Practice task 2

Download GHG_data.csv and load it into Tableau. The csv contains data on greenhouse gas emissions collected annually from 1990 to 2015. The numbers are CO_2 (carbon dioxide) equivalents, measured in kt (kilotonnes), and include LULUCF (Land use, land-use change, and forestry).

For more details on LULUCF, see https://en.wikipedia.org/wiki/Land_use,_land-use_change,_and_forestry.

This data was taken from the United Nations Climate Change website:

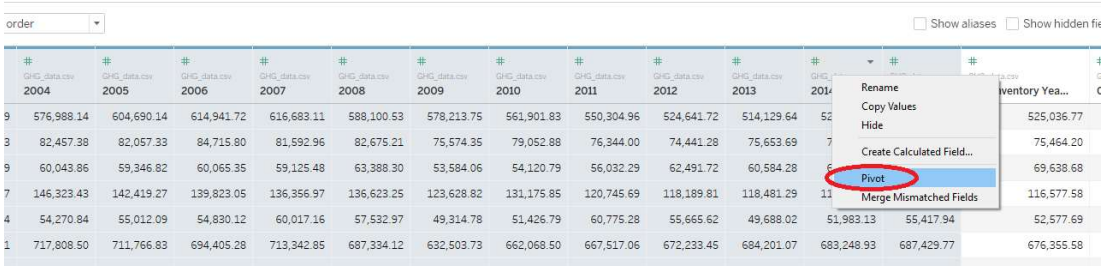
https://unfccc.int/process/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc

The Australian Government has set a target of reducing emissions to 26-28 per cent on 2005 levels by 2030 (source: https://www.environment.gov.au/climate-change/publications/factsheet-australias-2030-climate-change-target). We will investigate the progress towards this target as part of this practice task.

Before we can begin our analysis, we see in the *Data Source* tab that the data for each year has been regarded as a different variable (column).

Party	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Australia	576800.53	576,800.53	553,217.72	517,923.89	496,201.94	493,161.55	490,464.80	492,931.84	508,460.79	515,865.57	536,440.19	546,9
Austria	66708.16	66,708.16	65,810.95	64,132.52	63,893.07	64,554.10	66,468.92	72,280.19	63,337.68	64,535.35	60,558.29	64,0
Belarus	118169.05	118,169.05	106,502.31	98,612.53	89,465.38	63,864.77	54,760.36	57,670.25	63,196.73	61,140.05	50,707.08	47,9
Belgium	144220.33	144,220.33	146,931.68	146,556.78	145,567.95	150,228.12	152,394.37	156,569.60	147,562.36	152,724.85	146,501.27	147,8

We will need to tell Tableau that these entries actually form what's called a "Time Series", which just means the columns are actually connected and represent observations over time. To do this, we first highlight the columns containing the different years (1990-2015). Click on 1990, then SHIFT+CLICK



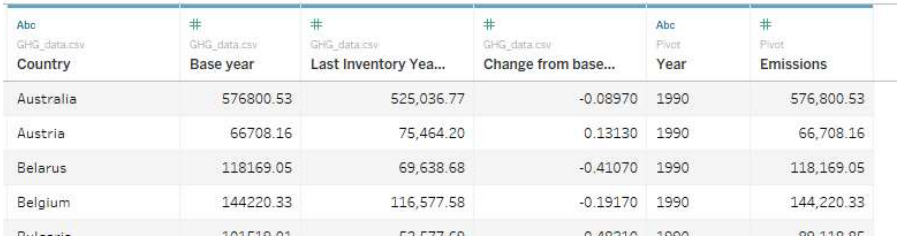
2015. Click on *Pivot*.

Party	Base year	Last Inventory Yea...	Change from base...	Pivot Field Names	Pivot Field Values
Australia	576800.53	525,036.77	-0.08970	1990	576,800.53
Austria	66708.16	75,464.20	0.13130	1990	66,708.16
Belarus	118169.05	69,638.68	-0.41070	1990	118,169.05
Belgium	144220.33	116,577.58	-0.19170	1990	144,220.33
Bulgaria	101519.01	52,577.69	-0.48210	1990	89,118.85

The year columns should now have collapsed to "Pivot Field Names".

While we are here, let's rename "Party", "Pivot Field Names", and "Pivot Field Values" to "Country", "Year", and "Emissions" respectively. Do this by right-clicking on the columns and selecting *Rename*.

Let's go over to our first sheet.



Abc GHG_data.csv Country	# GHG_data.csv Base year	# GHG_data.csv Last Inventory Yea...	# GHG_data.csv Change from base...	Abc Pivot Year	# Pivot Emissions
Australia	576800.53	525,036.77	-0.08970	1990	576,800.53
Austria	66708.16	75,464.20	0.13130	1990	66,708.16
Belarus	118169.05	69,638.68	-0.41070	1990	118,169.05
Belgium	144220.33	116,577.58	-0.19170	1990	144,220.33

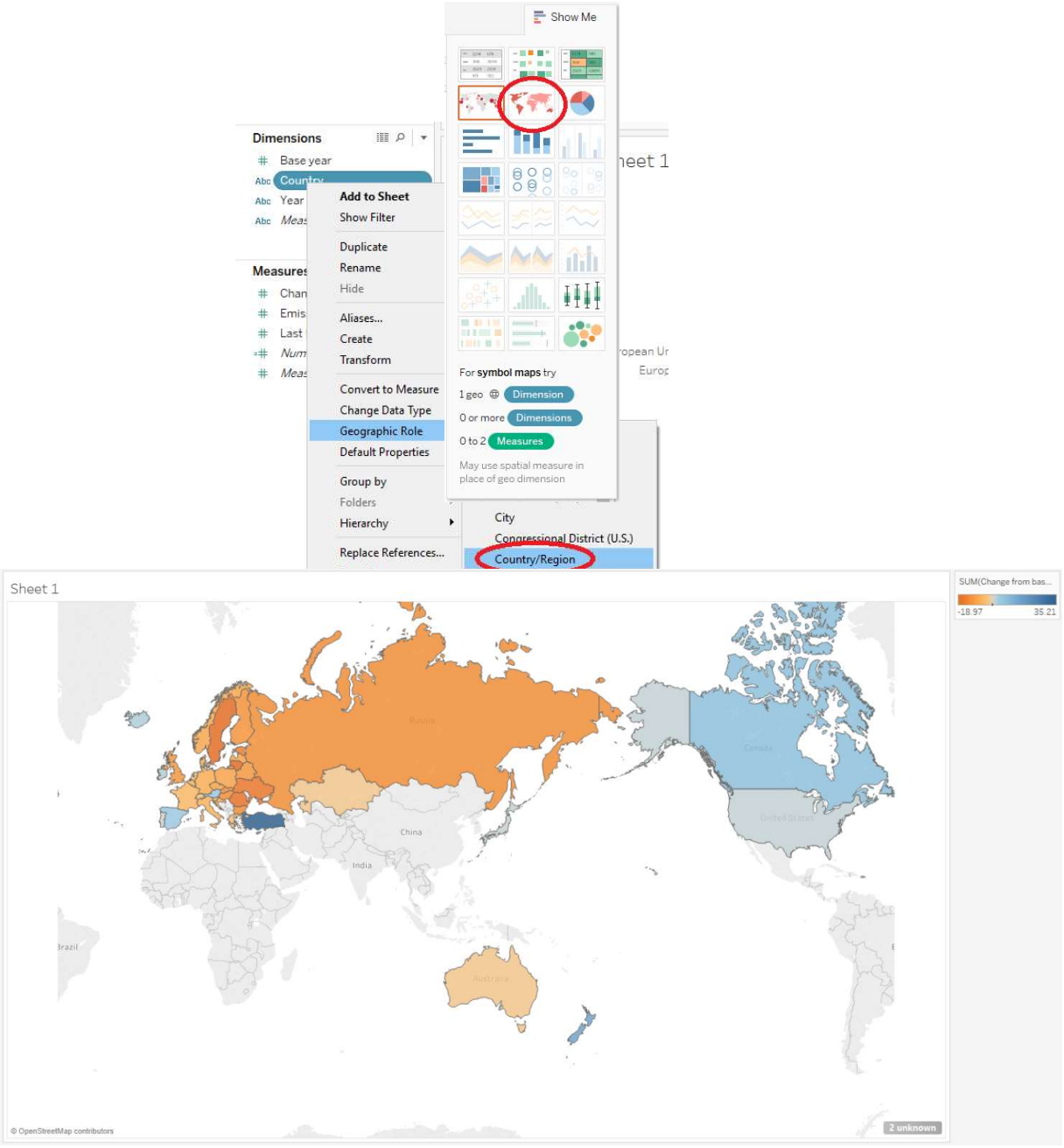
Let's start with something simple. Click-and-drag "Change from base year to latest reported year" into *Columns* and "Country" into *Rows*. You should get the following graph:

This graph shows the percentage change in greenhouse gas emissions from 1990 to 2015, expressed as a percentage. Whilst this seems fairly straight-forward to read, let's display this same data in a different way.

Under *Dimensions*, we see that “Country” is simply classified as text.

We can actually tell Tableau that the countries are actually real-world locations! To do this, we right-click “Country”, go to *Geographic Role* and select *Country/Region*.

We can now display the same data using a heat map. First, go to *Show Me* in the top right and select



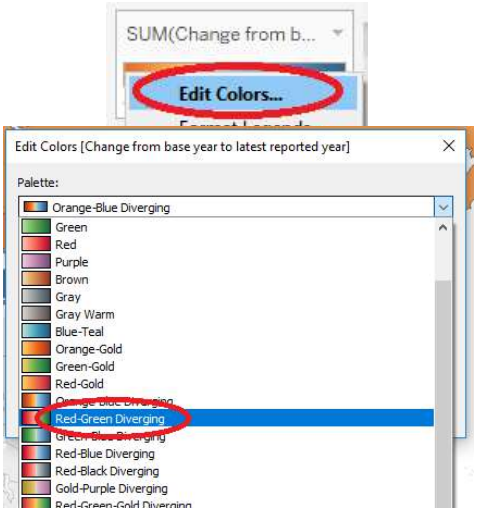
Maps.

Tableau will automatically display the data as a heat map.

We also see that there are 2 unknowns (bottom right). For your interest, these 2 unknowns are "European Union (convention)" and "European Union (KP)", which Tableau cannot recognise. We will ignore this issue in this task.

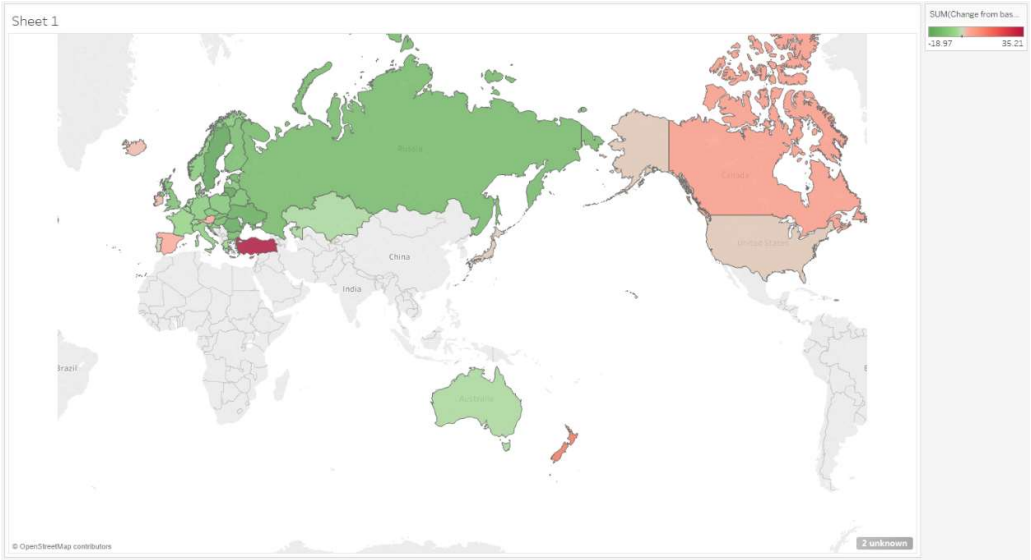
We also see from the colour scheme in the top right that negative values are displayed in red, and positive values are displayed in blue. This is a misleading colour scheme, since the colour red is typically associated with 'bad' and blue is typically associated with 'good', but for our data, negative values mean a *reduction* in greenhouse gases. We are actually sending the *opposite* message!

To fix this issue, right-click on the colour scheme bar on the top right and select *Edit Colours*.



Under *Palette*, we are currently using *Orange-Blue Diverging*, but there are many choices available. The instructions will use *Red-Green Diverging*, but you should feel free to experiment with the different colour schemes and choose whichever one you believe best represents the data and the message you are trying to convey.

However, we see that we still have the same problem as before; red is being associated with reductions in greenhouse gases. All we need to do is check the *Reversed* box, which will reverse the colours



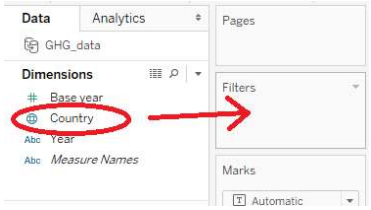
We now have a graph that accurately conveys the message contained in the data.

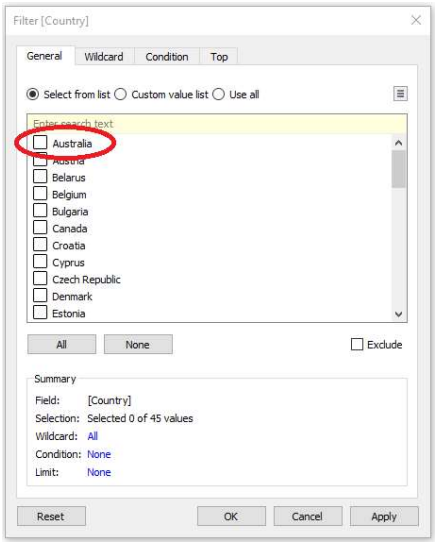
Next, we would like to measure how Australia is progressing towards meeting its target of reducing emissions to 26-28 per cent on 2005 levels by 2030. Start a new sheet by clicking the *New Sheet*

button at the bottom of the screen.

Because we are only interested in the data for Australia, we should first filter out the other data. To do this, click-and-drag “Country” from *Dimensions* into *Filters*.

You should see a dialog box to filter by country. Check the box for “Australia” and press OK. You

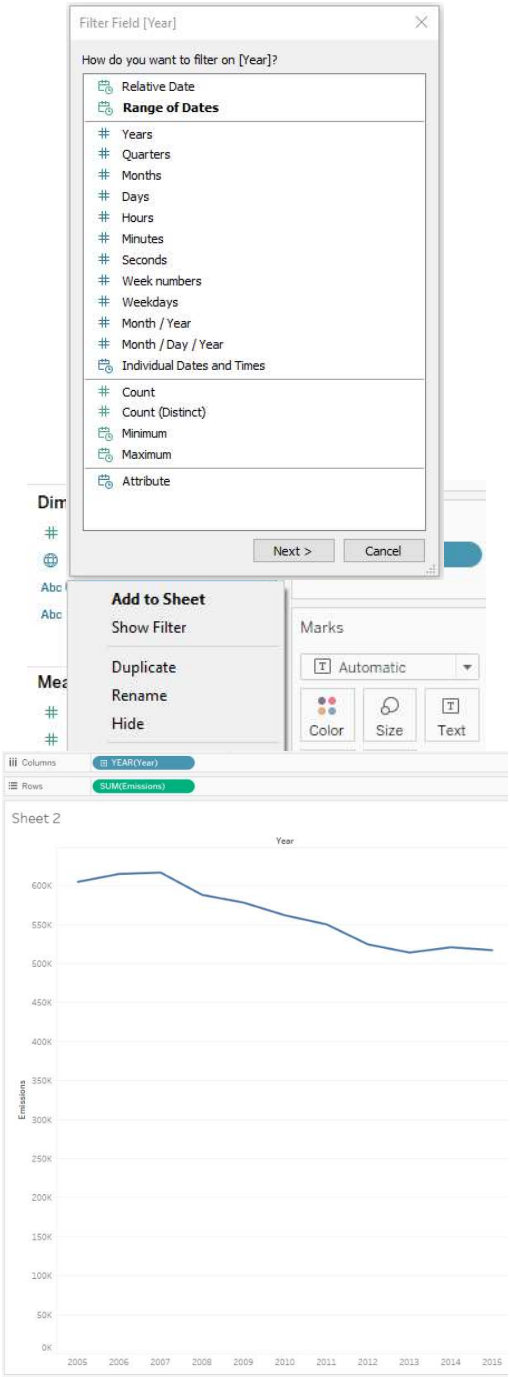




should see this filter appear.

We are also only interested in the progress from 2005 onwards. However, “Year” currently stores data as a string (from the *Abc* icon). We first convert it to a year (*Date & Time*). Right-click “Year” again, and select *Change Data Type*, and select *Date & Time* (selecting *Date* would also work).

We now filter by year (to exclude the data from 1990 to 2004). Click-and-drag “Year” from *Dimensions* into *Filters*. You should see the following dialog box:

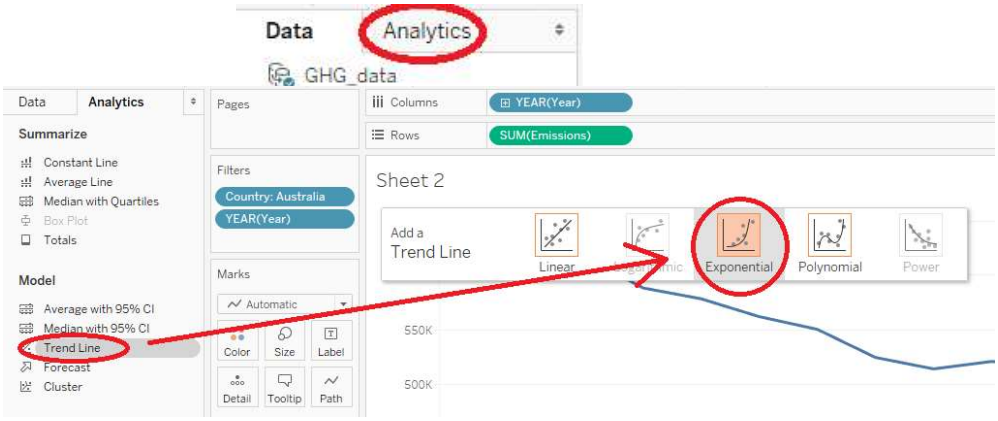


Select *Year* and press Next. You should see a dialog box similar to the first one when we filtered by country. Check only the boxes corresponding to 2005 onwards, then press OK.

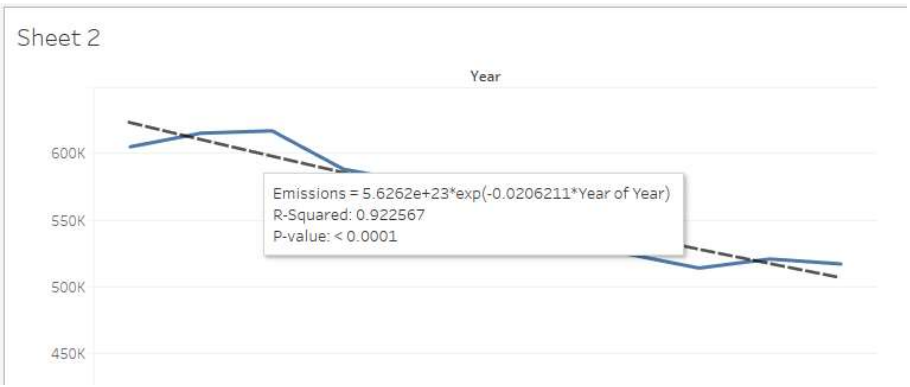
We now plot “Emissions” against “Year”.

As expected, you will see that only the data for Australia has been plotted, and only from 2005 onwards.

For this data, let's add a trend line and later use this to predict the emissions in 2030. Click on *Analytics*, located next to *Data* in the top left corner.



From there, click-and-drag *Trend Line* into the display, dropping it onto *Exponential* (we will not, in

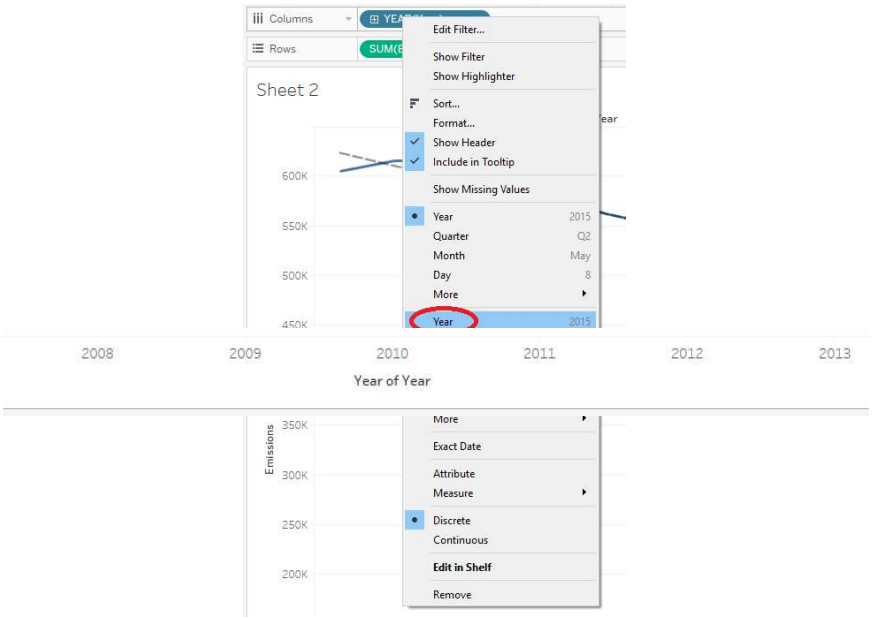


this task, go into why we choose an exponential trend line).

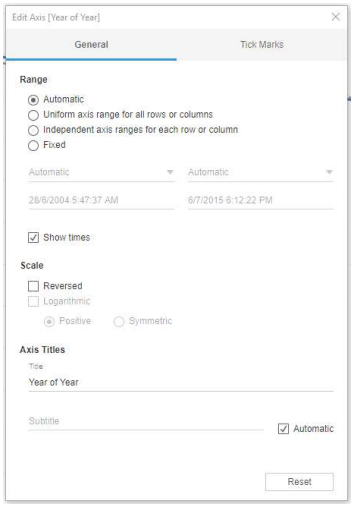
You should have a grey dotted line appear on your graph.

We will now use this trend line to forecast to 2030. We first need to make a slight adjustment to "Year". Right-click "Year" in *Columns* and select the second instance of *Year* (this will change "Year" into a *Measure*).

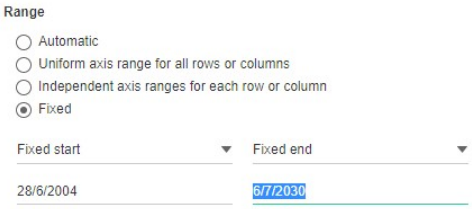
You should notice the x-axis (the horizontal axis on the bottom) has changed. Double-click the x-axis.



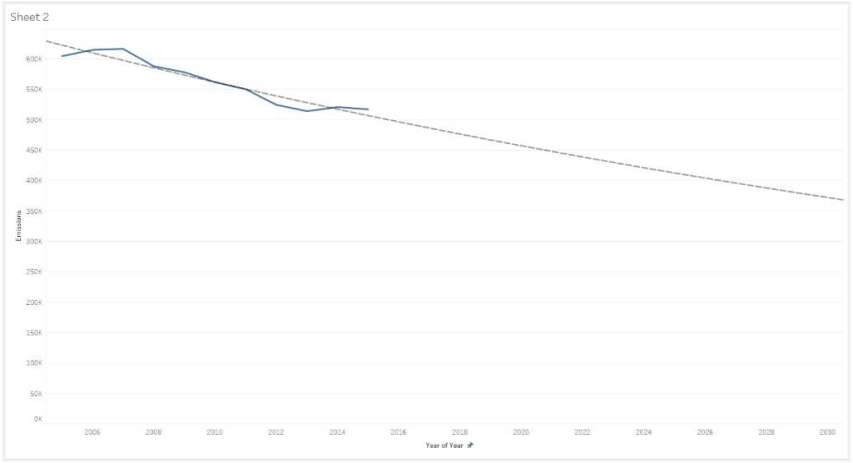
You will see a dialog box to edit the horizontal axis.



We will manually extend the graph to the year 2030. Under *Range*, select *Fixed*, and edit the *Fixed End* to include 2030 (the exact date does not matter).



Close this dialog box afterwards. The graph, as well as the trend line, has been extended to the year

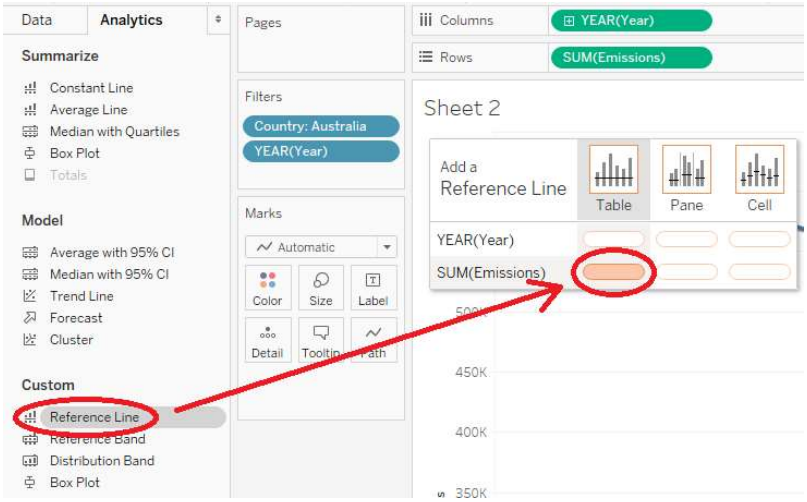


2030.

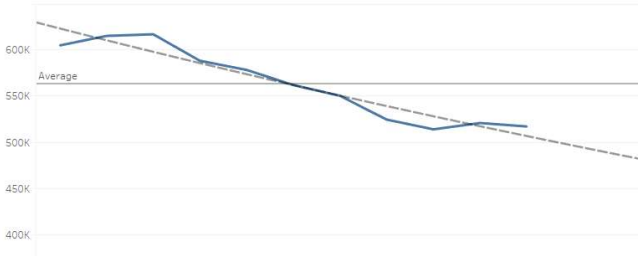
Remember, the Australian Government has set a target of reducing emissions to 26-28 per cent of 2005 levels by 2030. A quick calculation will tell us that 27% of the 2005 emission level of 604,690 is 163,266 (rounded to the nearest integer).

Note: We will not perform this calculation in Tableau for the sake of brevity.

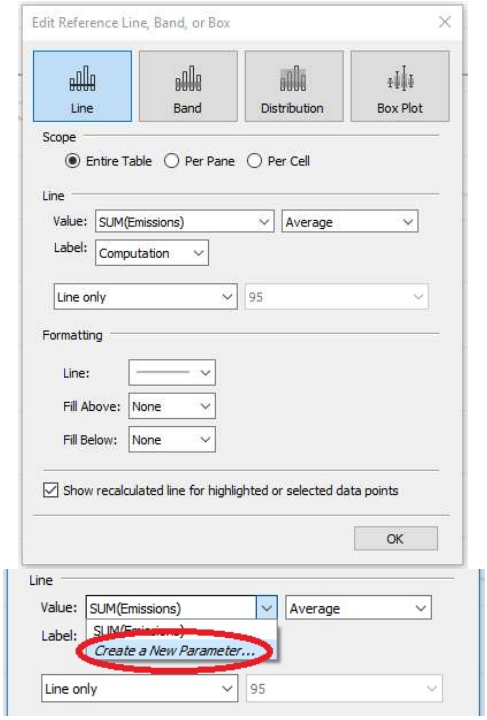
Let's also include this number in our graph. Go to the *Analytics* tab once again, and click-and-drag *Reference Line* onto the display, and drop on "Emissions" (see screenshot for reference).



By default, Tableau will put in an average line.

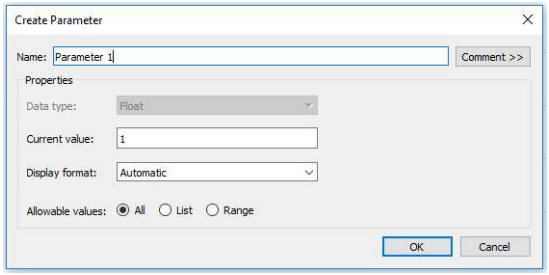


We can edit this line to instead indicate the target emission value. Right-click the line and select *Edit*. You should see the following dialog box:

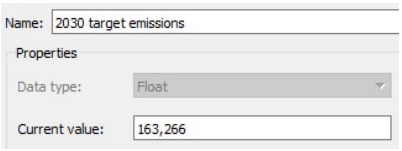


Open the drop-down menu for *Value* and select *Create a New Parameter*.

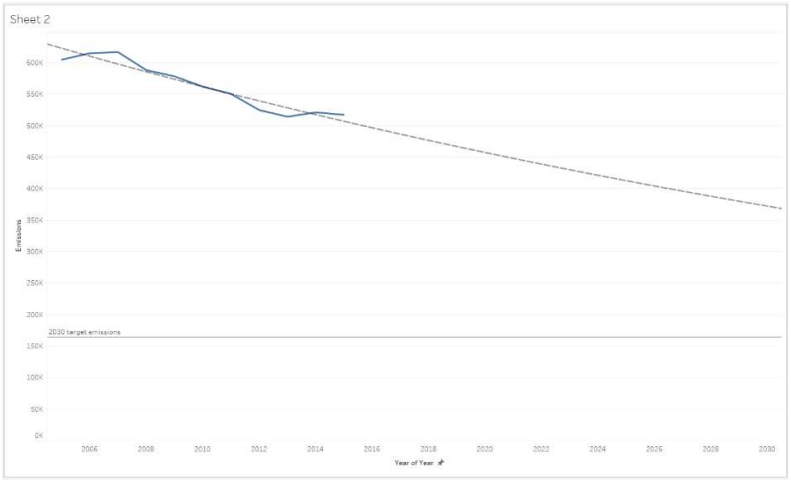
You will now see a new dialog box to create the new parameter.



Edit *Name* and enter the target emission of 163266 into *Current Value*. Then press OK.



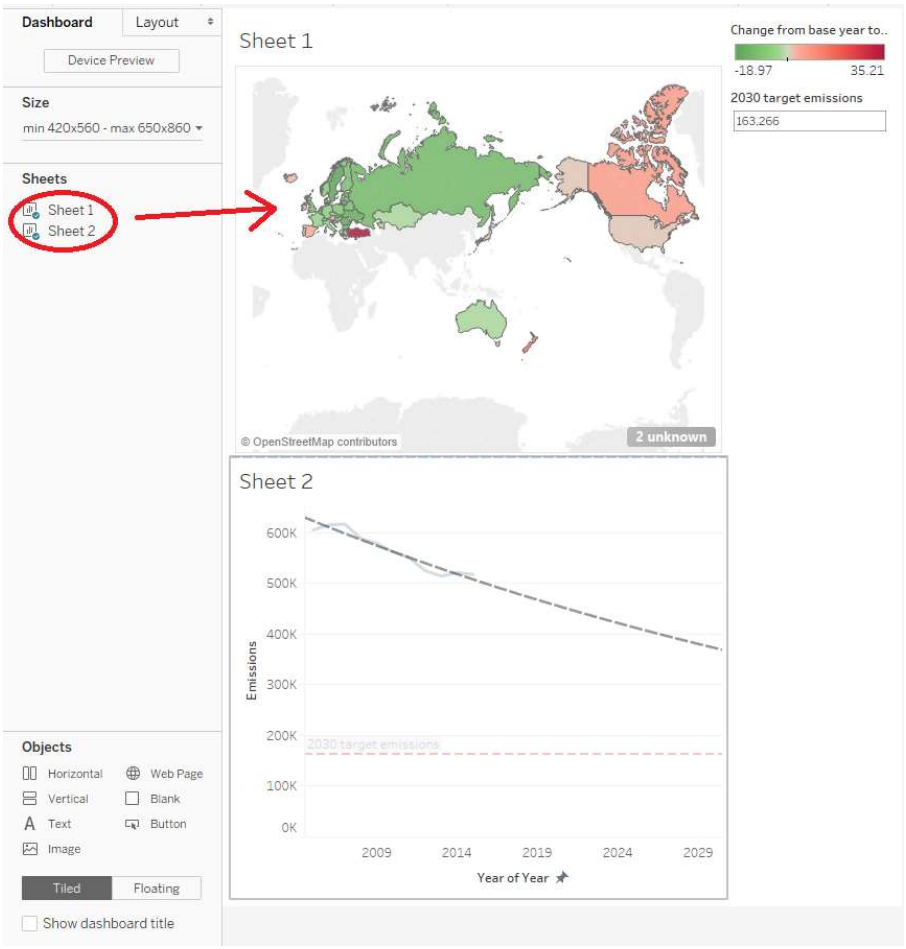
Press OK on the *Edit Reference Line* dialog box as well. You should now have the following graph:



We see that following the current trajectory, Australia will be very far from meeting its current emissions target in 2030.

Finally, we will combine these 2 charts into a dashboard. Create a new dashboard by clicking the *New Dashboard* button at the bottom of the screen.

Go to the newly created dashboard. Click-and-drag each of our 2 sheets onto the dashboard.



We can now see our 2 charts side-by-side, and of course we could add more charts if we wish.

As an exercise, try to find the emissions targets for other countries and create analogous graphs, and add them to the dashboard as well to compare against Australia.

(End of Task)