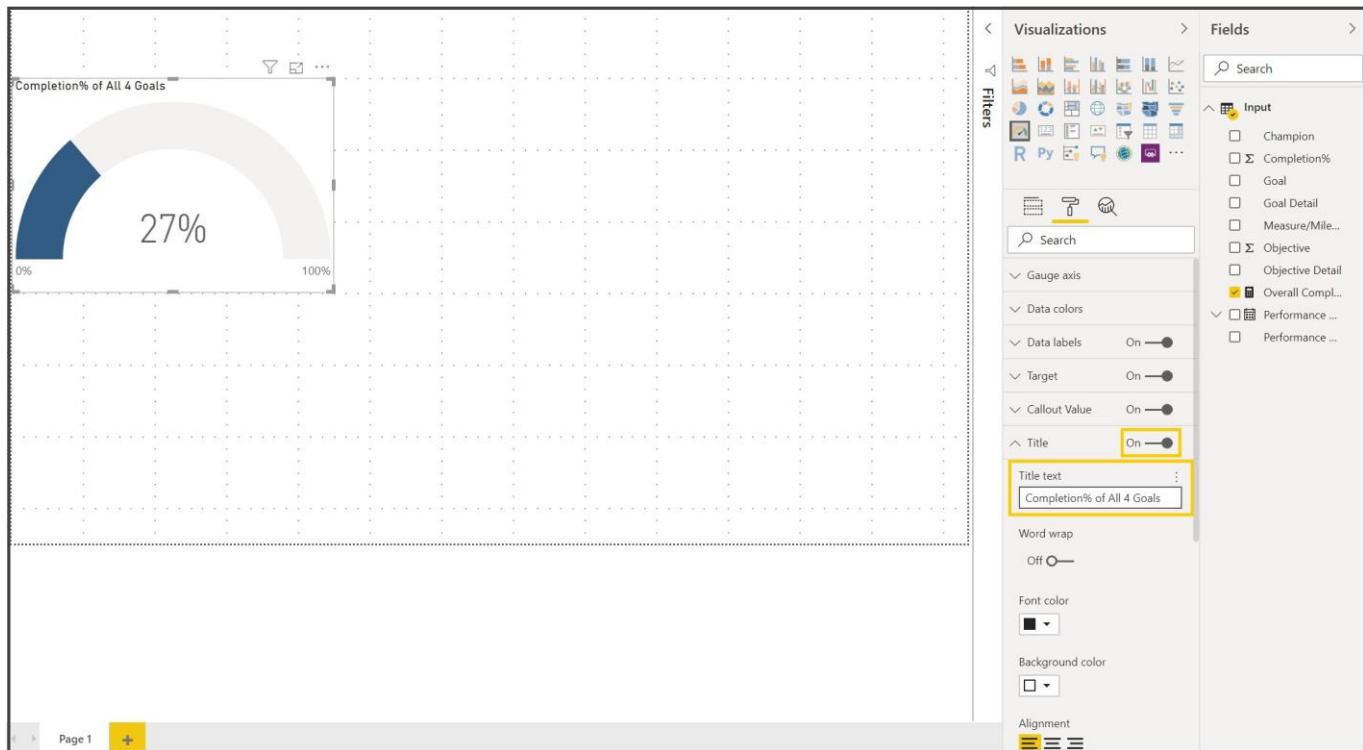


21. Click on the drop down of Target property and select Black color.



Exercise 9: Changing the Title of the Gauge Chart.

22. Expand the title property of the Gauge chart, Change the title text to “Completion% of All 4 Goals”.



We are done with our first visualization. We will create few more visualizations.

Exercise 9: Creating the Stacked Column Chart.

23. Click anywhere on the Canvas other than the visuals, select Stacked Column Chart and bring the visual next to the Donut Chart.

The screenshot shows the Power BI Desktop interface. On the left, there is a donut chart titled "Completion% of All 4 Goals" with a value of 27%. To its right, a stacked column chart is displayed, also titled "Completion% of All 4 Goals". The stacked column chart has four bars representing different goals. The canvas has a dotted grid. The ribbon at the top includes tabs like File, Home, View, Modeling, Help, Format, Data / Drill, Insert, and Visual tools. The Visual tools tab is selected. The Fields pane on the right lists various fields under the Input category, including Champion, Completion%, Goal, Goal Detail, Measure/Mile..., Objective, Objective Detail, Overall Compl..., Performance..., and Performance... . The Stacked Column chart is highlighted with a yellow box.

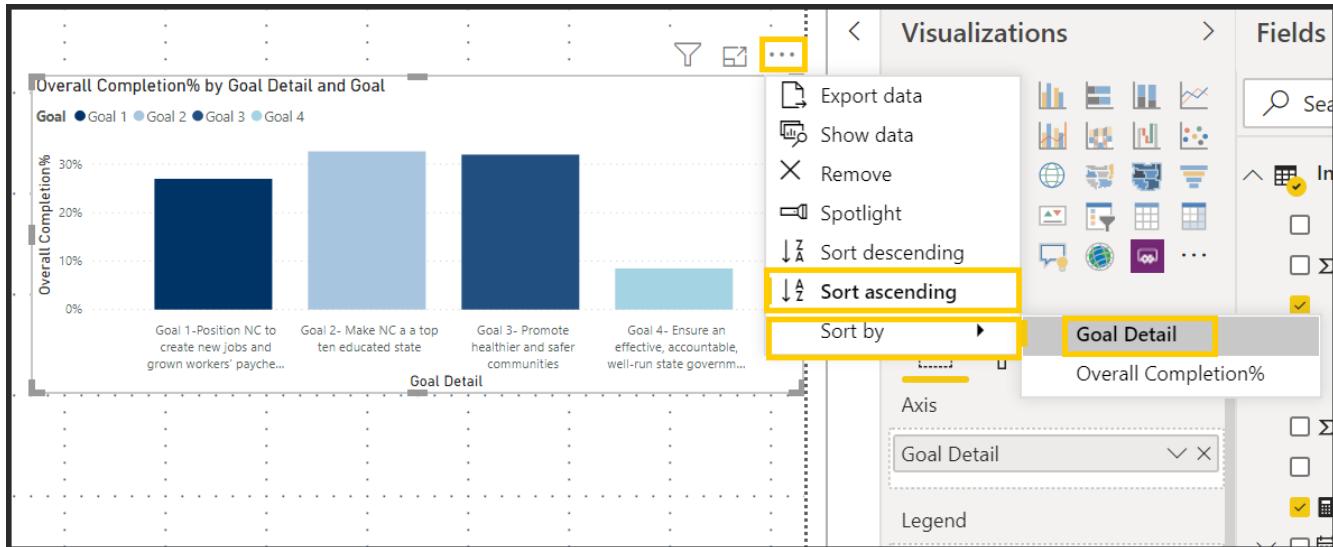
24. Expand Input, Drag Overall Completion% to the Value section, Goal Detail to the Legend, Goal to the Axis of the Fields pane of the Stacked Column Visual.

This screenshot shows the same Power BI Desktop interface after modifications. The stacked column chart now displays four distinct bars, each representing a goal with its corresponding completion percentage. The chart is titled "Overall Completion% by Goal Detail and Goal". The legend in the Fields pane shows "Goal" with four entries: Goal 1, Goal 2, Goal 3, and Goal 4. The axis is labeled "Goal Detail". The value is labeled "Overall Completion%". The Fields pane also shows "Goal" expanded, with "Goal Detail" checked. Red arrows point from the "Overall Completion%" field in the Fields pane to the "Value" section of the chart's properties, and from the "Goal Detail" field to the "Axis" section. The rest of the interface remains similar to the previous screenshot.

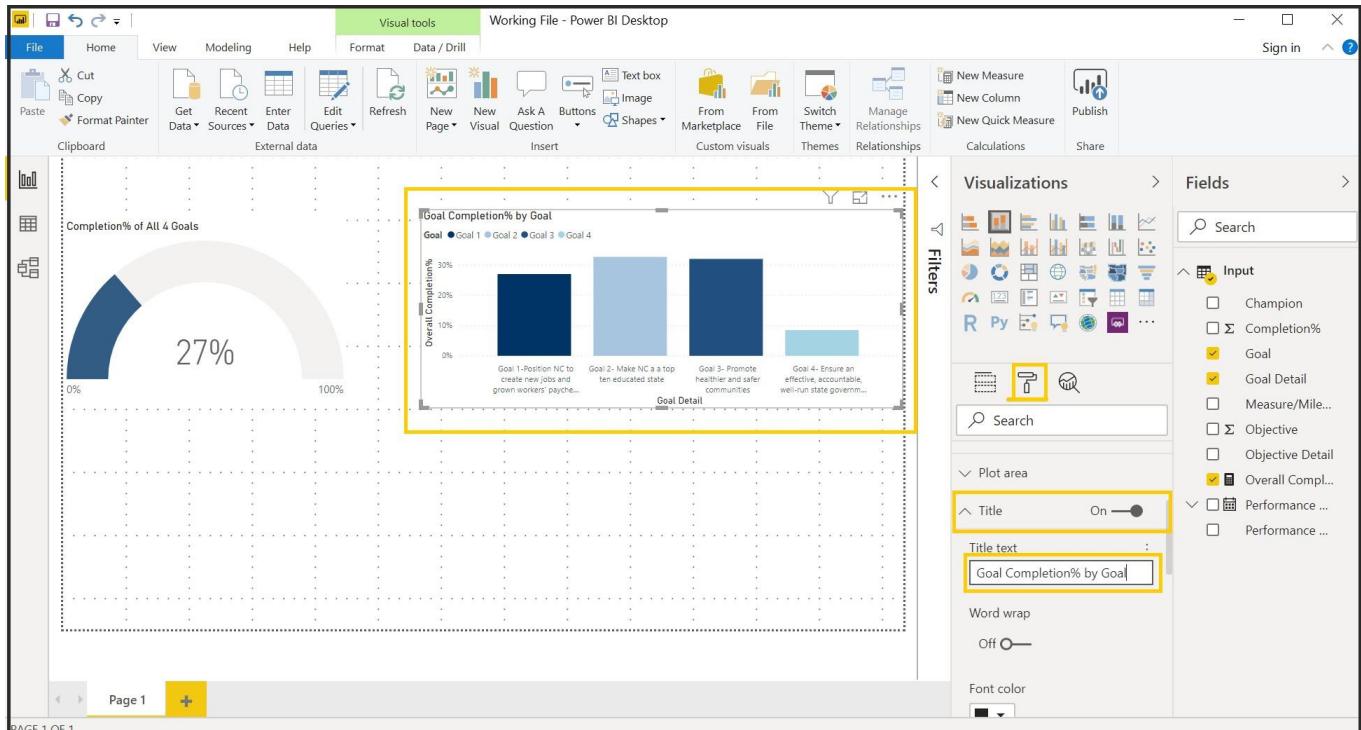
Notice that the goals are not in the right order.

Exercise 10: Sorting the Goals in the right order.

25. Click on the ellipses (More Options) of the Stacked Column Visual, Select Sort Ascending, Hover on Sort by and Select Goal Detail.

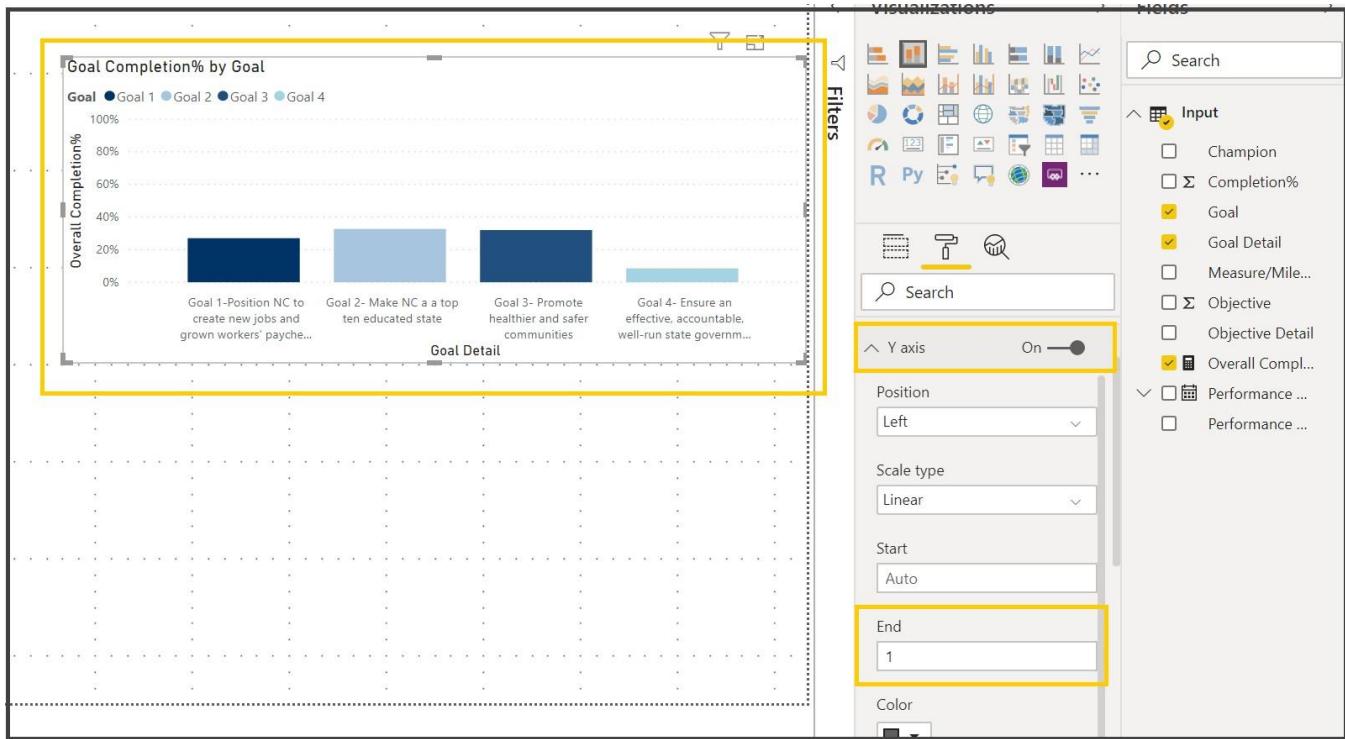


26. Click on the format icon (Format icon) for the visual, Expand Title and edit the title to “Goal Completion% by Goal”

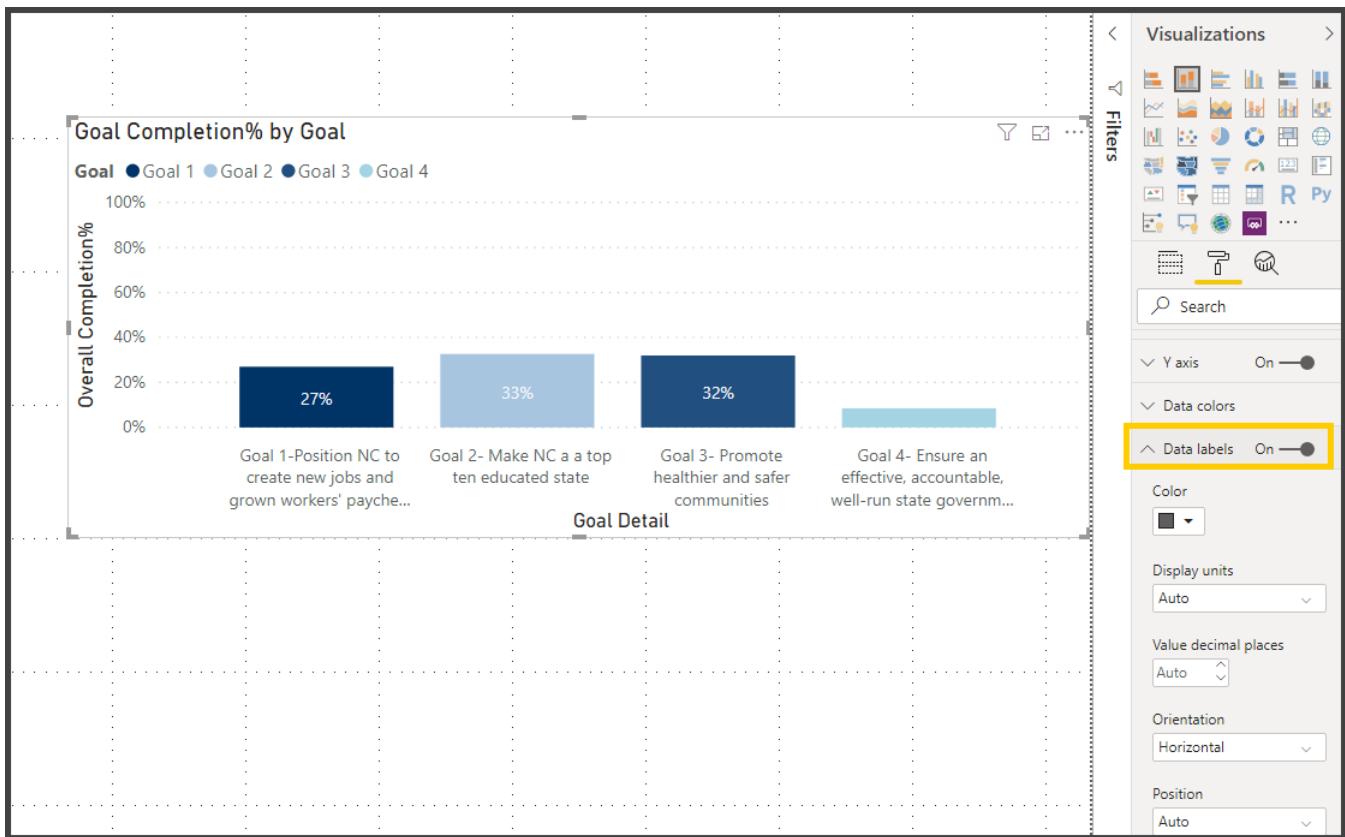


Notice that the Y axis is not 100%

27. Expand Y Axis property, In the End Box, Type in 1

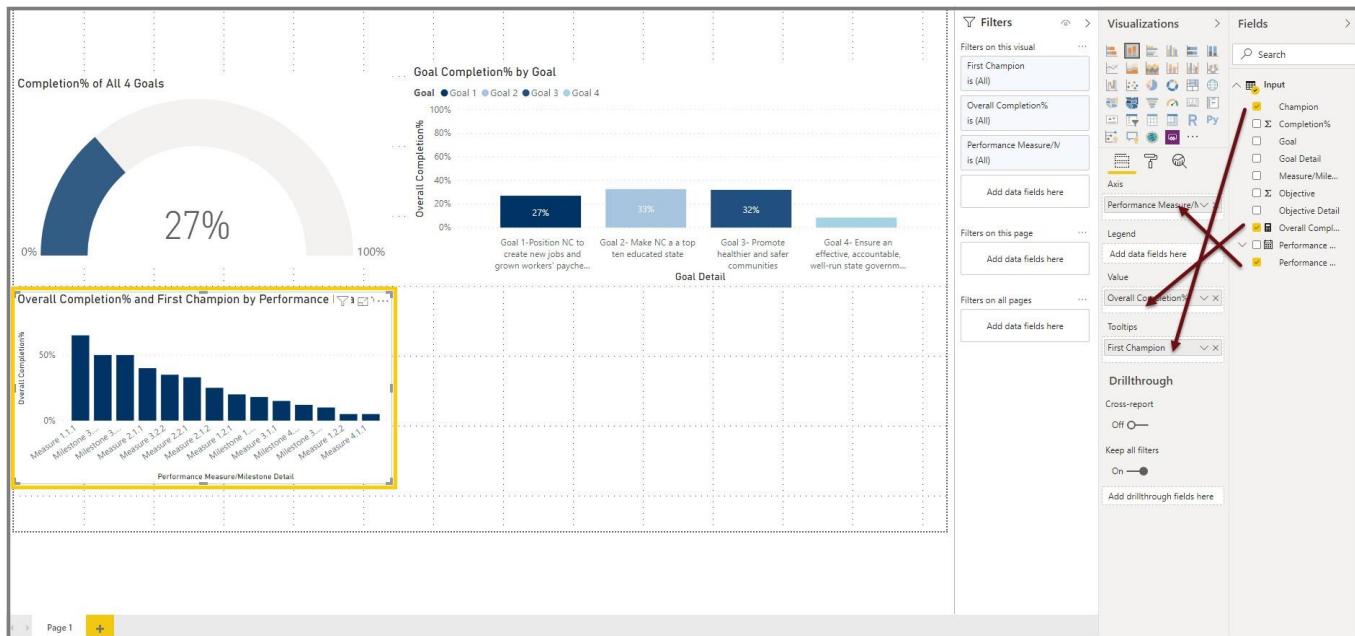


28. Turn on the Data Labels Property.



29. Click anywhere on the Canvas other than the visuals, select Stacked Column Chart and bring the visual below the Donut Chart.

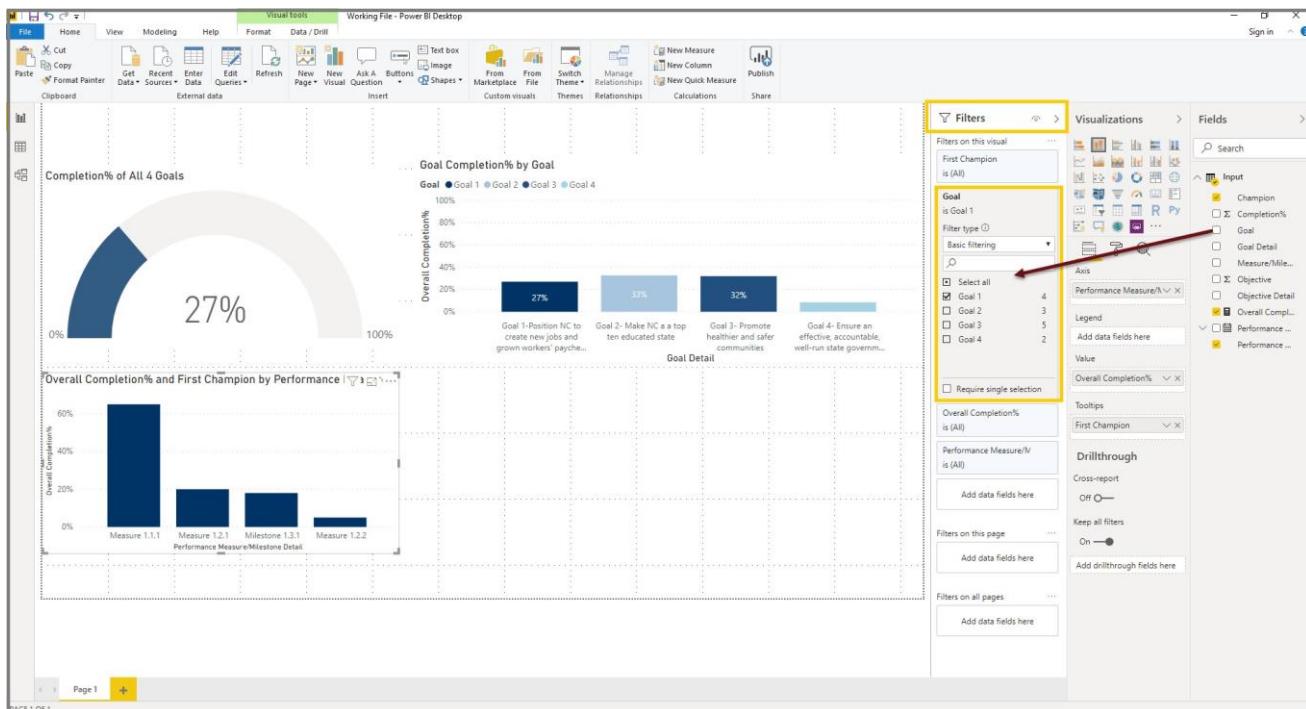
30. Expand Input, Drag Overall Completion% to the Value section, Performance Measure/Milestone Detail to the Axis, Champion to the tool tip of the Fields pane of the Stacked Column Visual.



Exercise 10: Filters in Power BI

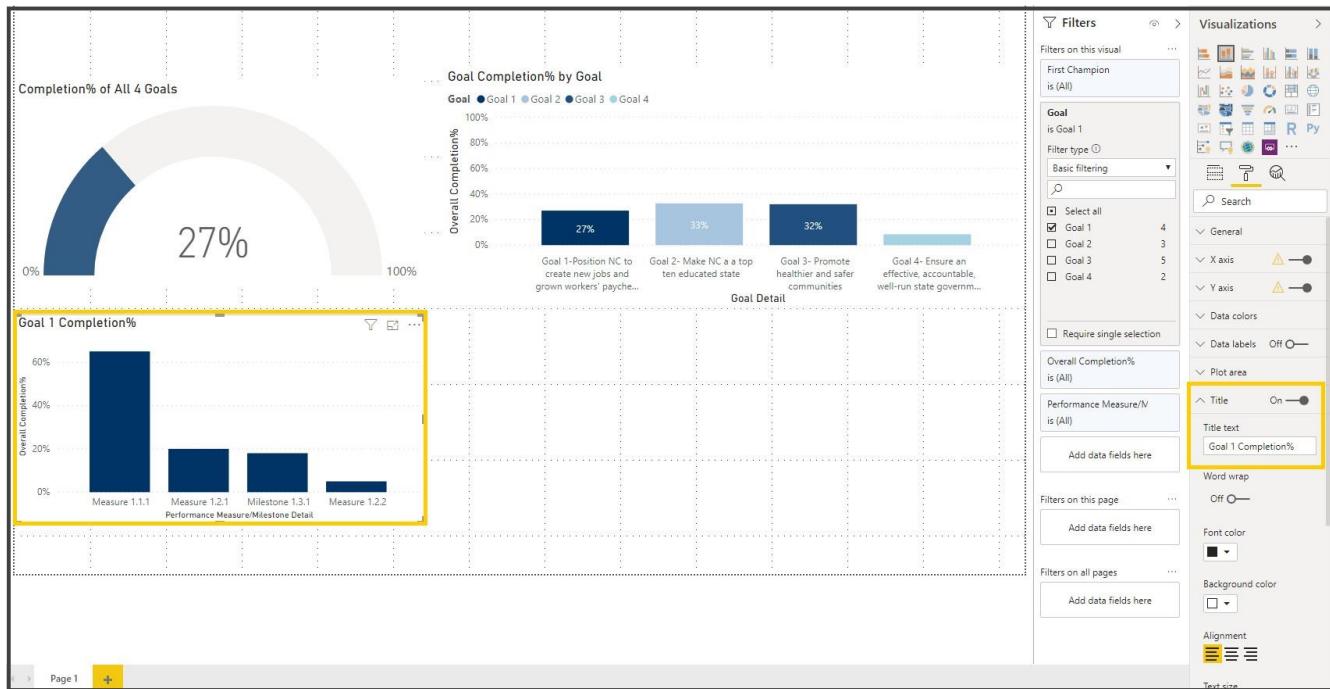
Filters allows the Power BI visual to narrow down or filter to the desired result. We are filtering the visual to show just the data for Goal.

31. Expand the filters pane, Drag Goal to the “Add data fields here” section under **Filters on this visual** section and select Goal 1

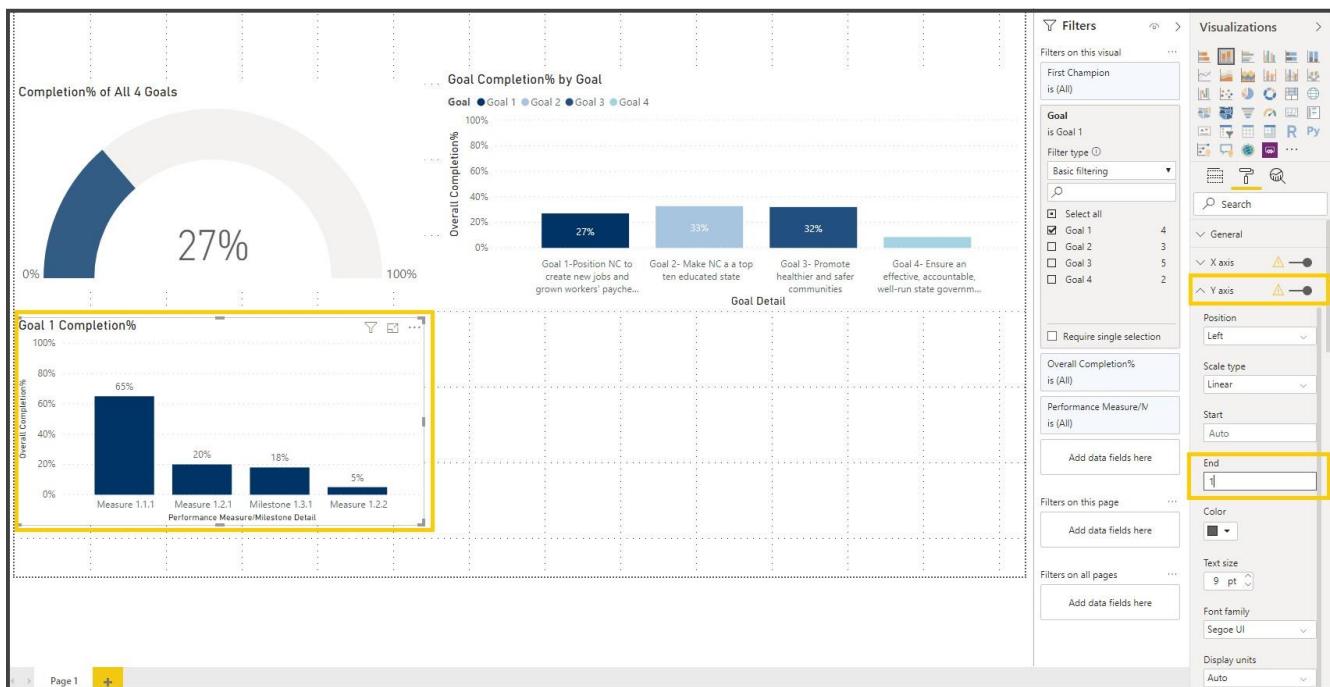




32. Click on the format icon (for the Stacked Column Chart visual, expand Title and edit the title to **Goal 1 Completion%**



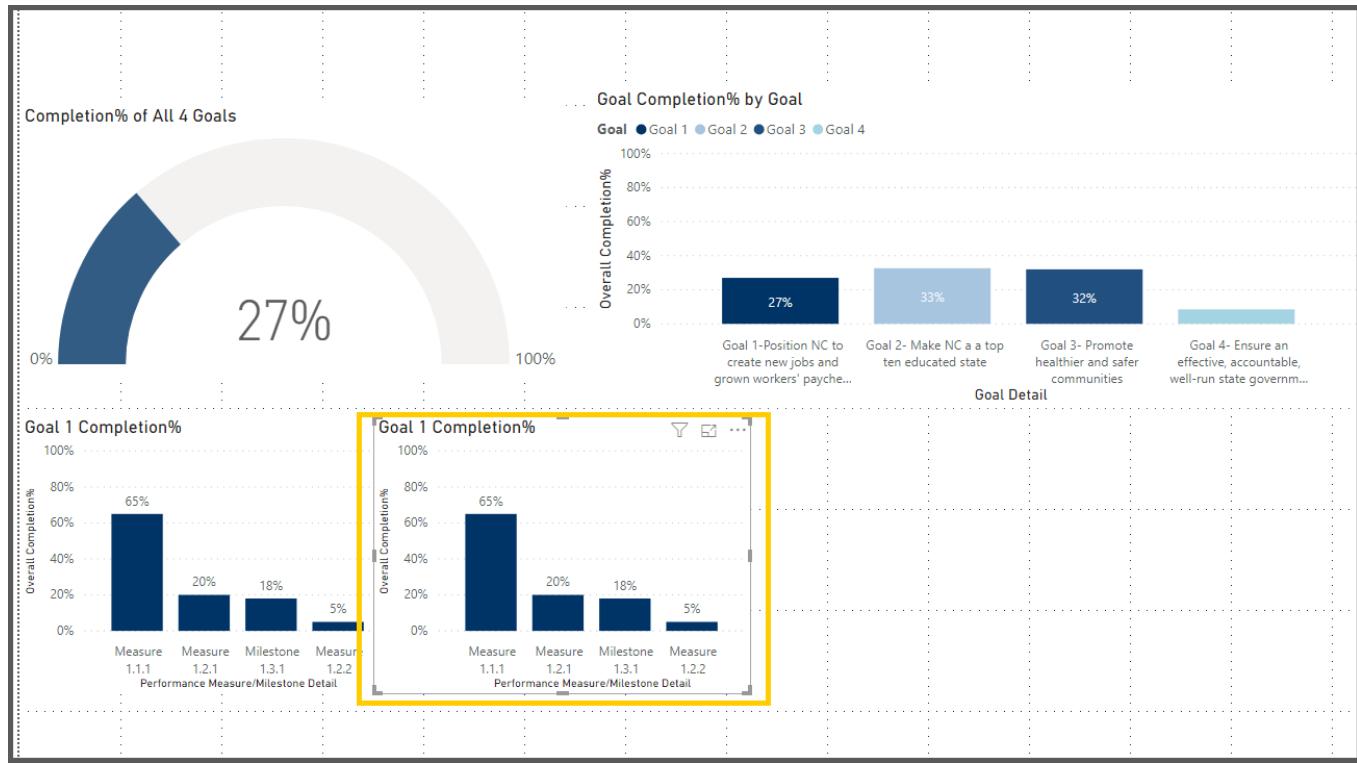
33. Turn on the Data Labels Property, Expand Y axis Property and in the End box Type 1



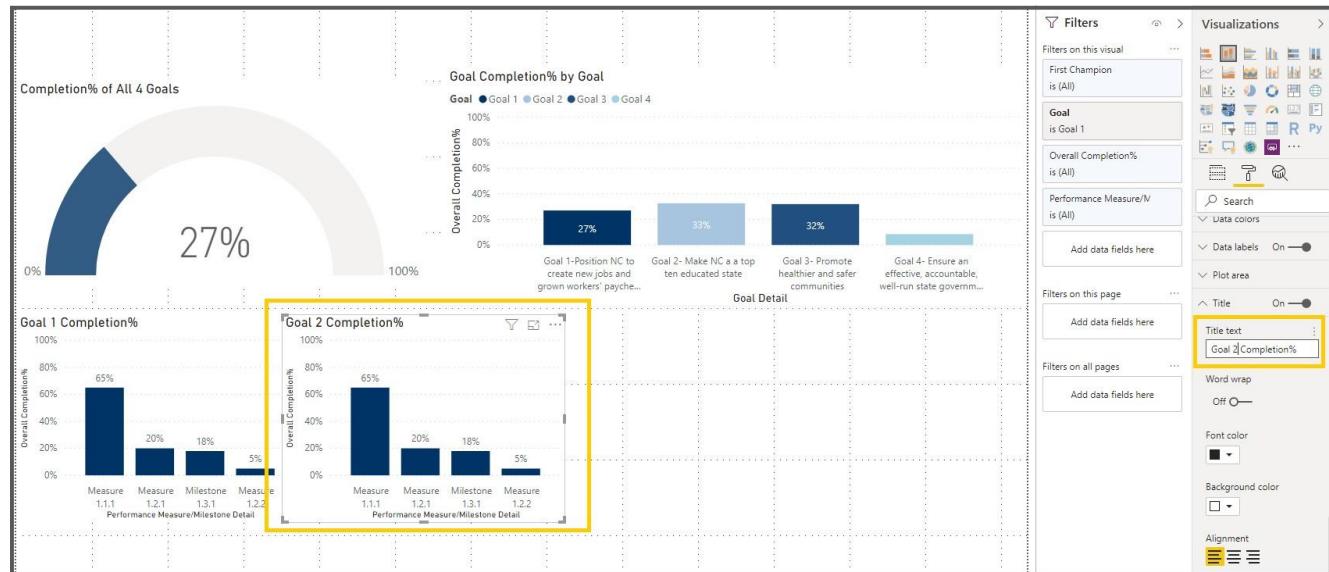
Adjust the height and width of the visual.

34. Click on the **Stacked Column Chart visual** and copy & paste it, Adjust the position on the Report page

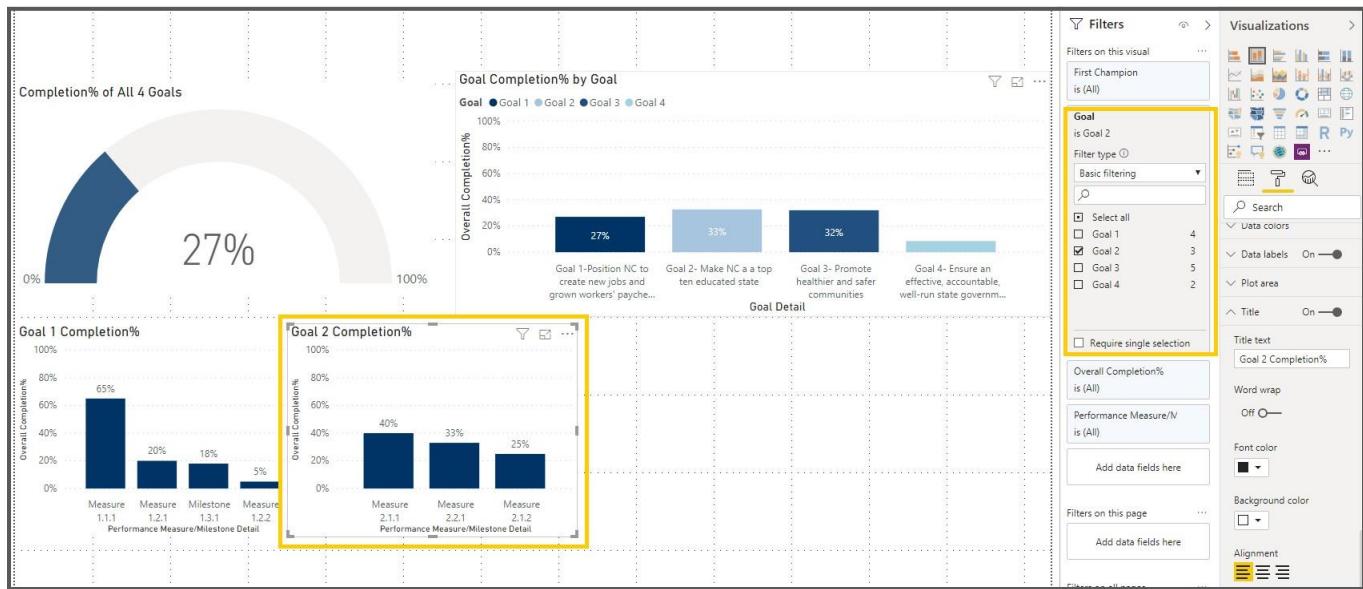
Note: It is like MS word Copy (Ctrl + C) and Paste (Ctrl + V)



35. Click on the format icon (for the Stacked Column chart visual, expand Title and edit the title to **Goal2 Completion %**



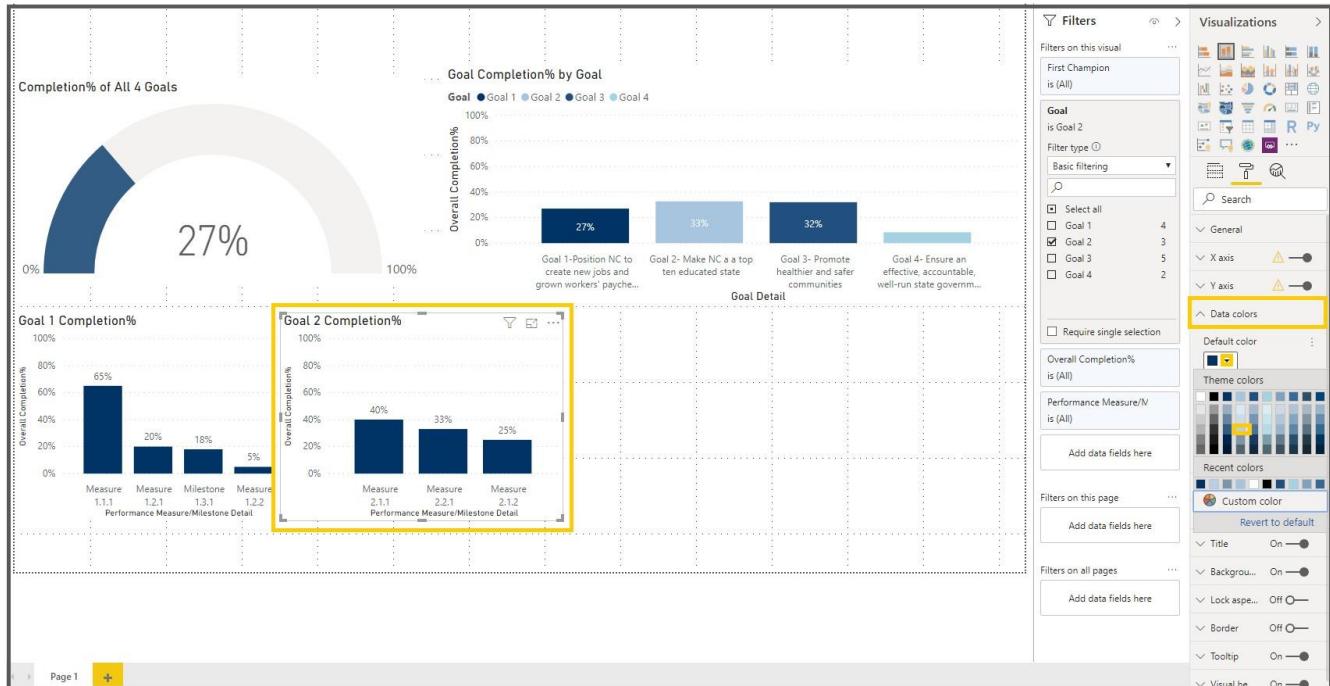
36. Expand the filters pane, click on the drop down of the Goal Filter on Filters Pane and select Goal 2



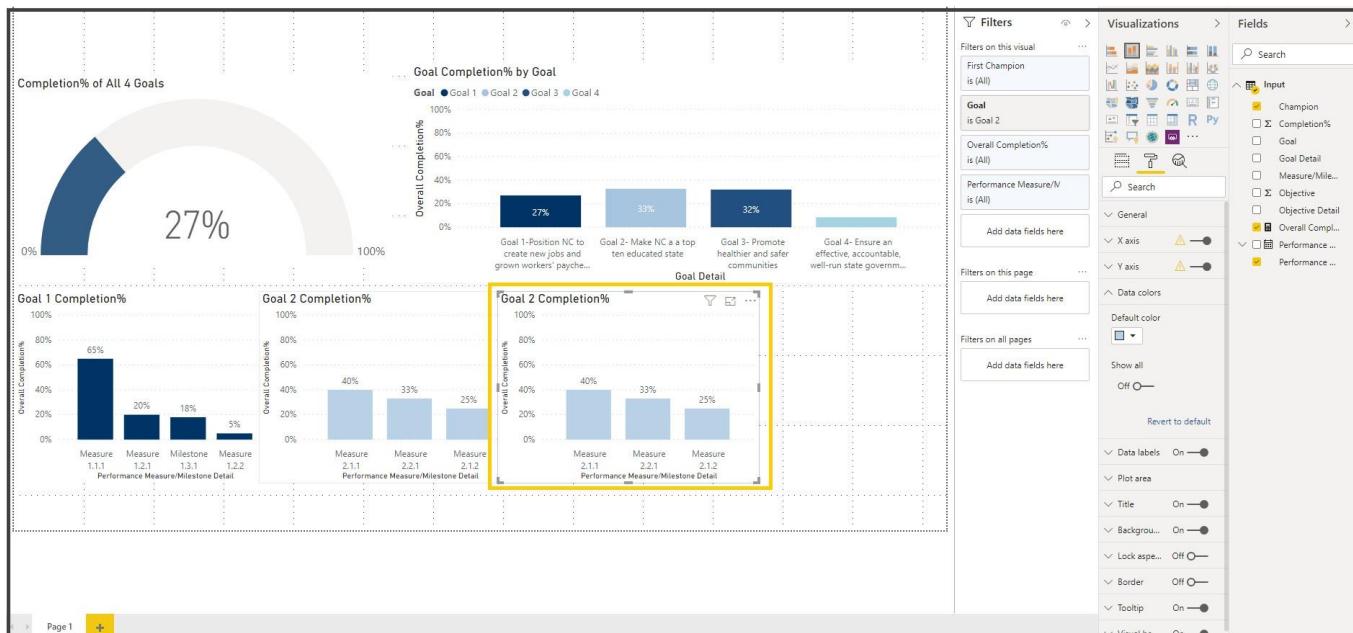
Notice that the **Stacked Column Chart visual** is automatically changed to reflect the data for Goal 2.



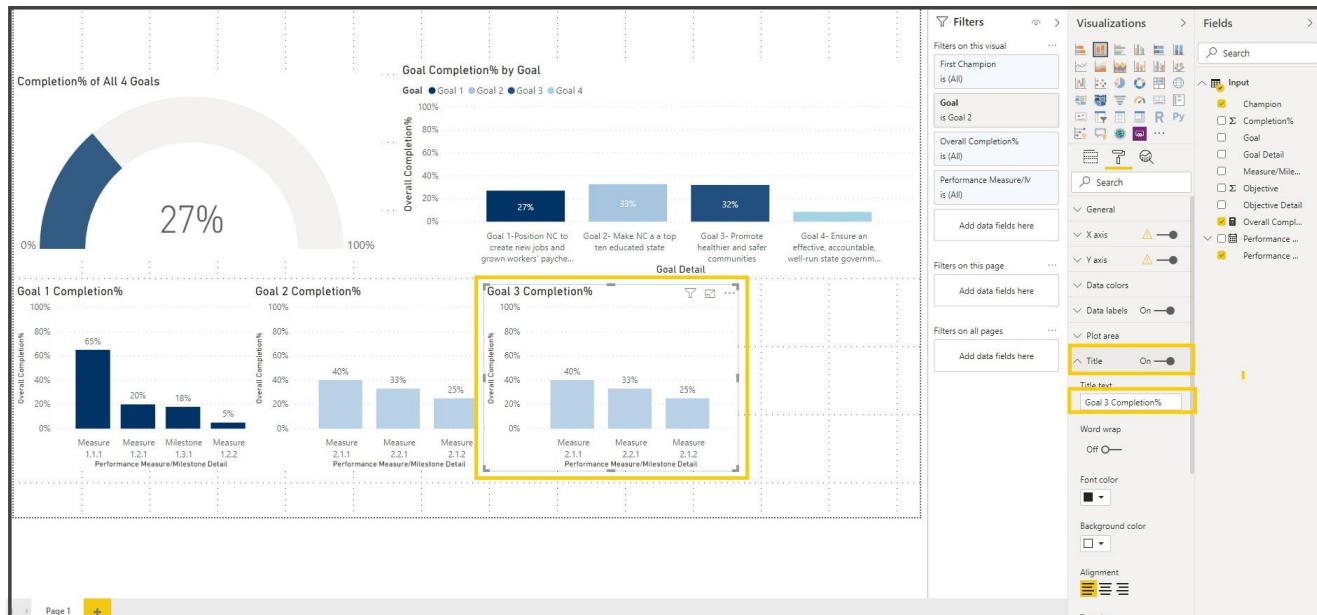
37. Click on the format icon (for the Stacked Column chart visual, expand Data colors property, Change the color to reflect the color for Goal 2 on the Goal Completion % by Goal.



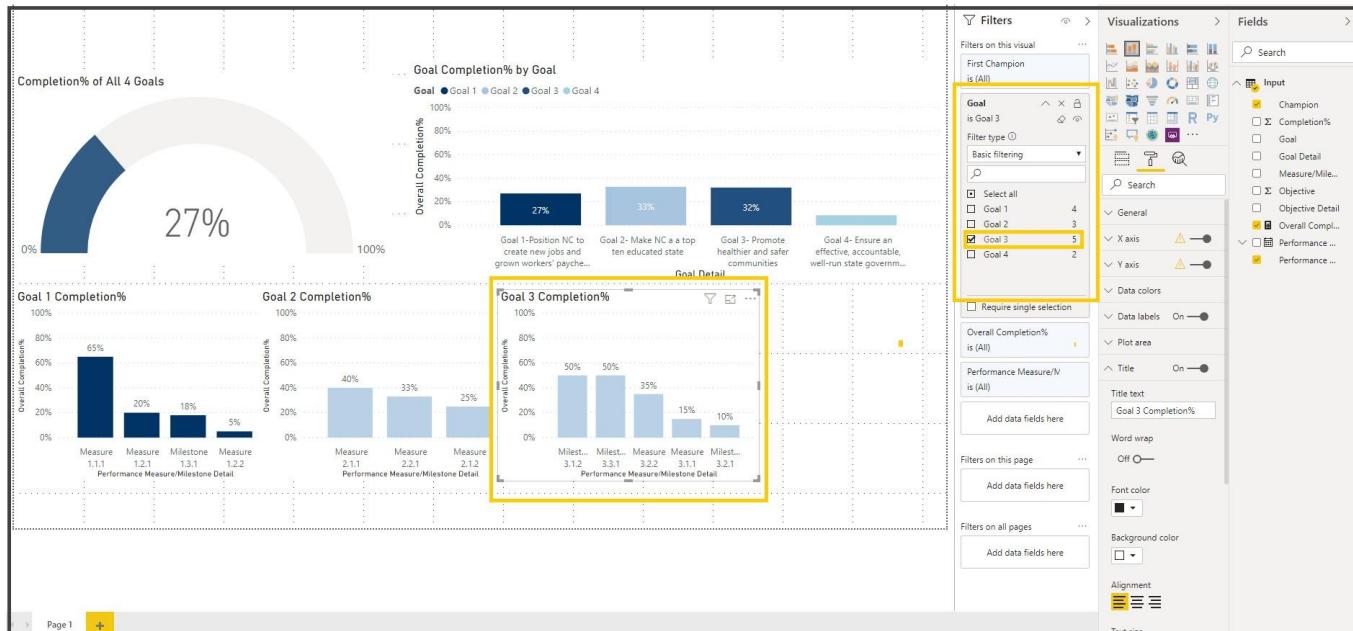
38. Click on the **Stacked Column Chart visual** and copy & paste it, Adjust the position on the Report page



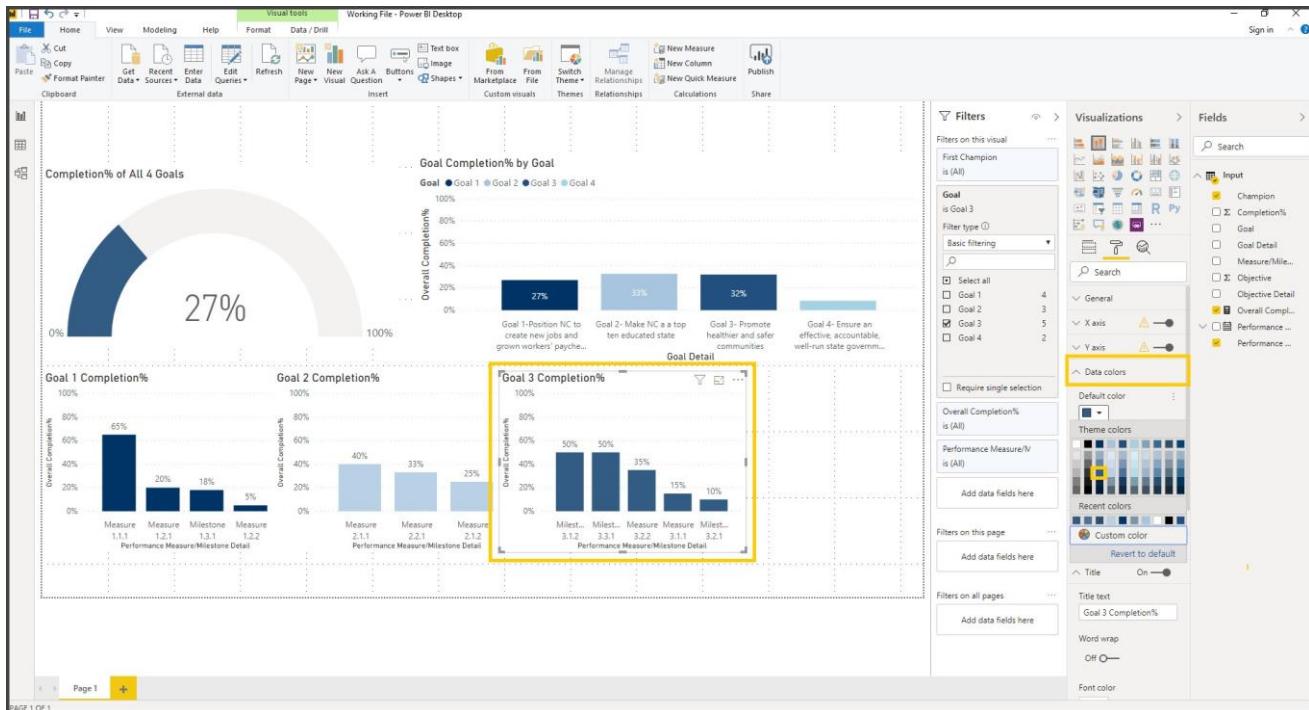
39. Click on the format icon () for the Stacked Column chart visual, expand Title and edit the title to **Goal3 Completion %**



40. Expand the filters pane, click on the drop down of the Goal Filter on Filters Pane and select Goal 3

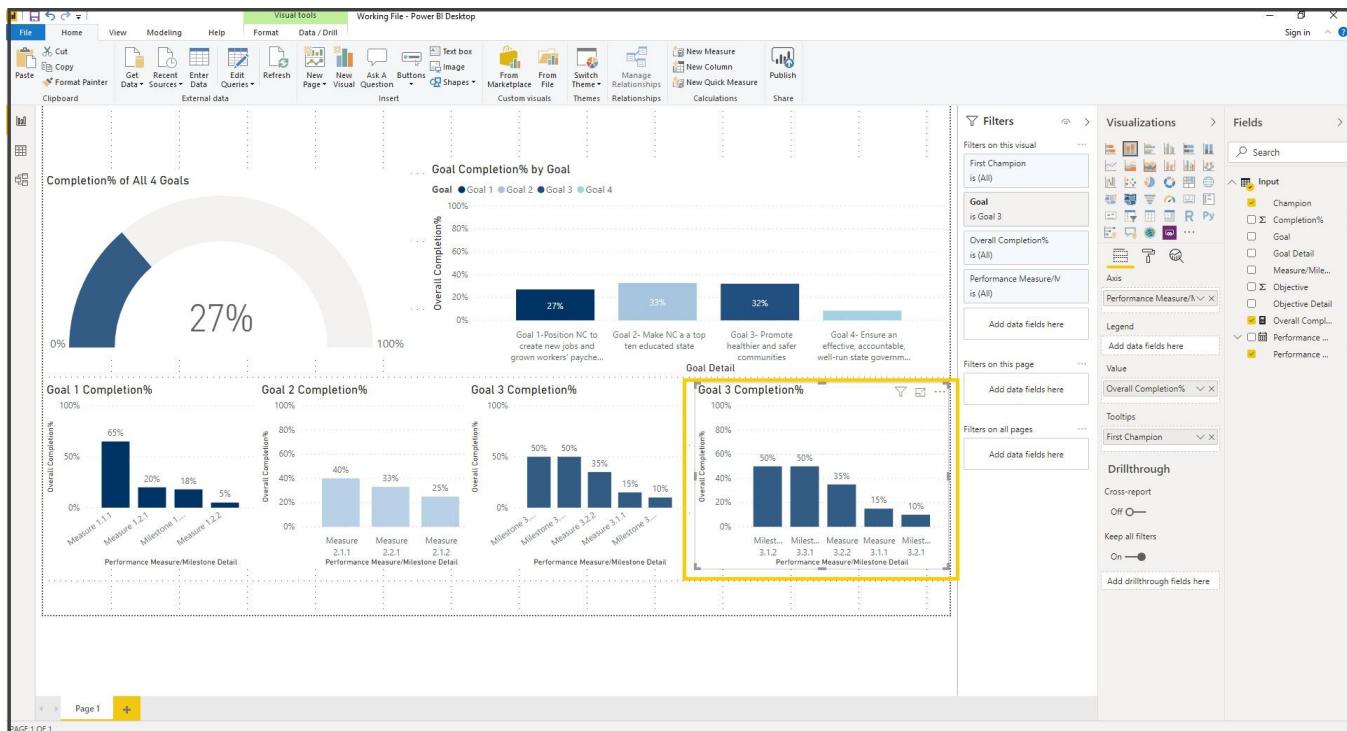


41. Click on the format icon () for the Stacked Column chart visual, expand Data colors property, Change the color to reflect the color for Goal 2 on the Goal Completion % by Goal.

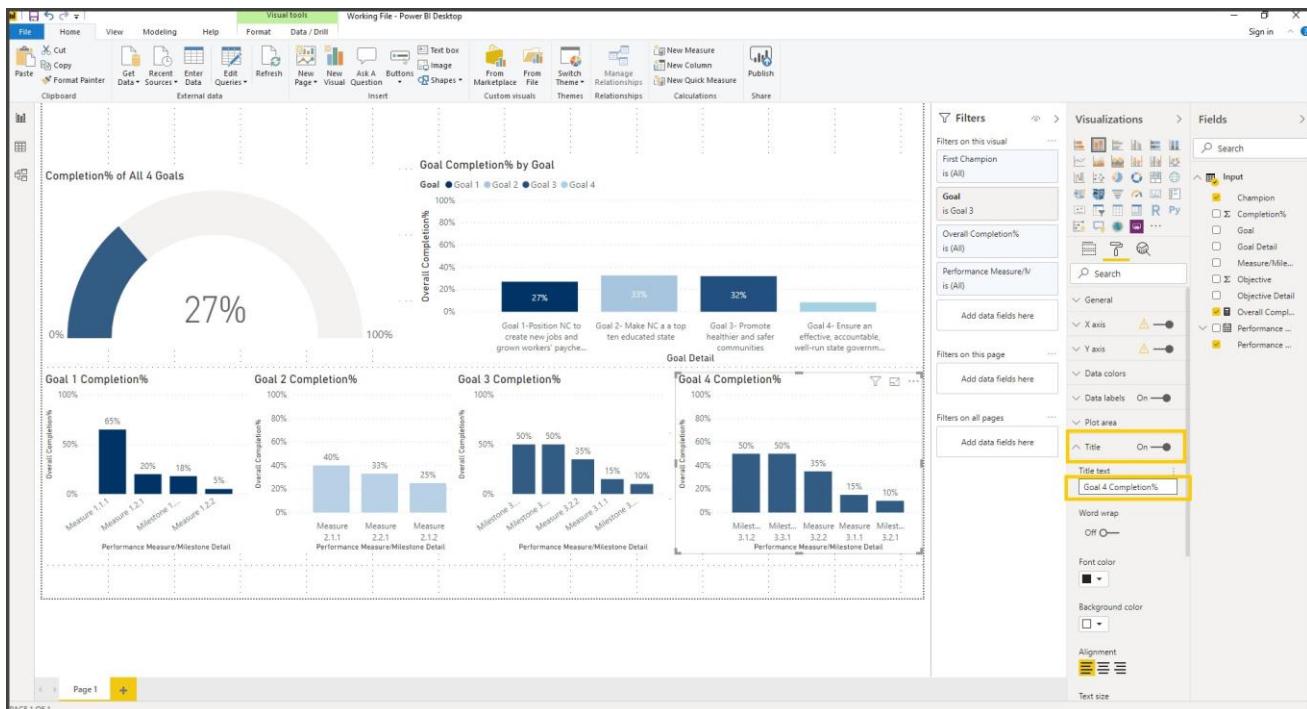




42. Click on the Stacked Column Chart visual and copy & paste it, Adjust the position on the Report page



43. Click on the format icon () for the Stacked Column chart visual, expand Title and edit the title to **Goal3 Completion %**





44. Expand the filters pane, click on the drop down of the Goal Filter on Filters

The screenshot shows the Power BI Desktop interface with the 'Filters' pane expanded. The 'Goal' filter dropdown is open, with 'Goal 4' selected. The visualization on the left displays a donut chart for 'Completion% of All 4 Goals' at 27% and four bar charts for 'Goal Completion% by Goal'. The bar chart for Goal 4 shows completion percentages for various measures and milestones.

Measure/Milestone Detail	Overall Completion%
Measure 1.1	65%
Milestone 1.1	20%
Milestone 1.2	18%
Measure 1.2	5%
Measure 2.1	40%
Milestone 2.1	33%
Measure 2.2	25%
Milestone 3.1	50%
Milestone 3.2	50%
Measure 3.2	35%
Measure 3.1	15%
Milestone 3.3	10%
Milestone 4.1	12%
Measure 4.1	5%

Pane and select Goal 4

45. From the Home Ribbon, click on the Text Box and type in “Strategic Plan Dashboard” and increase the fontsize to 21.

The screenshot shows the Power BI Desktop interface with the title 'Strategic Plan Dashboard' added to the ribbon and increased in font size. The visualization on the left displays a donut chart for 'Completion% of All 4 Goals' at 27% and four bar charts for 'Goal Completion% by Goal'. The bar chart for Goal 4 shows completion percentages for various measures and milestones.

Measure/Milestone Detail	Overall Completion%
Measure 1.1	65%
Milestone 1.1	20%
Milestone 1.2	18%
Measure 1.2	5%
Measure 2.1	40%
Milestone 2.1	33%
Measure 2.2	25%
Milestone 3.1	50%
Milestone 3.2	50%
Measure 3.2	35%
Measure 3.1	15%
Milestone 3.3	10%
Milestone 4.1	12%
Measure 4.1	5%