



BUS 5100 Term Project Tutorial



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Lab Tutorial

Group #5

Registered EV In State of Washington Data Analysis using SAC

Objectives

List your objectives. In this hands-on lab, you will learn how to:

- Select and download using Dr. Woo's approved list of data sources
- Examine the data and determine relevant fields before loading to SAC
- Load data to SAC, save to file location, and then concatenate the data as well as add dimension attributes as part of the modeler.
- Create stories using responsive pages
- Visualization of data to produce screenshots to generate Term Paper

Section 1: Get Data Manually and Prep Data

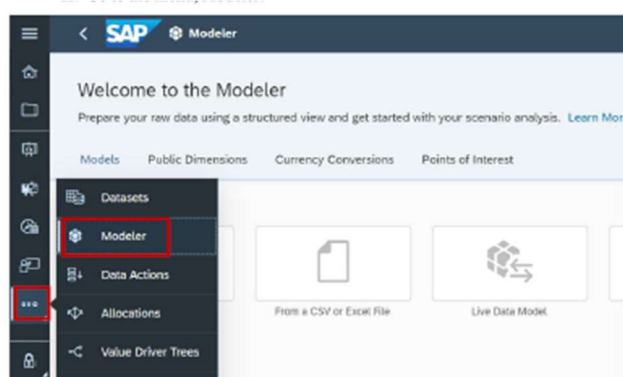
1. Identify data source from Dr. Woo's provided URLs. Group #5 selected registered EVs in the state of Washington. <https://catalog.data.gov/dataset/electric-vehicle-population-data>
2. Review the dataset in Excel. Remove column headings not relevant to the project based upon what we will analyze in order to determine the relationship between the dataset we will include for upload to SAP. The following column headings were removed prior to uploading to SAP:

VIN	Base MSRP (some values '0')	Legislative District
DOL Vehicle	Electric Range (some values '0')	2020 Census Tract

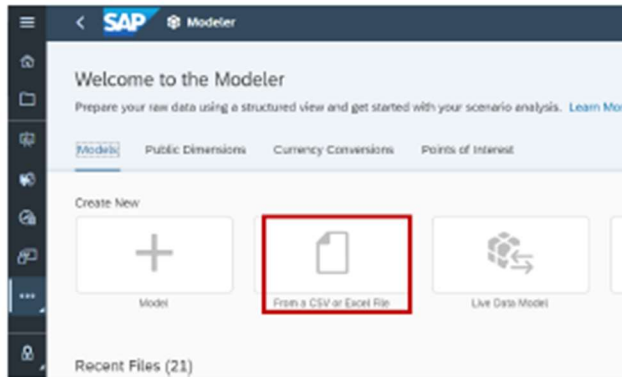
3. Open a web browser and go to SAP Analytics Cloud (SAC):
<https://highereducation.us10.sapanalytics.cloud/>.

Section 2: Creating the Model and Validate Data

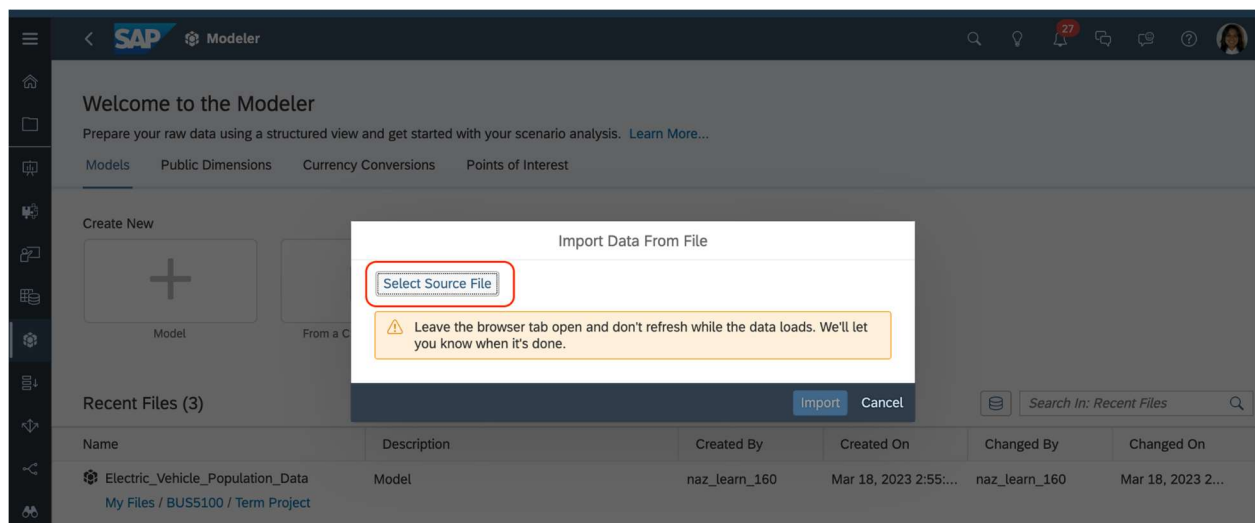
1. If you move your mouse pointer over the menu "...", you can select **"Modeler"**.



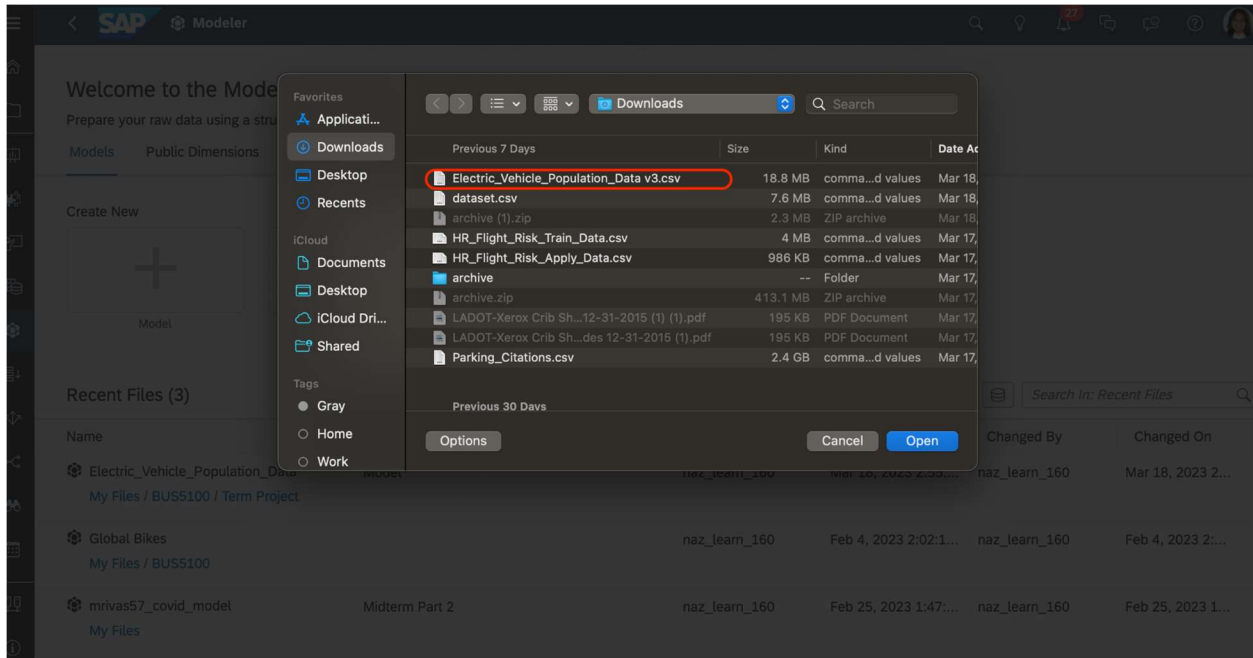
2. Choose **From a CSV or Excel File**.



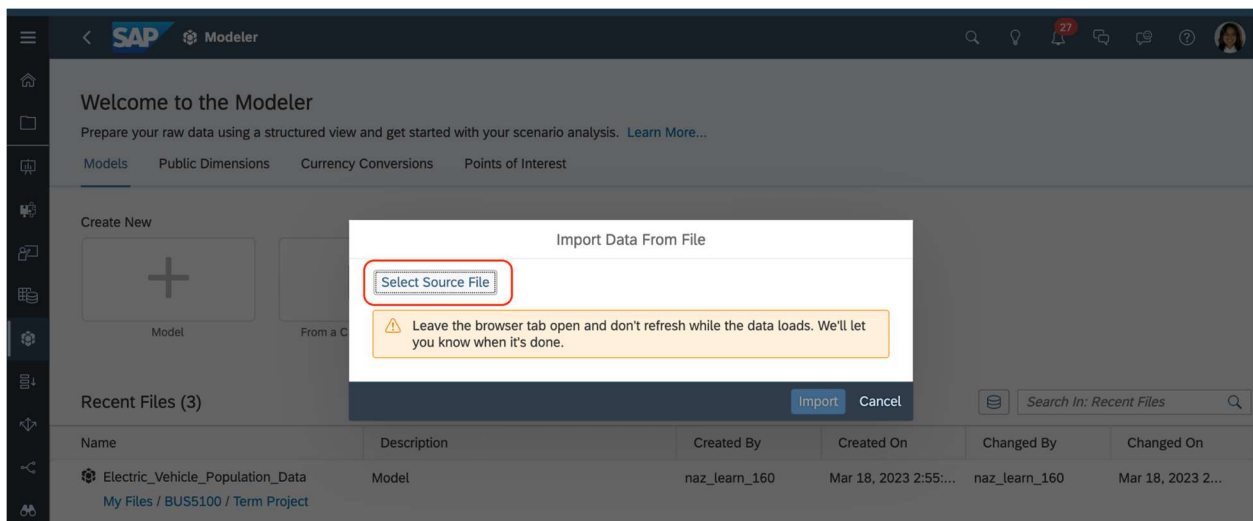
3. Then, click **Select Source File**.



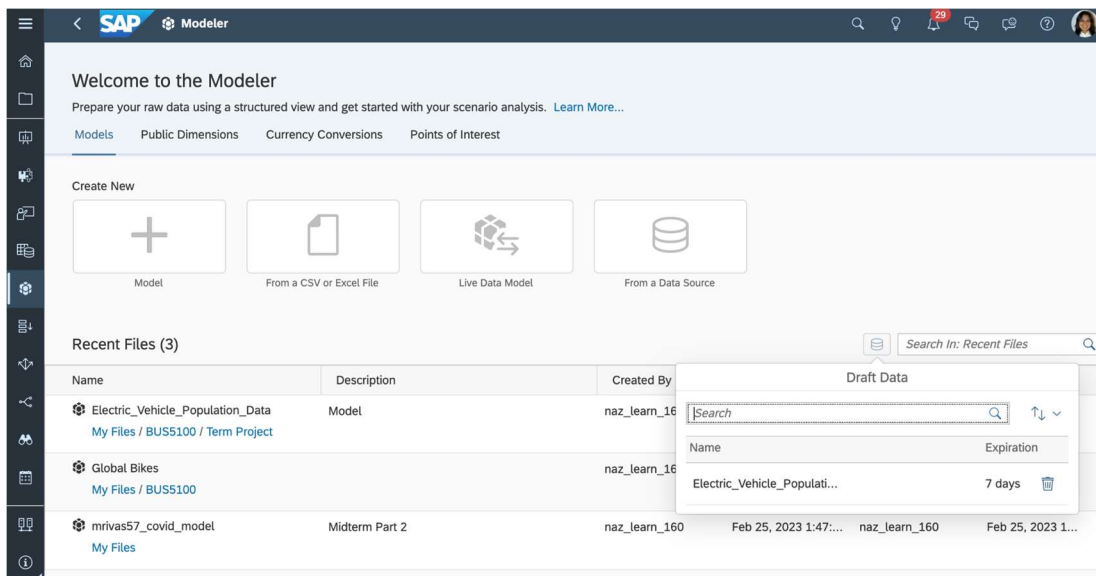
4. Select the excel file **Electric_Vehicle_Population_Data_v3** to open it.



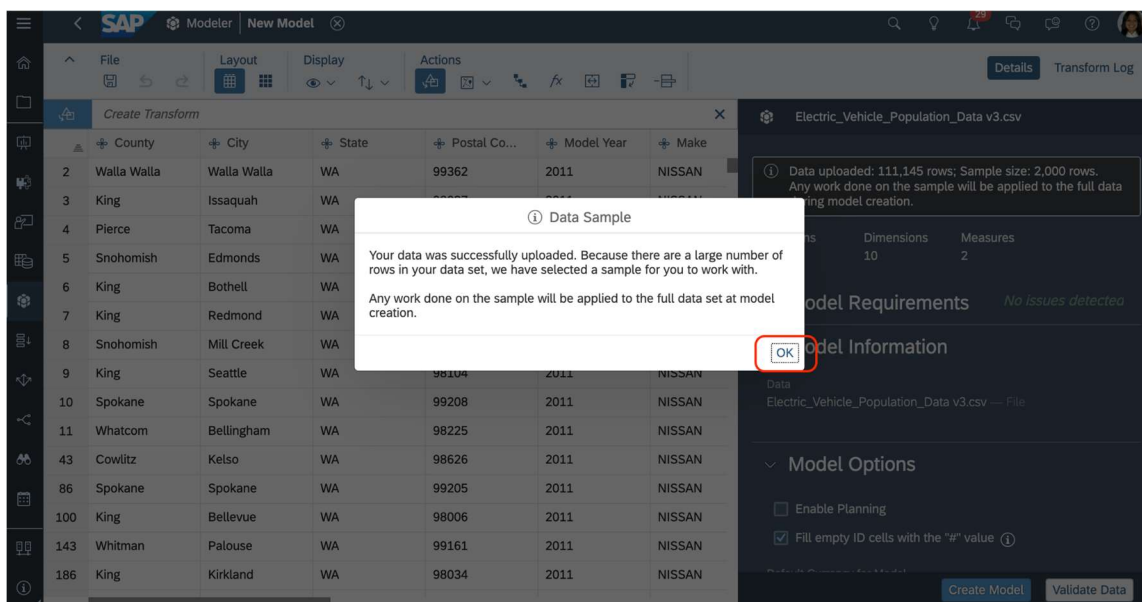
5. “Use the first row as column headers” should be selected as default. Select the model “**Electric_Vehicle_Population_Data_v3**” and import.



- After 1 - 2 minutes, a message and notification in the top right corner will say "Electric_Vehicle_Population_Data_v3 data upload has completed successfully". Select the **draft data icon** and click on the data file "**Electric_Vehicle_Population_Data_v3**" in the draft data menu. NOTE: You can find the file with the search icon.



- You will receive a message that only a sample of the data will be shown. Click **OK** to acknowledge the message. Then, select the **save icon** in the menu top left. NOTE: You need to save the model when you do each step to not lose any update.



8. Now you will see the data and a window with “Create Model” and “Validate Data”. You will then select **Geo Enrich > Coordinates**.

The screenshot shows the SAP Modeler interface. On the left, a table displays data with columns for ID, Name, Status, Longitude, Latitude, and Area Name. A red box highlights the 'Geo Enrich by:' dropdown menu, which is set to 'Coordinates'. On the right, a panel titled 'Electric_Vehicle_Population_Data v3.csv' shows model details. It includes a message about data upload (111,145 rows; sample size: 2,000 rows) and a table with 12 columns, 10 dimensions, and 2 measures. Below this, the 'Model Requirements' section shows 'No issues detected'. The 'Model Information' section lists the data source as 'Electric_Vehicle_Population_Data v3.csv'. The 'Model Options' section has checkboxes for 'Enable Planning' (unchecked) and 'Fill empty ID cells with the "#" value' (checked). At the bottom right, there are 'Create Model' and 'Validate Data' buttons.

ID	Name	Status	Longitude	Latitude	Area Name
2	.tric Vel	Clean Alternative F	-118.34261	46.07068	
3	.tric Vel	Clean Alternative F	-122.03439	47.5301	PUGET SOUND EN
4	.tric Vel	Clean Alternative F	-122.47554	47.21835	BONNEVILLE POW
5	.tric Vel	Clean Alternative F	-122.31768	47.87166	PUGET SOUND EN
6	.tric Vel	Clean Alternative F	-122.20563	47.76144	PUGET SOUND EN
7	.tric Vel	Clean Alternative F	-122.13158	47.67858	PUGET SOUND EN
8	.tric Vel	Clean Alternative F	-122.21061	47.83448	PUGET SOUND EN
9	.tric Vel	Clean Alternative F	-122.32945	47.60357	PUGET SOUND EN
10	.tric Vel	Clean Alternative F	-117.45005	47.7333	BONNEVILLE POW
11	.tric Vel	Clean Alternative F	-122.47122	48.75235	PUGET SOUND EN
43	.tric Vel	Clean Alternative F	-122.89868	46.14425	BONNEVILLE POW
86	.tric Vel	Clean Alternative F	-117.45674	47.69963	BONNEVILLE POW
100	.tric Vel	Clean Alternative F	-122.12096	47.55584	PUGET SOUND EN
143	.tric Vel	Clean Alternative F	-117.0768	46.9101	AVISTA CORP
186	.tric Vel	Clean Alternative F	-122.22901	47.72201	PUGET SOUND EN

9. You will then click **Create**.

The screenshot shows the 'Geo by Coordinates' dialog box. It has a 'Dimension Name*' field with 'Location' entered. Below this, there are two sections: 'Identifiers' and 'Coordinates'. The 'Identifiers' section has a 'Location ID' dropdown menu with the option 'Select column with location identifiers' and a 'Location Description' dropdown menu with the option 'Select column with location descriptions'. The 'Coordinates' section has a 'Latitude*' field with 'Latitude' entered and a 'Longitude*' field with 'Longitude' entered. At the bottom right, there are 'Create' and 'Cancel' buttons. A red box highlights the 'Create' button.

10. Now you will see the data and a window with “Create Model” and “Validate Data”.

The screenshot shows the SAP Modeler interface. On the left, a table displays data with columns: V..., Clean Alt..., Longitude, Latitude, and Electric U... The table contains 186 rows of data. On the right, a configuration panel for 'Electric_Vehicle_Population_Data v3.csv' is visible. It shows 'Data uploaded: 111,145 rows; Sample size: 2,000 rows.' and 'Columns: 12, Dimensions: 10, Measures: 2'. The 'Model Requirements' section indicates 'No issues detected'. The 'Model Information' section shows the data source as 'Electric_Vehicle_Population_Data v3.csv'. The 'Model Options' section has 'Enable Planning' unchecked and 'Fill empty ID cells with the "#" value' checked. At the bottom right, there are two buttons: 'Create Model' (highlighted with a red box) and 'Validate Data'.

11. Create the model.

- Select **Create Model**. It may take time to validate the data.
- You will be asked if you are finished mapping and editing. Click **Create**.

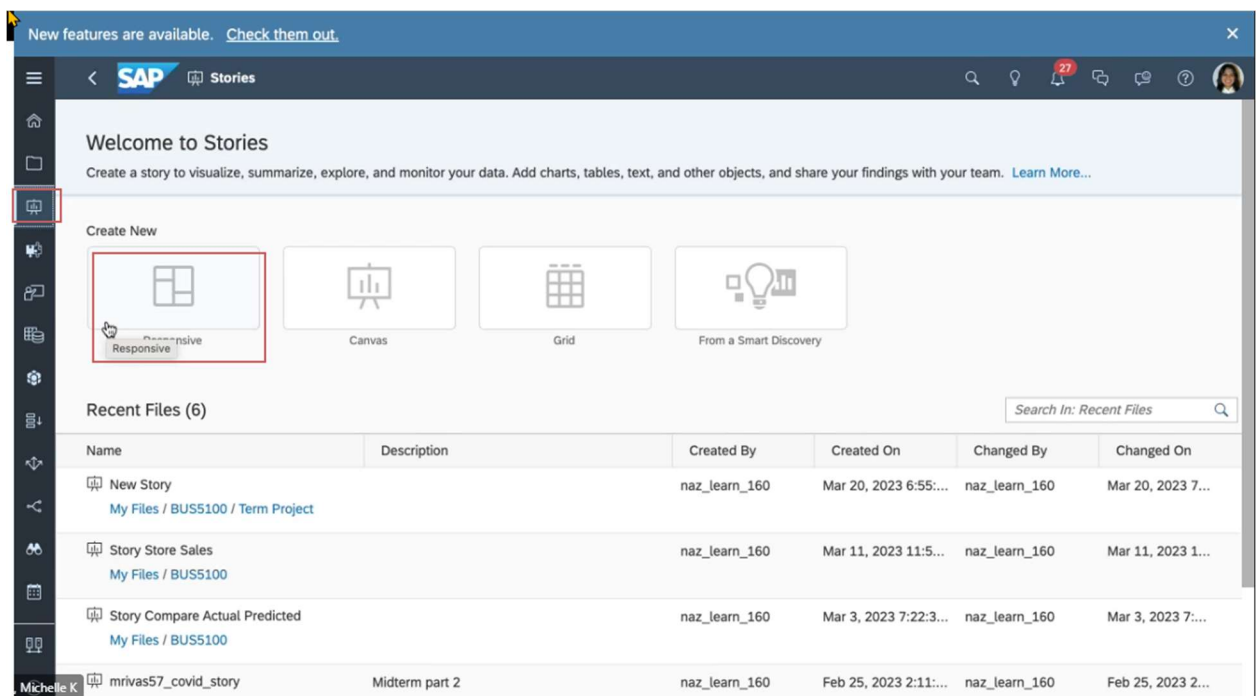
The screenshot shows the SAP Modeler interface. On the left, a table displays data with columns: Area, County, City, State, Postal Co..., Model Year, Make, Model, and Electric V... The table contains 386 rows of data. On the right, a configuration panel for 'Area' is visible. It shows 'Unique Values: 0, Sampled Rows: 1743, Data Type: Text'. The 'Modeling' section shows 'Type: Location Dimension, Description: Location_County, Property: Location_State, Property: Selected_Country'. The 'Data Quality' section shows 'No data quality issues detected.' and a progress bar. The 'Data Distribution' section shows a warning: 'The selected column does not contain enough data points to generate a histogram.' At the bottom right, there are two buttons: 'Create Model' and 'Validate Data'. A tooltip in the center of the screen reads: 'Validating data and checking for errors in your full data set. Please wait while the data is processing.' A green bar at the bottom of the table indicates 'Geo enrichment complete.'

- c. Give the model a meaningful name, e.g. “Electrical Vehicles” and **save the model** to your folder. For example, **My Files > BUS5100**. NOTE: You created this folder at the step . Click your folder and save the model.

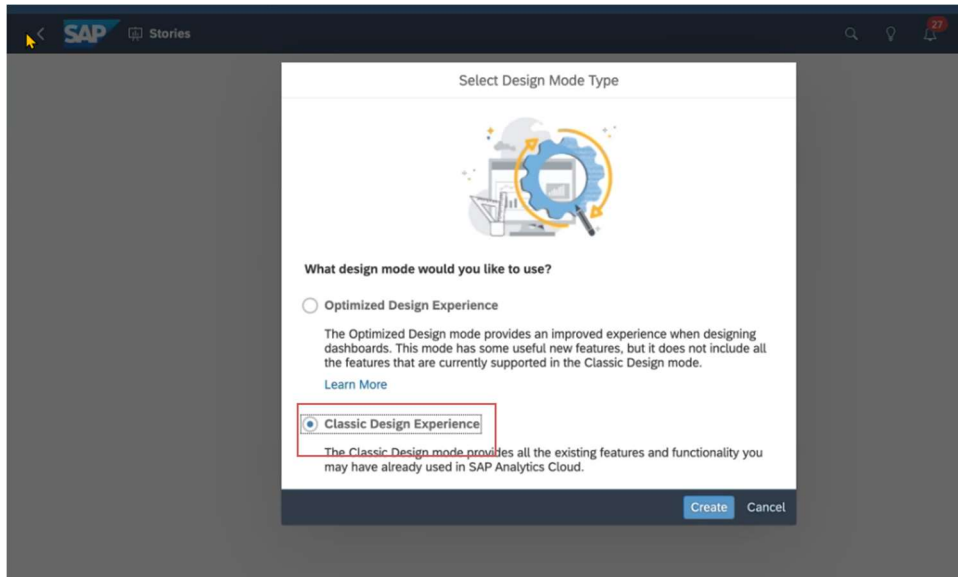
Section 3: Acquire Data and Start the Story

Visualizations within the stories are created as either responsive pages or canvas pages. Responsive pages can be presented in various formats – they will adapt to the screen size. If you expect to present the story on various devices, perhaps on a phone or in a boardroom with big screens, then you would want to choose Responsive Pages.

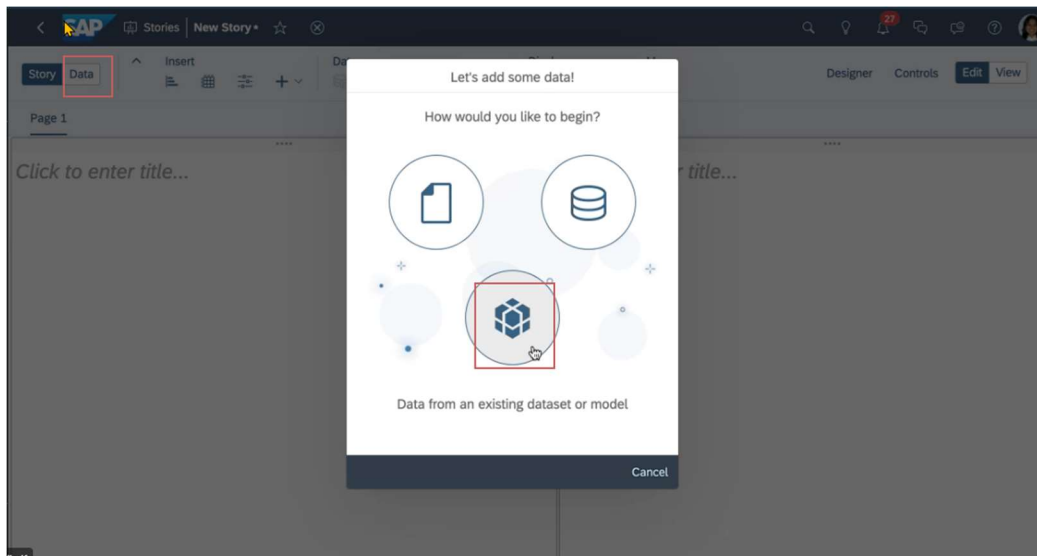
1. Select **Stories** from the menu on the left side of the screen. Then, select Create New **Responsive Page**.



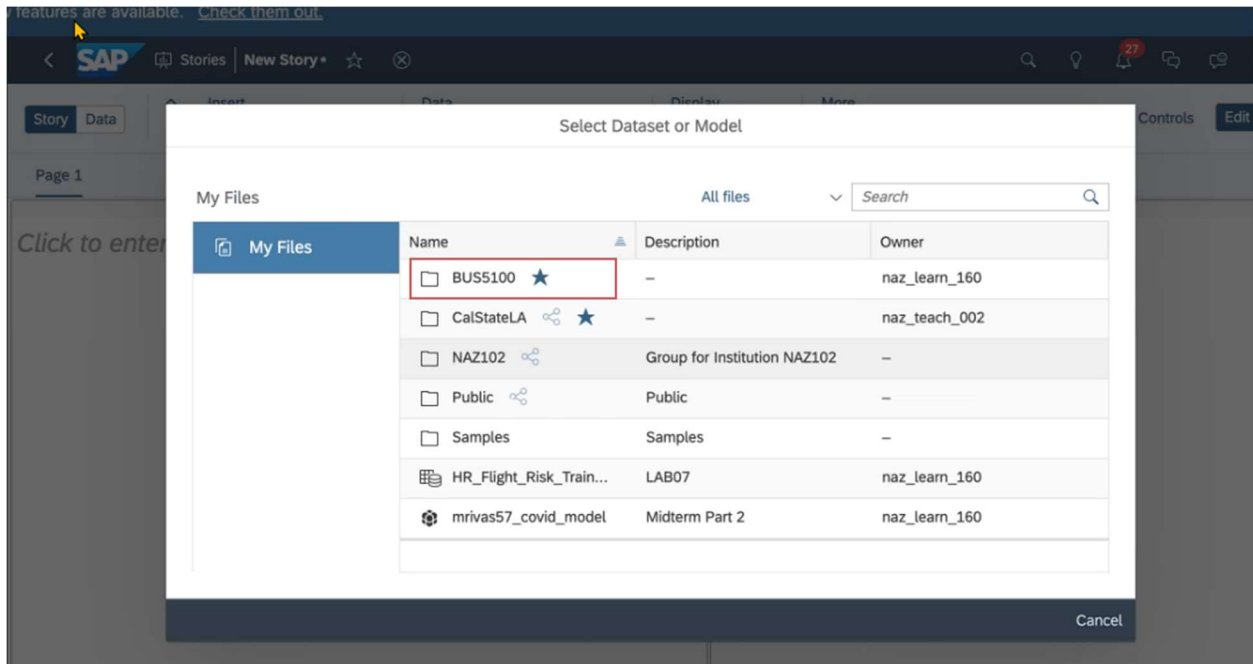
2. You will see the following screen. Select **Classic Design Experience**.



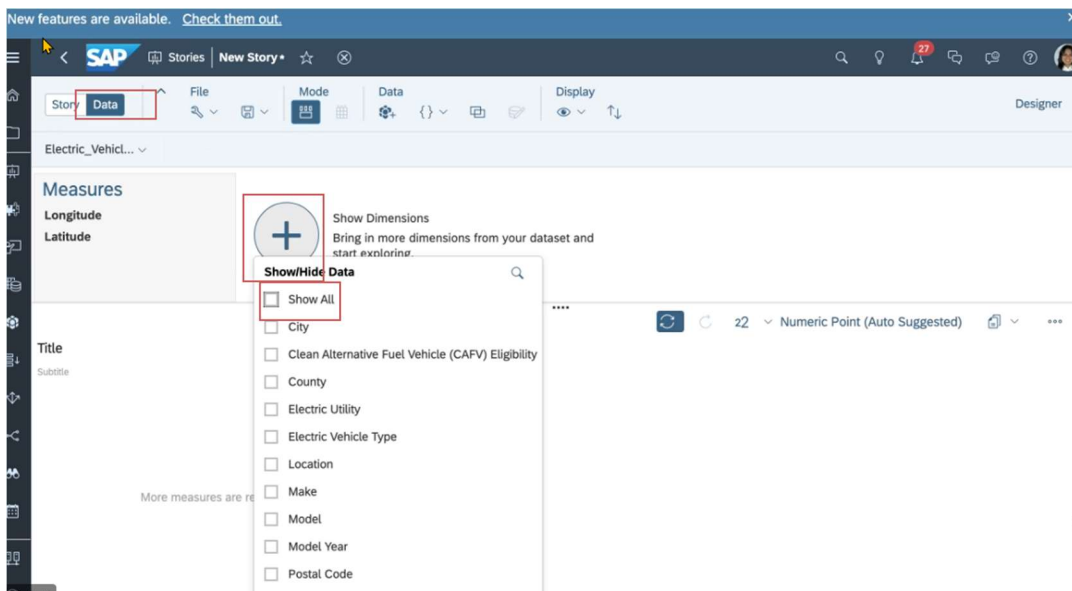
3. Data for a story may be acquired via a live connection, importing of a data source(s), or data that has already been modeled in SAC. We will use the **Electric_Vehicle_Population_Data model**. Click the **Data** tab on the Responsive Page at the upper left corner of the canvas. Then, choose **Data from an existing dataset or model**.



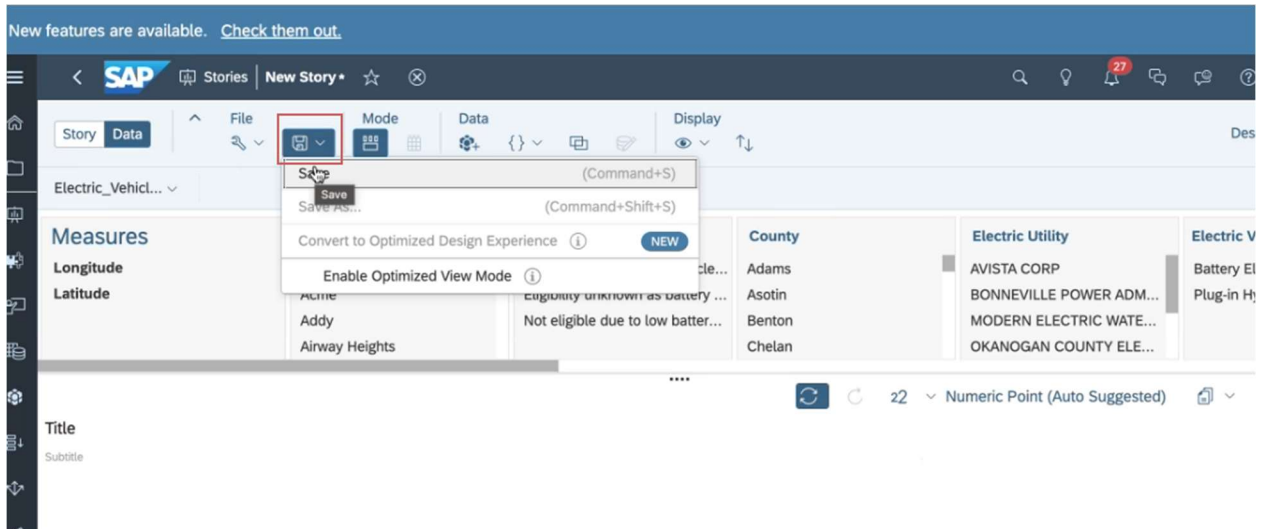
4. Select the **Electric_Vehicle_Population_Data** model that you created in the previous lab. Most likely it is stored in your class folder. For example, **My Files > BUS5100 > Term Project> Electric_Vehicle_Population_Data**.



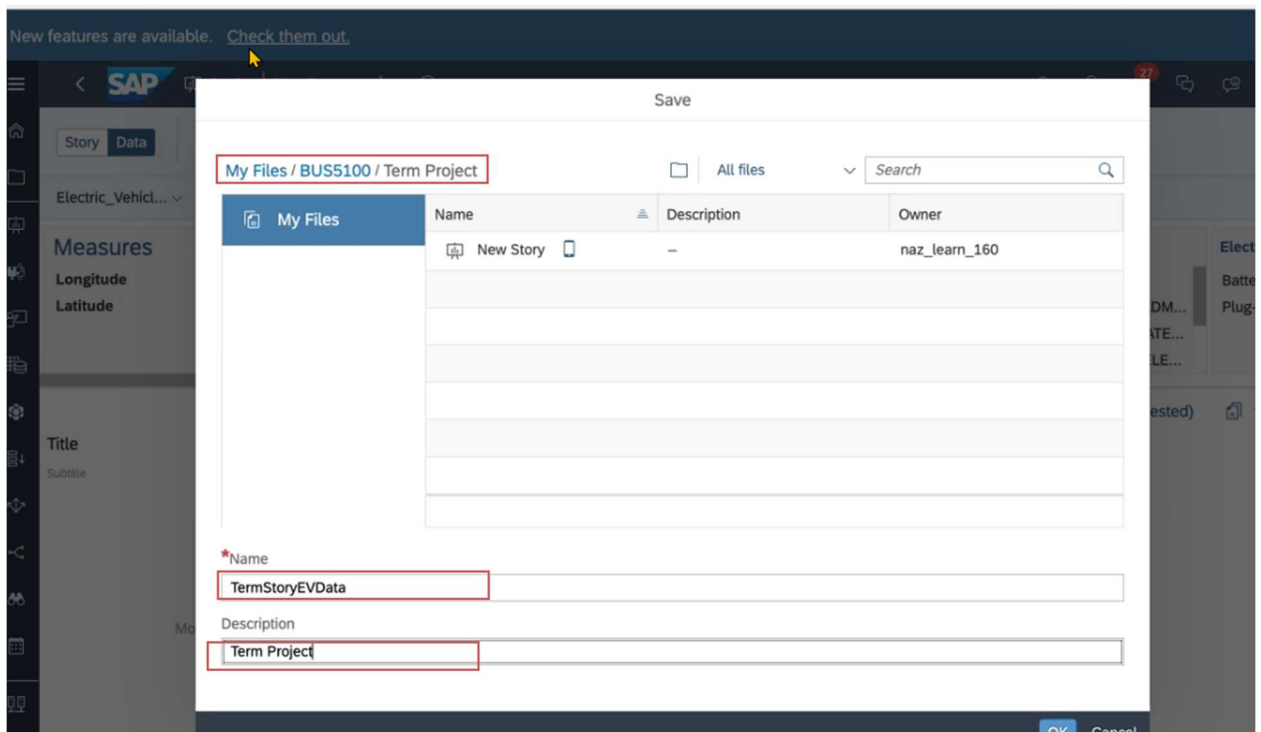
5. Select "+" and "Show All" Dimensions.



6. Save your Story as **TermStoryEVData** in your class folder. Path: **My Files > BUS5100 > Term Project > TermStoryEVData**.

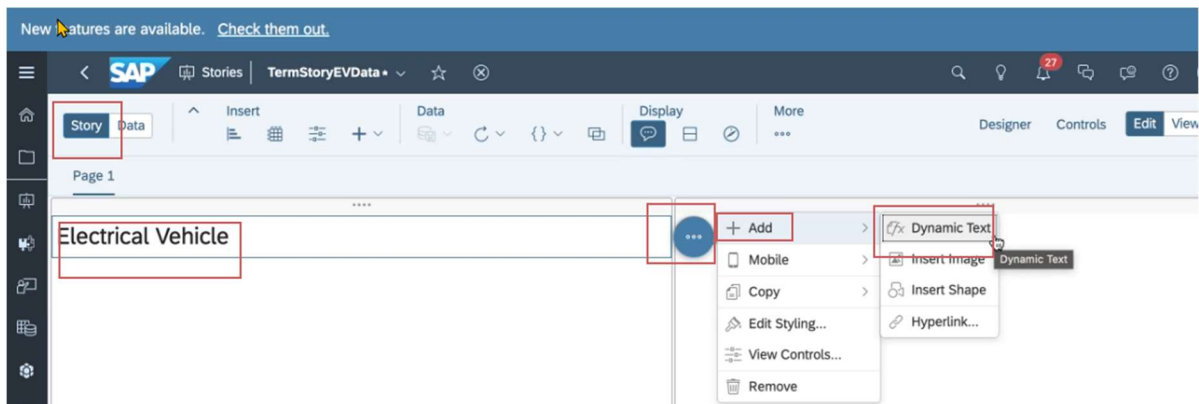


7. You may wish to **save** your story periodically and of course, after you finish it. SAC will actually warn you if you try to exit without saving. If the system asks you if you want to save or remove the model, choose save.

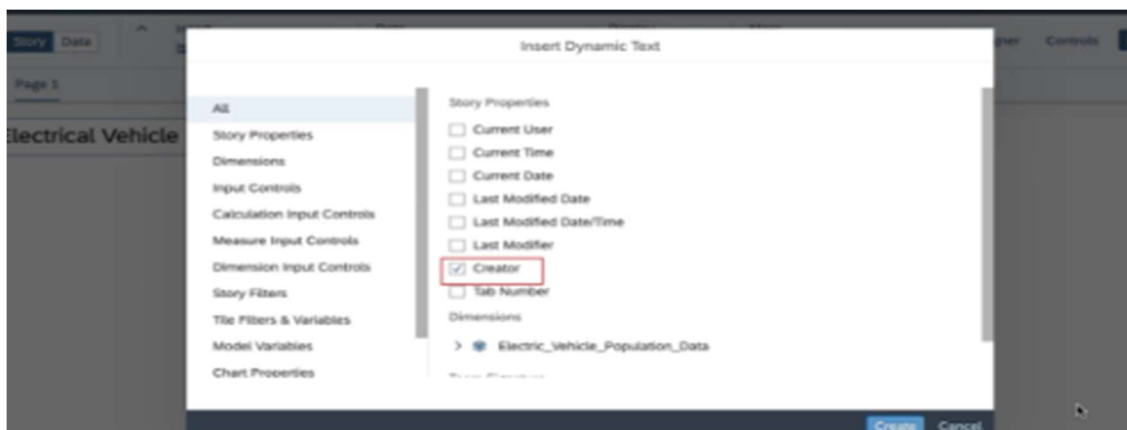


Section 4: Create a Geo-Map Page of EV Locations in Washington

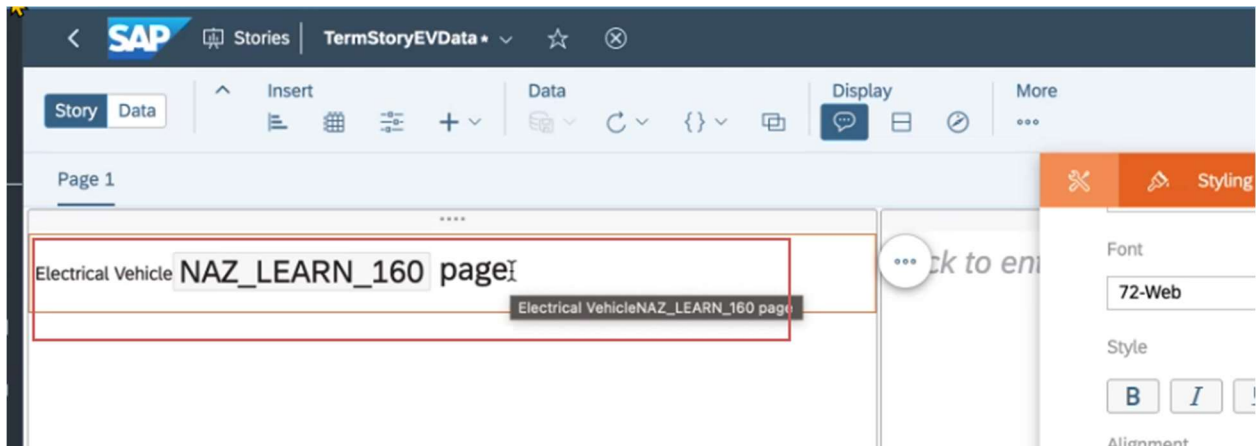
1. Go to the **Story Tab**. (The Story Tab is in the upper left corner, see figure below)
 - a. The default view for a responsive page is two lanes arranged vertically as two frames. Lanes are used to organize content on multiple devices. If you were to create a canvas page, you would not see lanes.
 - b. Each lane can have its own style.
2. You can add or delete lanes as you see fit.
3. On one of the lanes, click inside the title box to add a title **"Electrical Vehicle"**; See the below figure. (There should be a space after Electrical.)
 - a. To add text to the title that is generated by the story page, we use **Add Dynamic Text** from the "..." (More) choice on the chart actions drop down list shown in the figure below. Select **Add > Dynamic Text**.



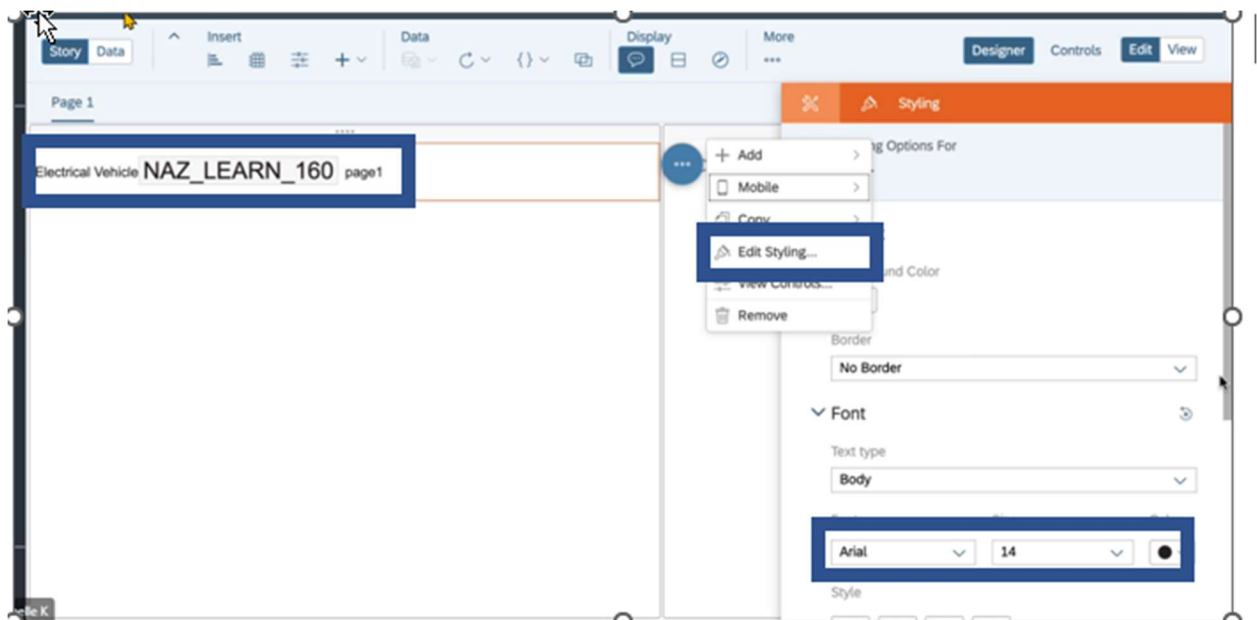
- b. On the **Insert Dynamic Text** Story Properties, choose **Creator** and select **"Create"**. The dynamic text creator is illustrated below. Notice that there are several choices as to what you would like to insert and where in your story page you would like to insert the text. Ours is a simple insertion of who created the story into the title.



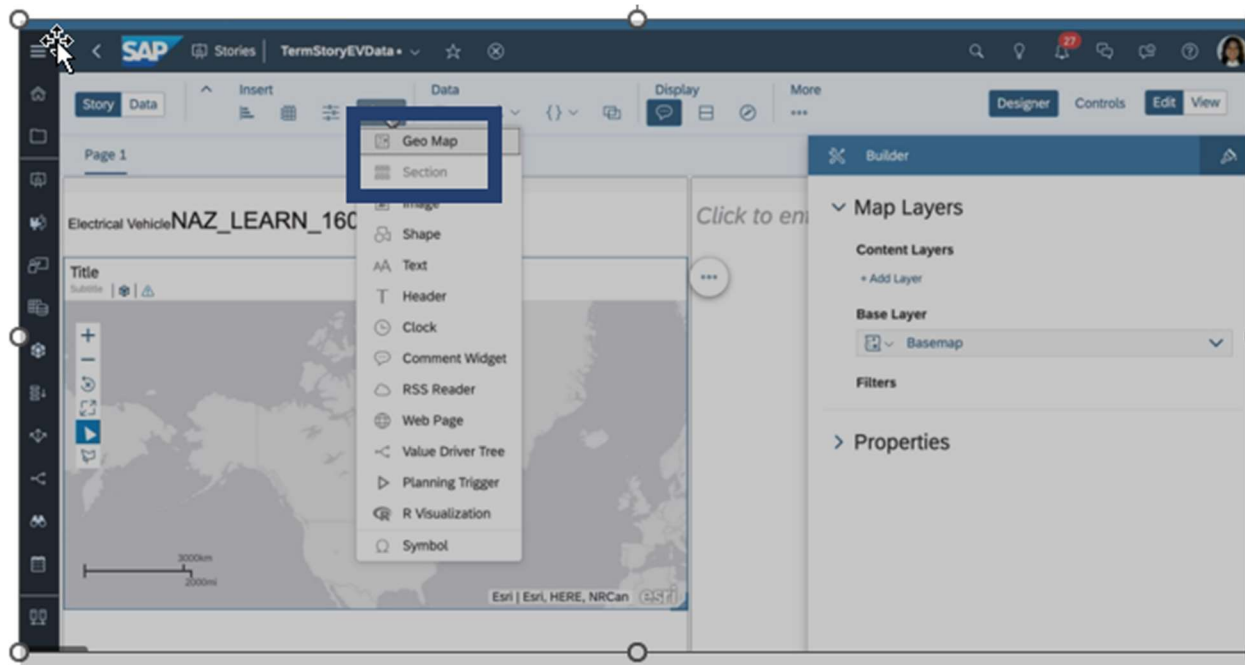
c. Once you have inserted **Creator** into the title, enter a space, the word “**page**” and click **insert dynamic text Page Number**.



d. Select the tile (and/or the page). Then, select “**Edit Styling**” as shown in the photo below. Perhaps change the font or color, add a background or borders.



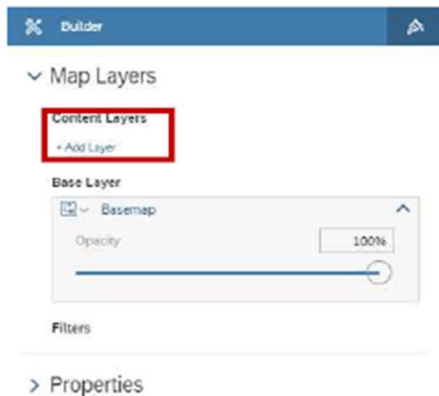
4. Insert a **Geo Map** by choosing the **Insert +** option and choosing **Geo Map** from the drop down list of options.



5. On the **Designer Builder panel** to the right of the chart and lanes, choose **Basemap**.

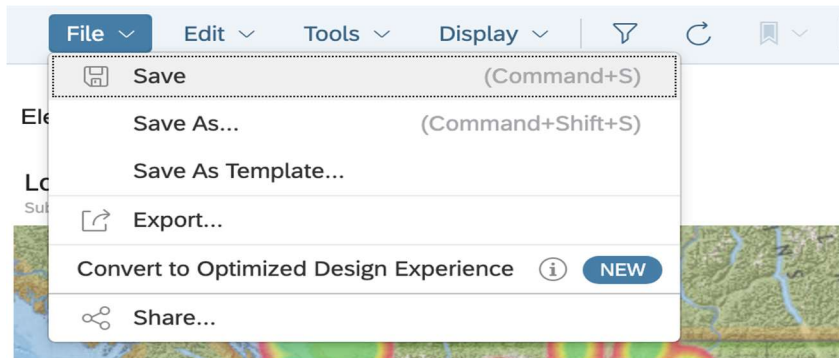
a. Choose the style of the background, “**base map**” for your visualization. You could choose any from the base map: Streets, Satellite, ...

6. Under **Content Layer** select **+ Add Layer > Bubble Layer**.



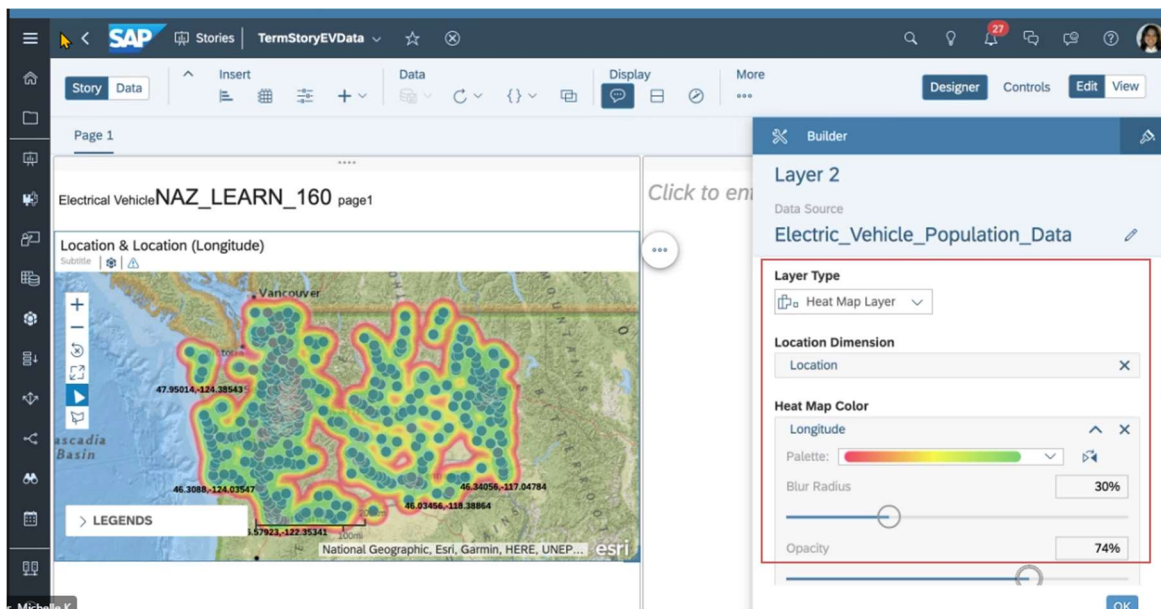
7. Designer/Builder Panel for a Geo Map

- Geo data can be layered using multiple data sets or geographical sources. For example, you could use a different data model for layer 1 than for layer 2 and so on. We will be using the defaulted data model, Electrical VehicleNAZ_Learn_160.
- NOTE: Don't forget to **save** your story periodically; you can hit "control + s" keys.



8. For this layer add a new layer. We are interested in EVs by zip code.

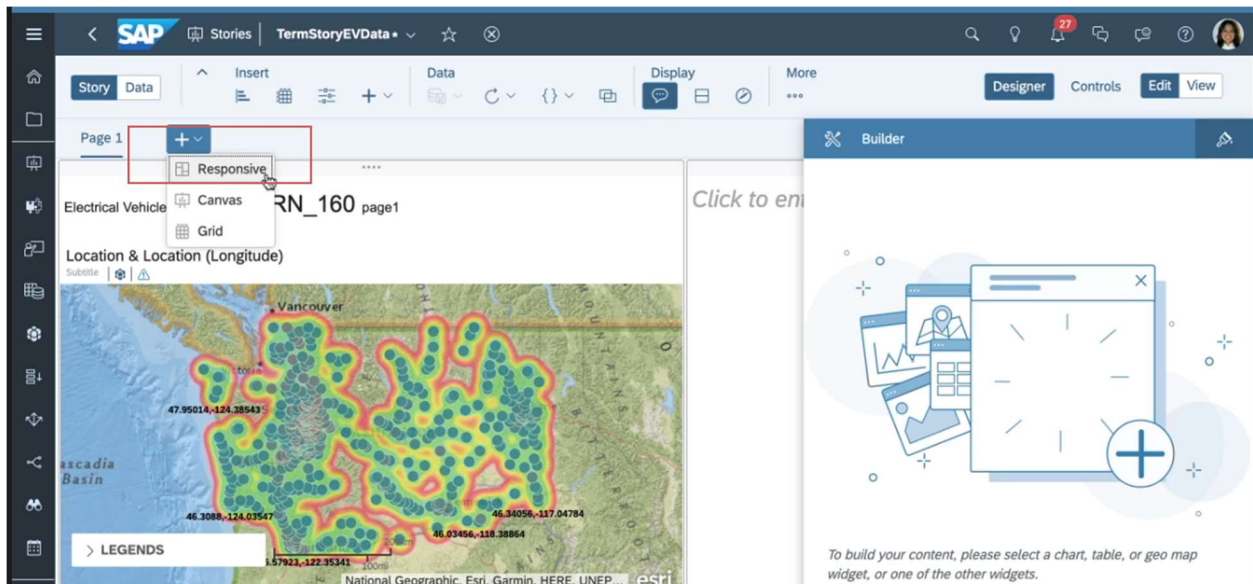
- Under **Location Dimension**, choose **Location**.
- Under **Heat Map Color**, choose **Longitude**.



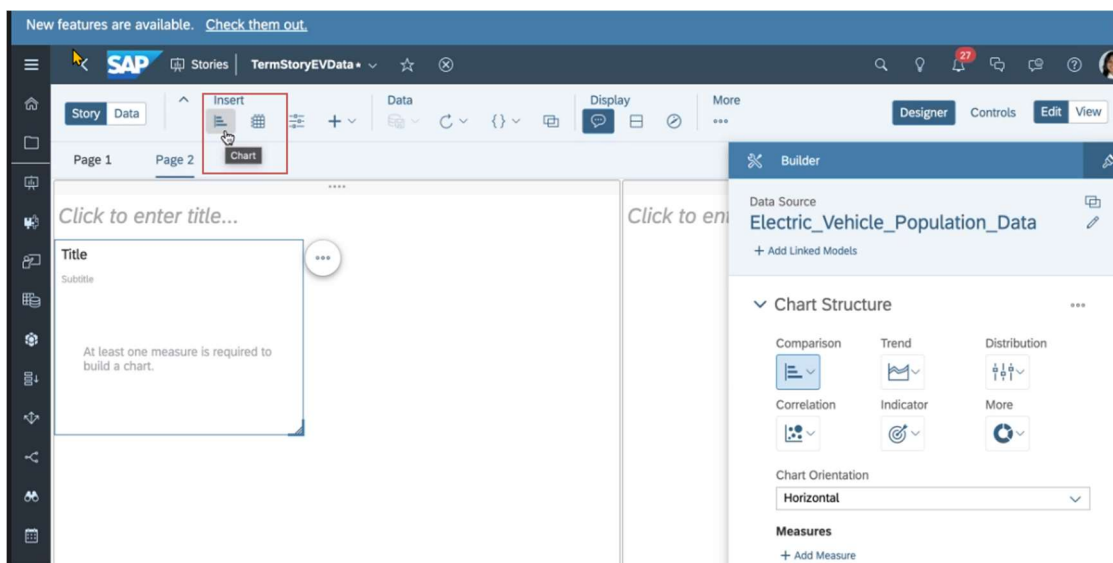
9. We may want to analyze the geographic (EV by zip code). We can build a Trend chart. In this step, we will see the amount of electrical vehicles per city.

Section 5: Create a Geo-Map Page of EV Locations in Washington

1. Add a new responsive page, Page 2.(Use the + next to Page 1.)



2. On the first Lane go to the menu: **Insert > Chart**



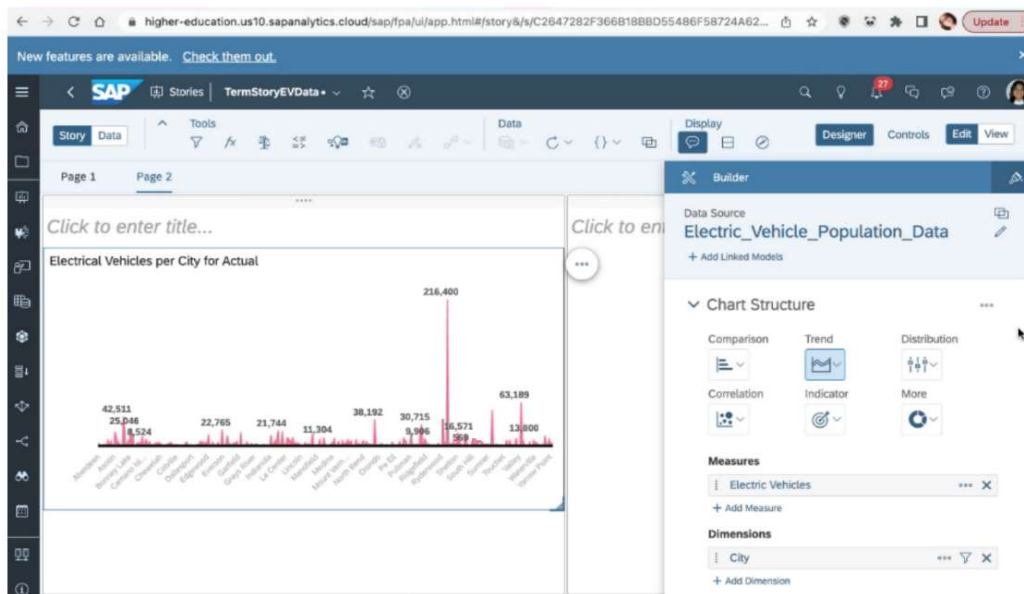
b. In the Builder panel of the figure below:

i: Set **Measures** > **Electrical Vehicles**

ii: Set **Dimension** > **City**

c. Then, select the chart: **Trend** > **Stacked Area**

d. The next step will be to choose any color of your liking for **Measures: Electric Vehicles**.



3. Click on the right side of page 2 to begin on the right side lane.

a. Go to menu: **Insert** > **Chart**

b. In the Builder panel of the figure below:

i. Set **Measures** > **Electrical Vehicles**

ii. Set **Dimension** > **County**

Builder

▼ **Chart Structure**

Comparison

Trend

Distribution

Correlation

Indicator

More

Measures

Electric Vehicles

+ Add Measure

Dimensions

County

+ Add Dimension

Color

Measures

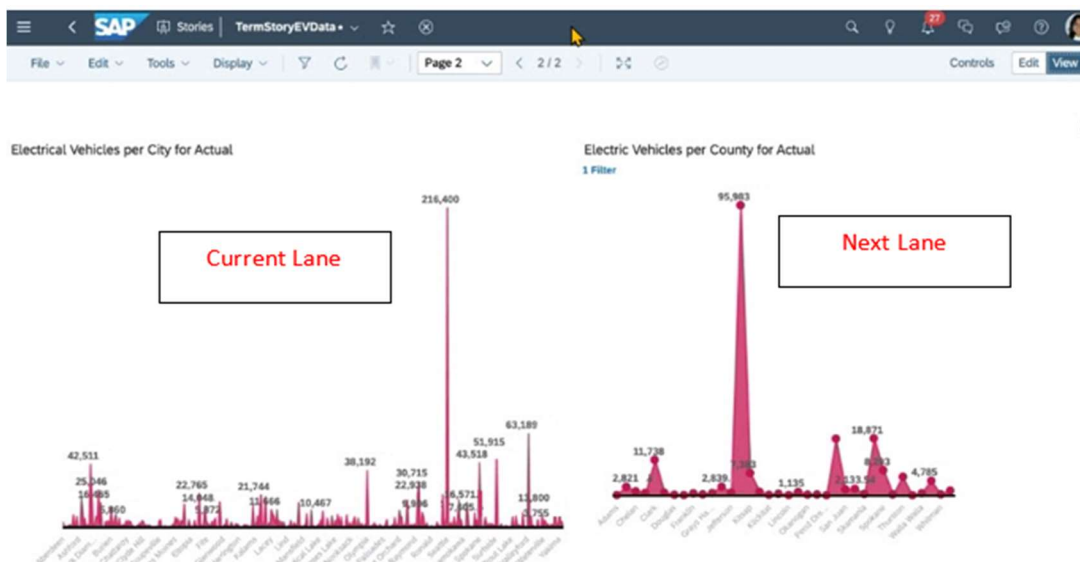
Member

Electric Vehicles

Pattern

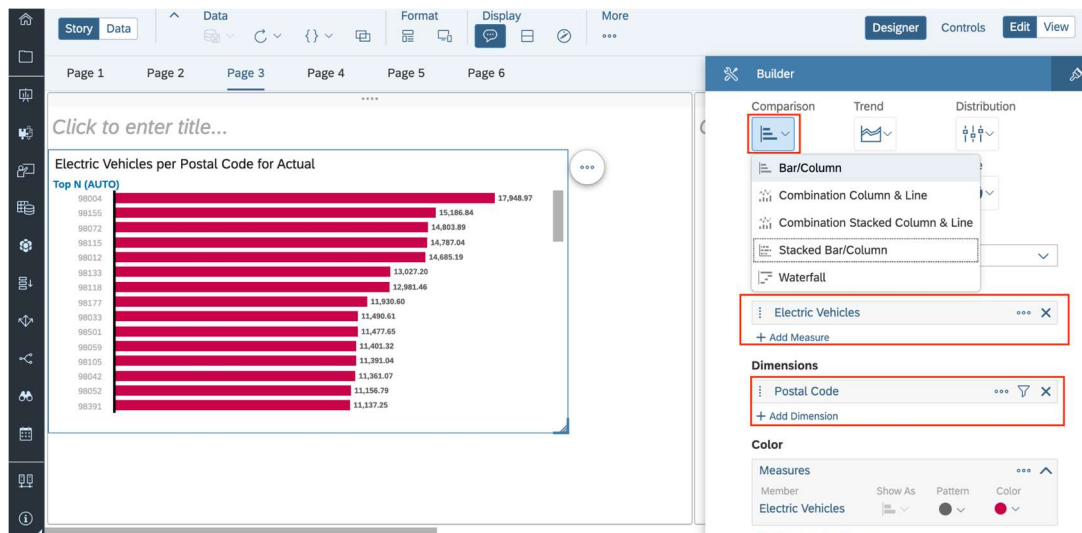
Color

c. Then, select the chart: **Trend> Stacked Area**



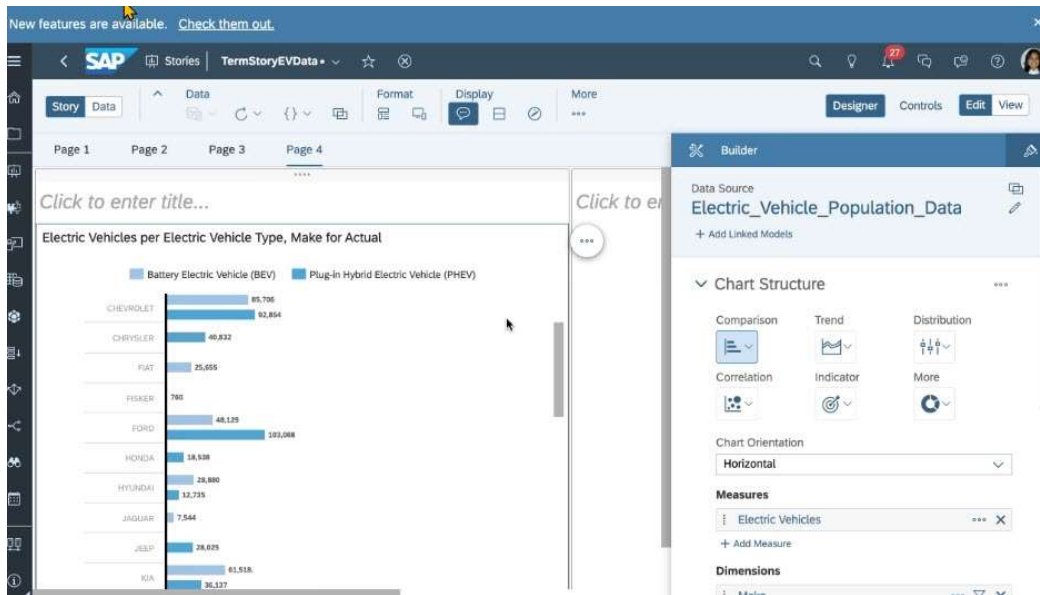
Section 6: Create Bar/Column to Show EV by Postal Code

1. Add a new responsive page, Page 3.(Use the + next to Page 2.)
 - a. Go to menu: **Insert > Chart**
 - b. In the Builder panel as seen in the figure below:
 - i. Set **Measures > Electrical Vehicles**
 - ii. Set **Dimension > Postal Code**
 - iii. Set **Chart Orientation > Horizontal**
 - c. Then, select the chart: **Comparison > Bar/Column** as seen in the image below.

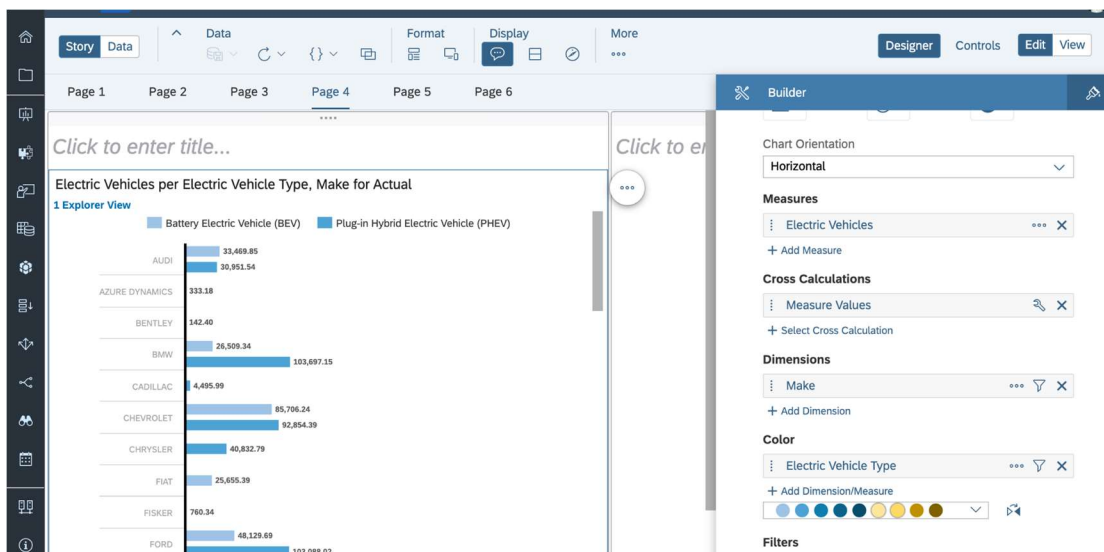


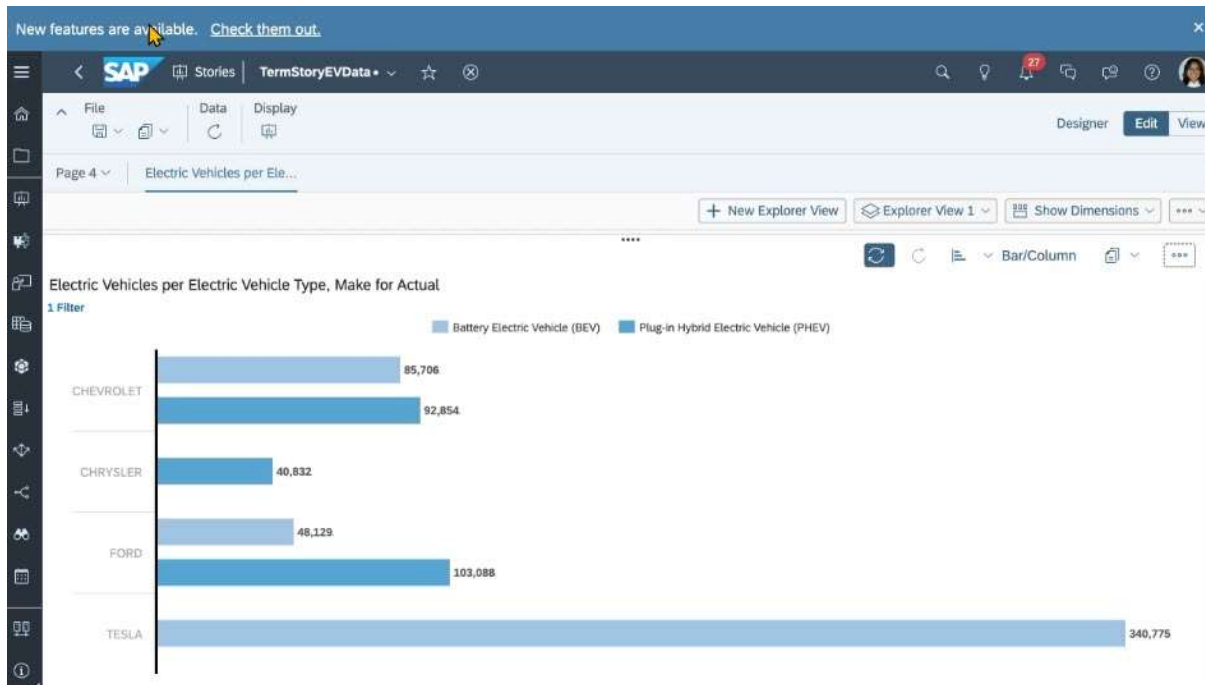
Section 7: Create Bar/Column Chart: EV Per Electrical Vehicle Type by Make

1. Add a new responsive page, Page 4. (Use the + next to Page 3.)
 - a. Go to menu: **Insert > Chart**
 - b. Then, select the chart: **Comparison > Bar/Column** as seen in the image below
 - c. Set **Chart Orientation > Horizontal**

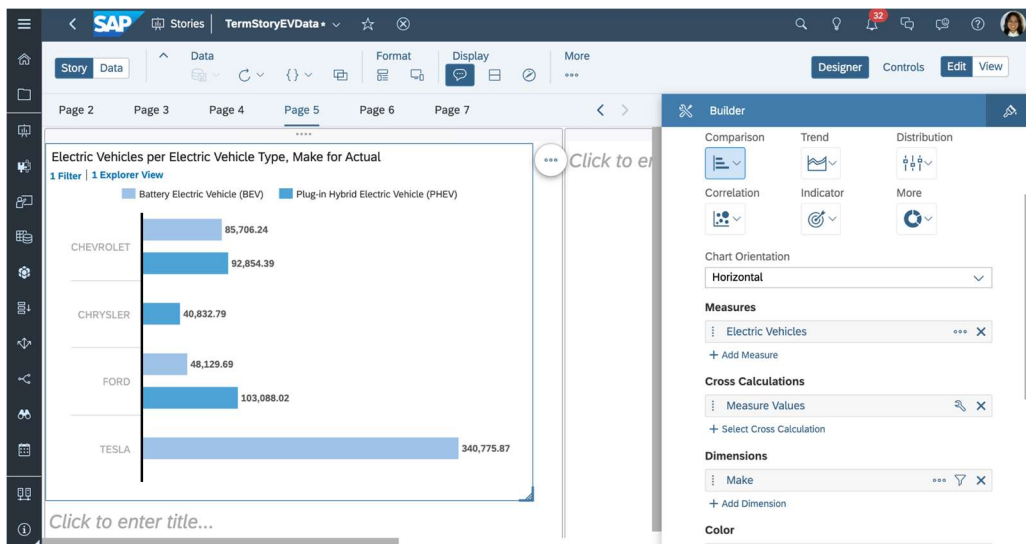


2. In the Builder panel as seen in the figure below:
 - a. Set **Measures** > **Electrical Vehicles**
 - b. Set **Cross Calculations** > **Measure Values**
 - c. Set **Dimension** > **Make**
 - d. Set **Color** > **Electric Vehicle Type**



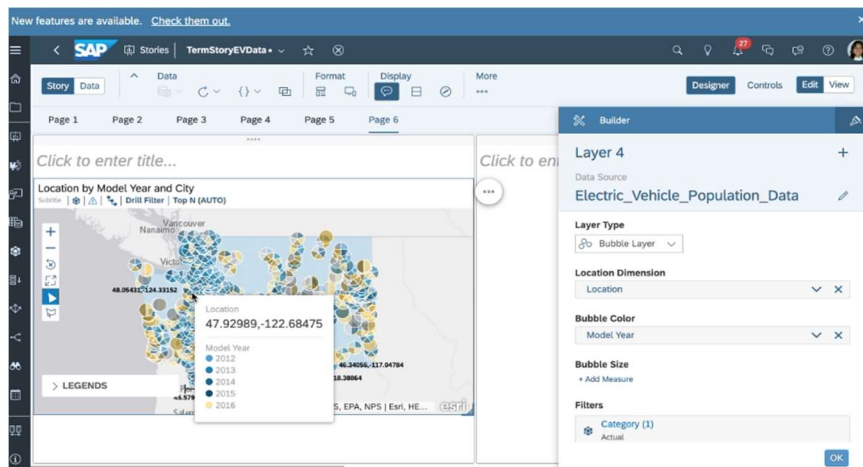


4. Add a new responsive page, Page 5. (Use the + next to Page 4.)
 - a. Go to menu: **Insert > Chart**
 - b. Then, select the chart: **Comparison > Bar/Column** as seen in the image below.
 - c. Set **Chart Orientation > Horizontal**
 - d. Add **Measure > Electric Vehicles**
 - e. Set **Cross Calculations > Measure Values**
 - f. Set **Dimensions > Make**
 - i. Click on the **filter icon** and only select Chevrolet, Chrysler, Ford, and Tesla.



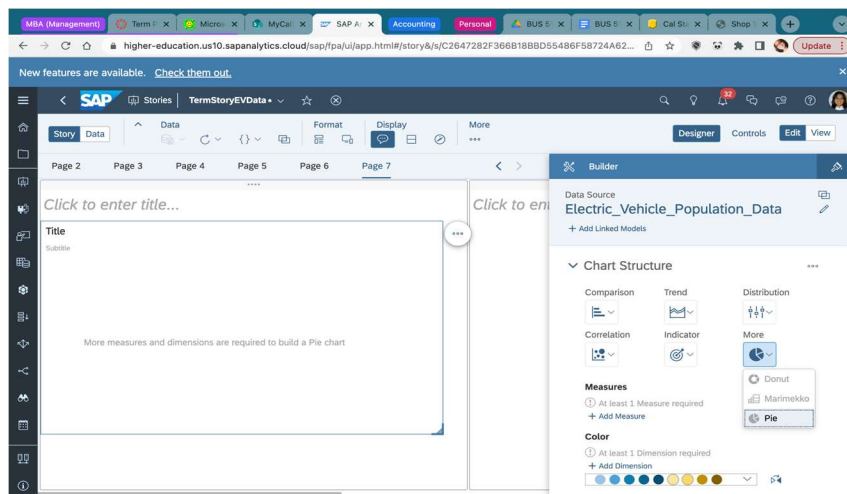
Section 8: Create a Geo-Map by Model, Year and City

1. Add a new responsive page, Page 6. (Use the + next to Page 5.)
 - a. Go to menu: **Insert > Geomap**
 - b. For this chart, we are interested in EVs by their location and model year to distinguish which models work best in the area.
2. In the Builder panel as seen in the figure below:
 - a. Set **Layer 4 type> Bubble Layer**
 - b. Set **Location Dimension > Location**
 - c. Set **Bubble Color > Model Year**

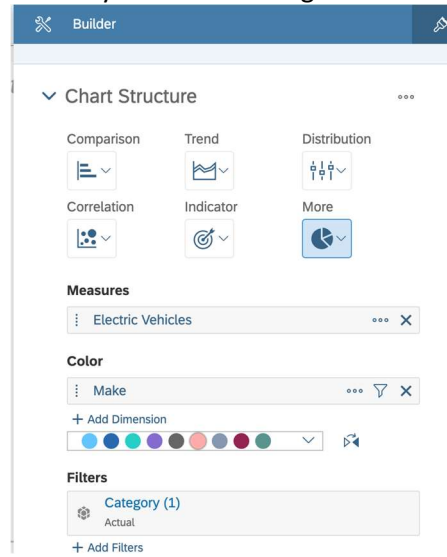


Section 9: Pie Chart: EVs Per Make

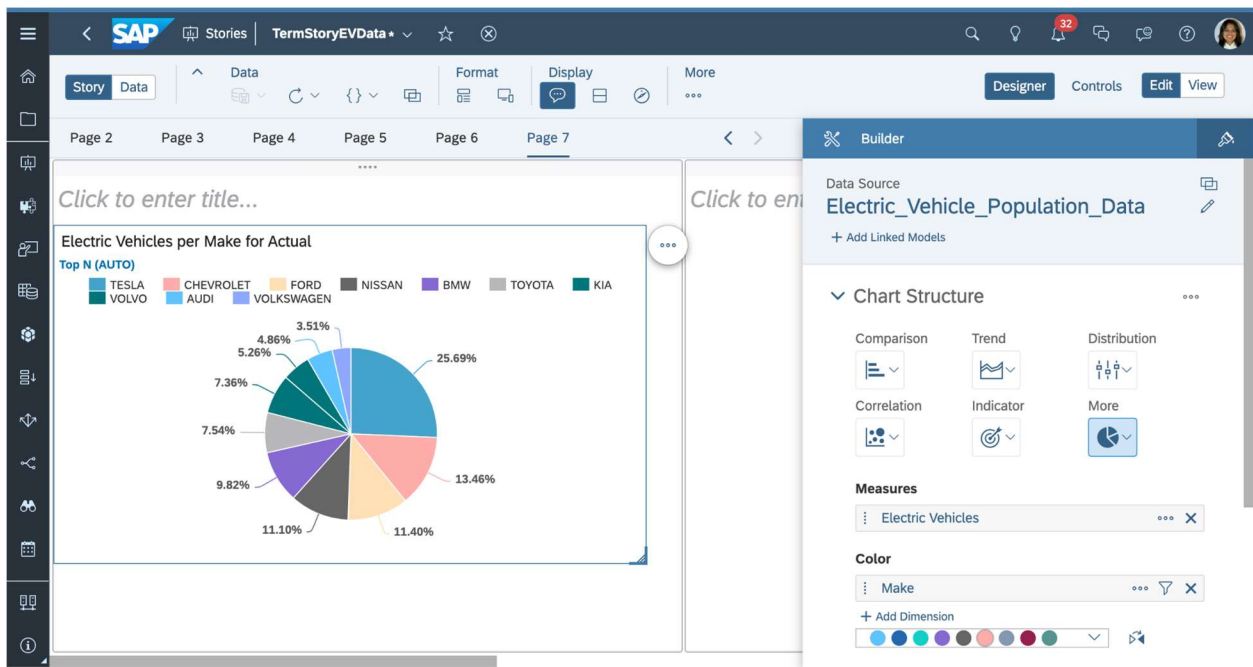
1. Add a new responsive page, Page 7. (Use the + next to Page 6.)



- a. Go to menu: **Insert > Chart**
- b. Then, select the chart: **More > Pie** as seen in the image below
- c. Set **Measures > Electric Vehicles**
- d. Set **Color > Make**
 - i. You may choose to change the color to your choice.



2. Your image or story should look like the figure below. As you can see, the majority of Washington's EV registered vehicles are Tesla.



THIS IS THE END OF THE LAB