Arshdeep Kaur

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CO_2 Emissions by London Borough

1. Dataset description and link to the dataset

Dataset: CO_2 Emissions by London Borough (2005-2014) - This dataset provides estimates of total CO_2 emissions by London Borough, as well as emissions per capita of population via data.london.gov.uk. It also represents the breakdown of estimates of CO_2 emissions based on sectors that are within the scope of influence of Local Authorities. The dataset contains 62 variables which are described as follows:

Code	Area Code of London Borough
Name	London Borough
Industry and Commercial (n)	Estimate of total CO_2 emissions in various years (n = from 2005 to 2014) contributed by industry and commercial sector in London Boroughs.
Domestic (n)	Estimate of total CO_2 emissions in various years (n = from 2005 to 2014) contributed by domestic sector in London Boroughs.
Transport (n)	Estimate of total CO_2 emissions in various years (n = from 2005 to 2014) contributed by transport sector in London Boroughs.
Grand Total (n)	Estimate of total CO_2 emissions in various years (n = from 2005 to 2014) contributed by industry and commercial, domestic and transport sectors in London Boroughs.
Population ('000, mid-year estimate) (n)	Total population of London Boroughs in thousands in various years (n = from 2005 to 2014) using mid-year estimate.
Per Capita Emissions (n)	Estimate of Per Capita CO_2 Emissions in various years (n = from 2005 to 2014) calculated by dividing Grand Total CO_2 Emissions by Total Population.

Link to dataset:

https://public.tableau.com/en-us/s/resources?qt-overview_resources=1#qt-overview_resources

Under section Science: dataset is: CO_2 Emissions by London Borough (2005-2014).

1. Description of audience (User Story)

- User:

Ms. Kiara is a data analyst working in the Department of Energy and Climate Change in United Kingdom. As part of her work, she has to present data regarding estimates of total CO_2 emissions in different London Boroughs over years ranging from 2005 to 2014. The data should provide information regarding major sectors like industry and commercial, domestic and transport among others that contribute to the CO_2 emissions in these areas. It should also depict the trend of total CO_2 emissions with respect to population of boroughs over years. This information is used by various Local Authorities of each of the boroughs in an attempt to identify major sectors that contribute to total CO_2 emissions, understand their future implications on environment and people, and hence take further actions to reduce them to prevent global warming.

- Problem:

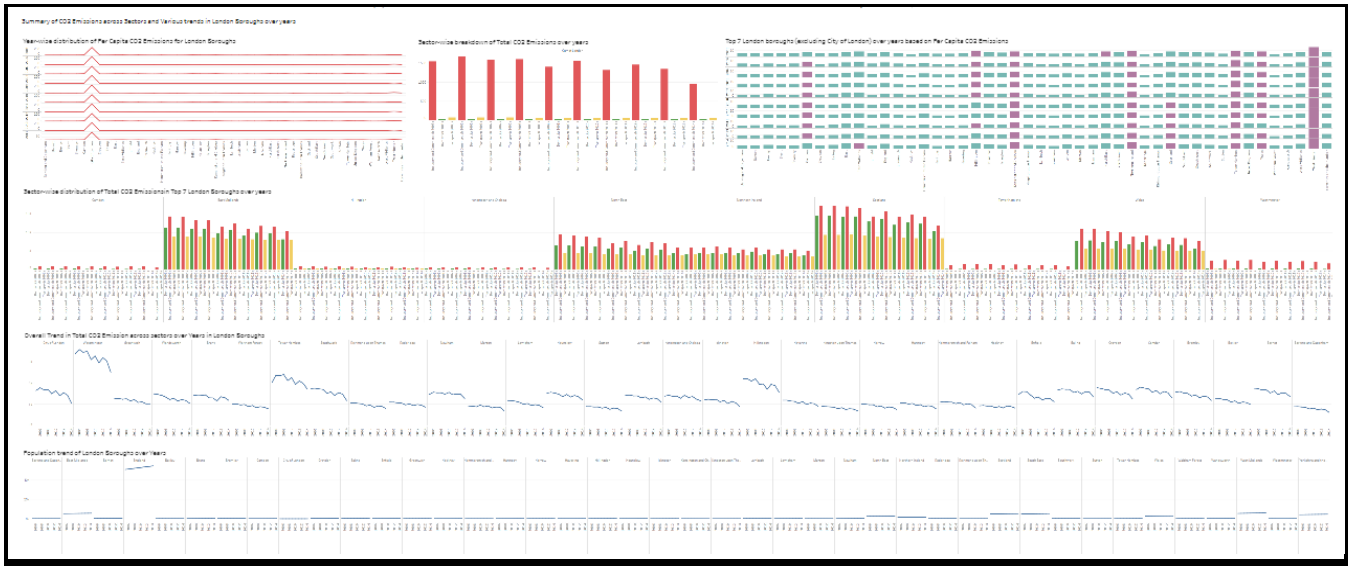
As with every passing year, it is witnessed that global warming is on the rise with CO_2 emissions being one of the major contributors to such environmental problem. When total CO_2 emissions do not meet the National Indicator 186, which is an internationally agreed target value, it becomes a significant contributor to global warming which is an area of serious concern. Since our scope of this study is limited to United Kingdom, identification of London Boroughs having high CO_2 emissions and different sectors majorly contributing to such emissions is of paramount importance. This information is useful to Local Authorities which can make significant changes in the governing rules for the contributing sectors that are under their influence and thus, help in reduction of CO_2 emissions in future. A good visualization can help in identifying London Boroughs that have high CO_2 Emissions beyond the standard values, major contributing sectors to such emissions, overall trend in the CO_2 emissions with respect to population of these areas over the years which can help the authorities in making decisions regarding future course of action to prevent global warming.

- Scenario:

The visualization created by Ms. Kiara should convey the message in a clear manner with minimum display of any technical/statistical information. The end user to whom dashboard will be presented may or may not be technically sound. Hence, the dashboard should contain graphs that are easy to understand and are coherently consistent. The same dashboard will be presented in meetings with different stakeholders like political groups, industry officials and environmentalists to explain them the overall situation related to CO_2 emissions and global warming which will mould their decision making. Under the sectors of concern within this study, for Industry and Commercial sector, it will be discussed with their representatives to explain them to make their processes more efficient if they are the major contributors to such emissions. For Transport sector, similar meetings will be held with their representatives so that new vehicular rules can be introduced or ban of certain type of vehicles can be made if required if they are the major contributors. Similarly, this information can be used to aware general public if they are taking certain steps like overusing products that cause CO_2 emissions and hence educate them to not take such steps or to ban the use of some products. The visualization should also be appealing to the political groups if some large scale implementation of certain rules is required. Thus, the dashboard should depict adequate information to meet such expectations.

2. Link to the Dashboard from Tableau Public

Dashboard:



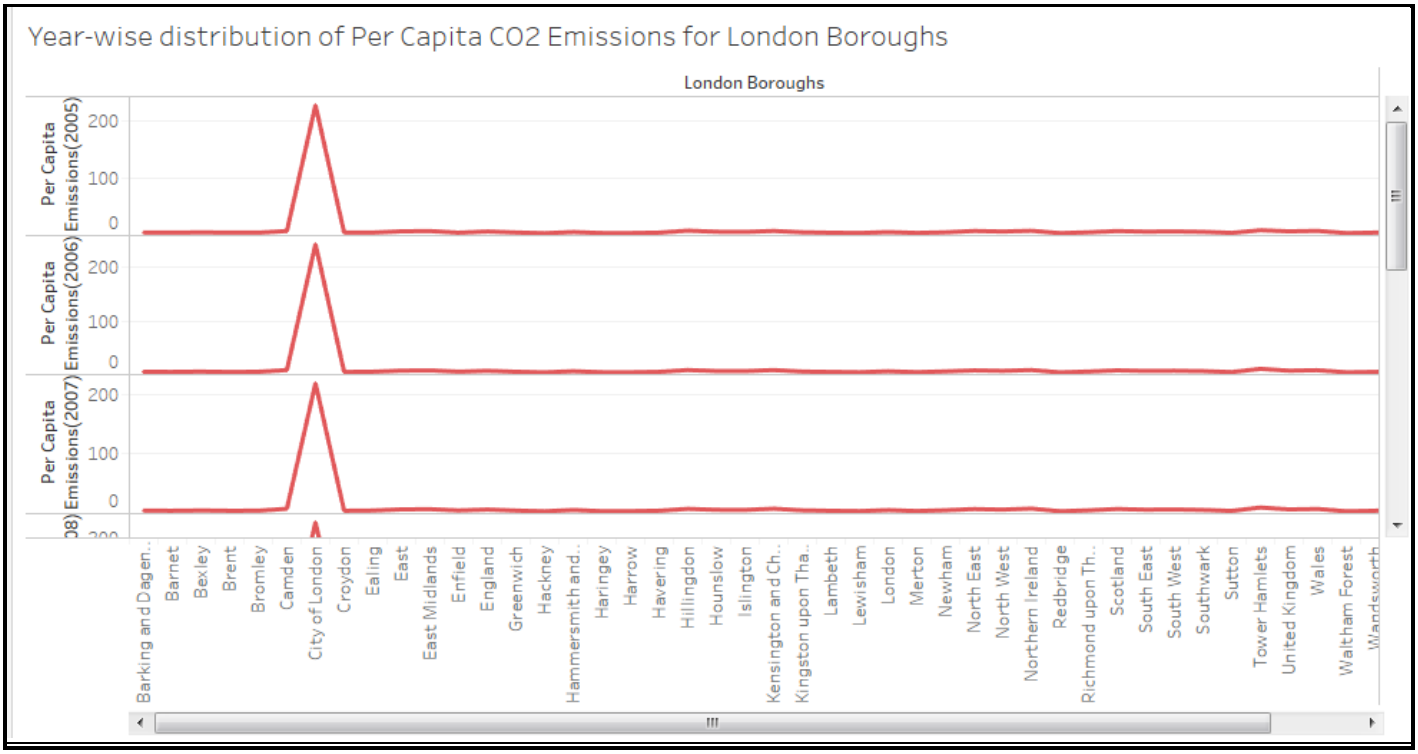
Link:
https://public.tableau.com/profile/arshdeep.kaur#!/vizhome/Assignment3Dashboard_2/Dashboard?publish=yes

Dashboard Description: The dashboard gives information regarding the London Boroughs that are the majorly responsible for high emissions of CO_2 and various sectors within them that contribute heavily in causing such high emission values. It also gives CO_2 emission trend over the years 2005-2014 which can help in analyzing whether any significant improvements have happened at the ground level based on the past actions taken. It also depicts population trends over the years to determine what impact population change made in the CO_2 emission trend. Since the CO_2 emission trend showed decrease and population trend showed minimal change over the years, this implies that overall, CO_2 emission have been controlled with the previously applied rules proving to be successful. This can help in sustaining those rules for similar results in future. Population trend should be constantly checked as it can have an impact on CO_2 emissions as it can affect the contribution of domestic sector. Moreover, controlling the emissions from sectors who are prominent contributors as can be seen from dashboard should be the area of concern for deciding future course of action.

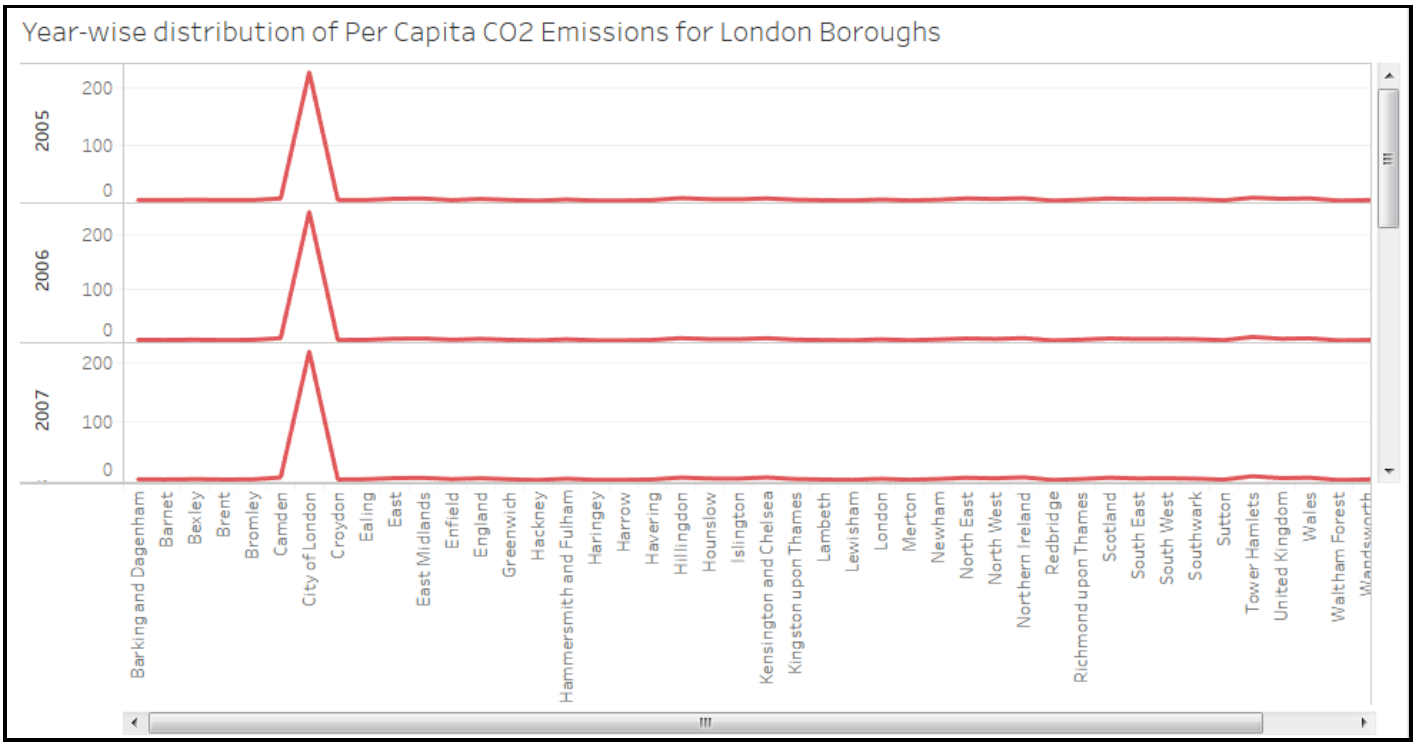
3. **Screenshots of previous iterations from Tableau Public**

- Iteration 1

Before:



After:



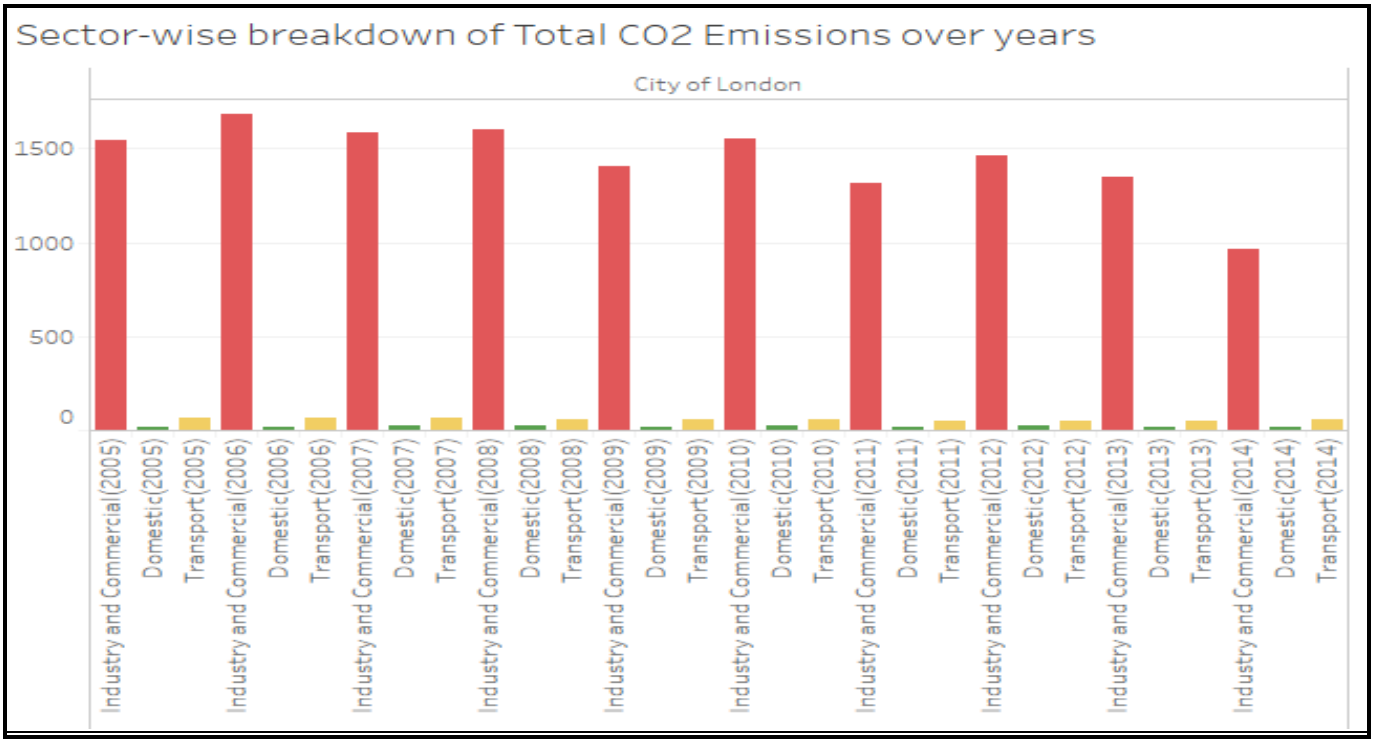
Changes made:

- Title for x-axis i.e. London Boroughs, as can be seen from 'before' graph, has been removed as the title of the graph itself gives information that the CO_2 emission values are for London boroughs, hence removing redundant information.
- Title for y-axis i.e. Per Capital Emissions (n), as can be seen from 'before' graph where n corresponds to different years, has been replaced by n i.e. the year for which distribution of CO_2 emission is being visualized. This has been done as the title of the graph itself gives information that the per capita emissions are being visualized thus increasing data-ink ratio.

- Iteration 2

Before:

After:

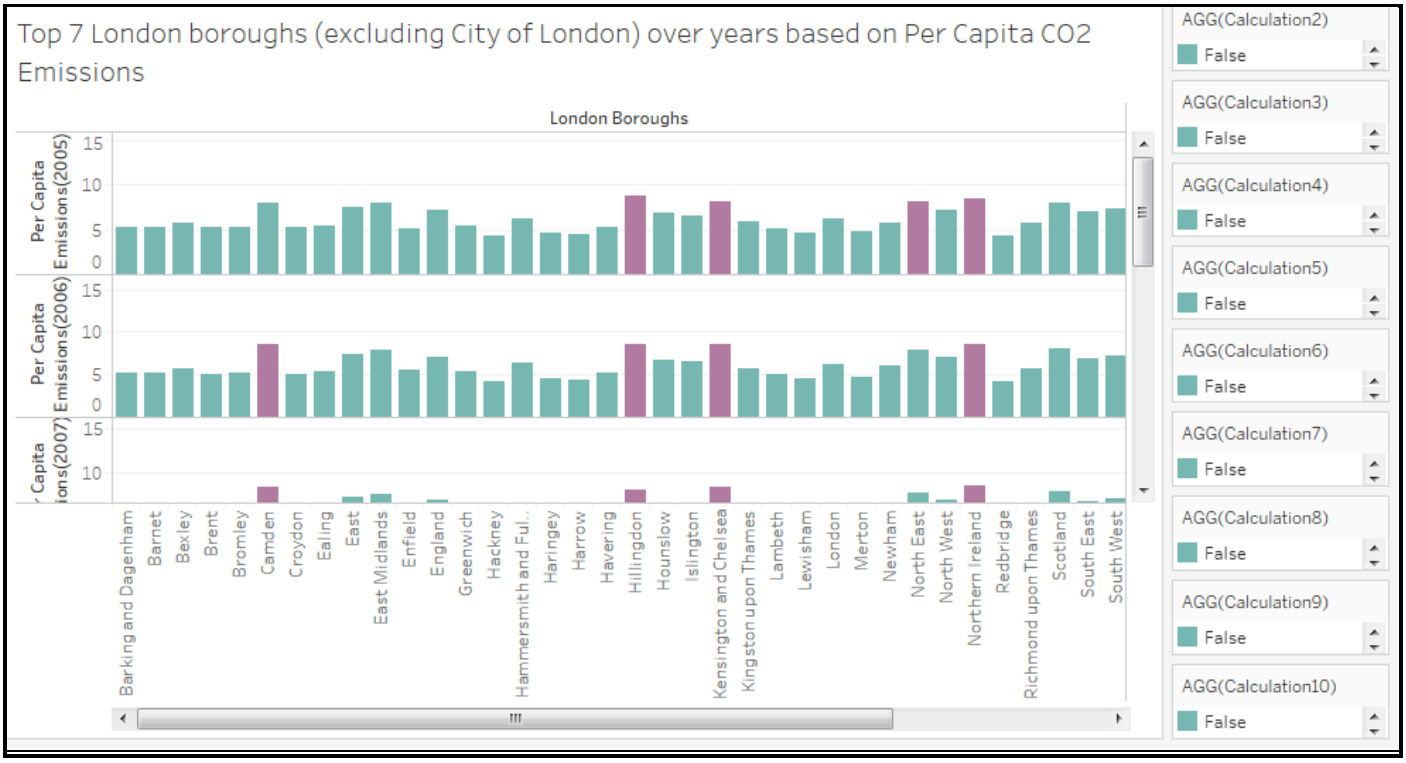


Changes made:

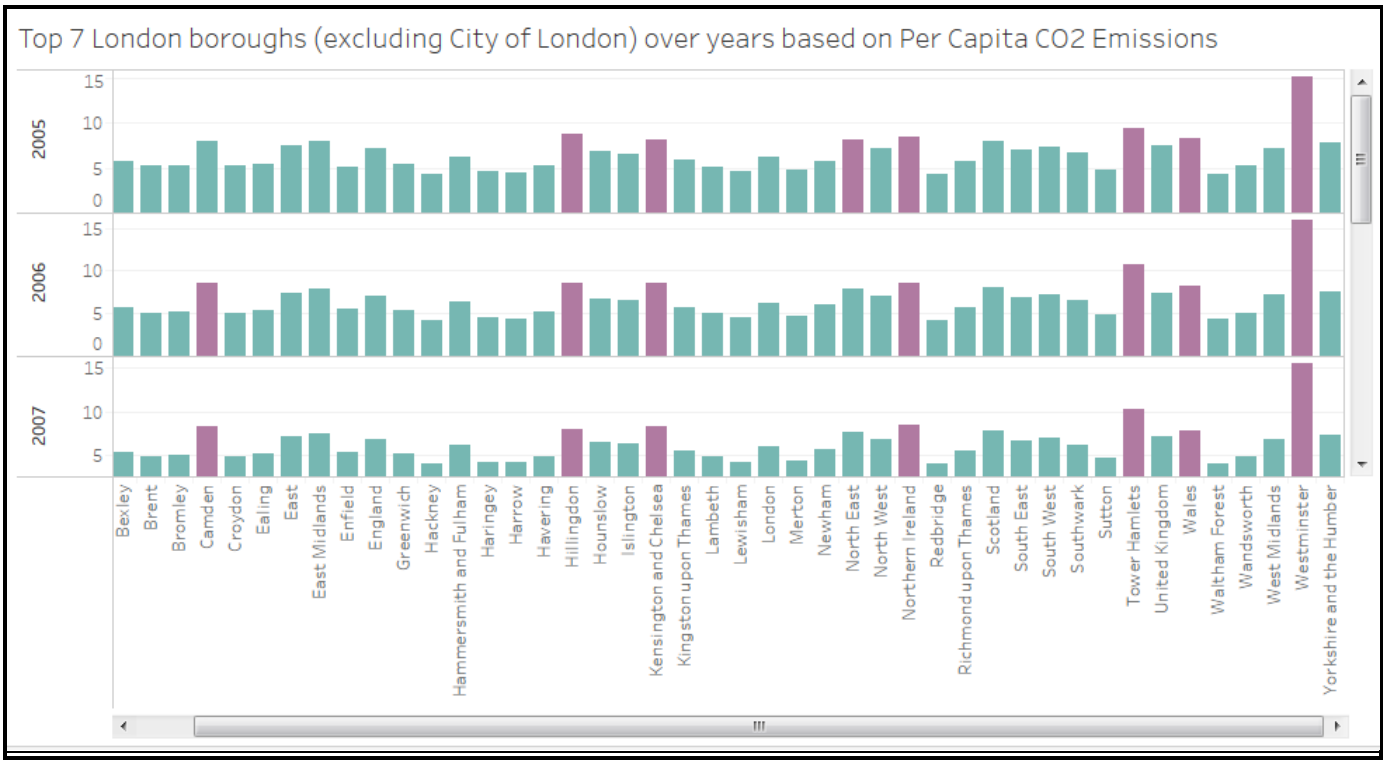
- Legends box has been removed from 'before' graph as different color shadings of bars and x-axis labels clearly describe the sectors being represented, hence redundant information has been removed.
- Title for y-axis i.e. Total CO_2 Emissions, as can be seen from 'before' graph, has been removed as this is evident from the title itself thus increasing data-ink ratio.
- Title for x-axis i.e. London Boroughs, as can be seen from 'before' graph, has been removed as this is redundant information as it is evident from graph that it is for City of London.

➢ Iteration 3:

Before:



After:

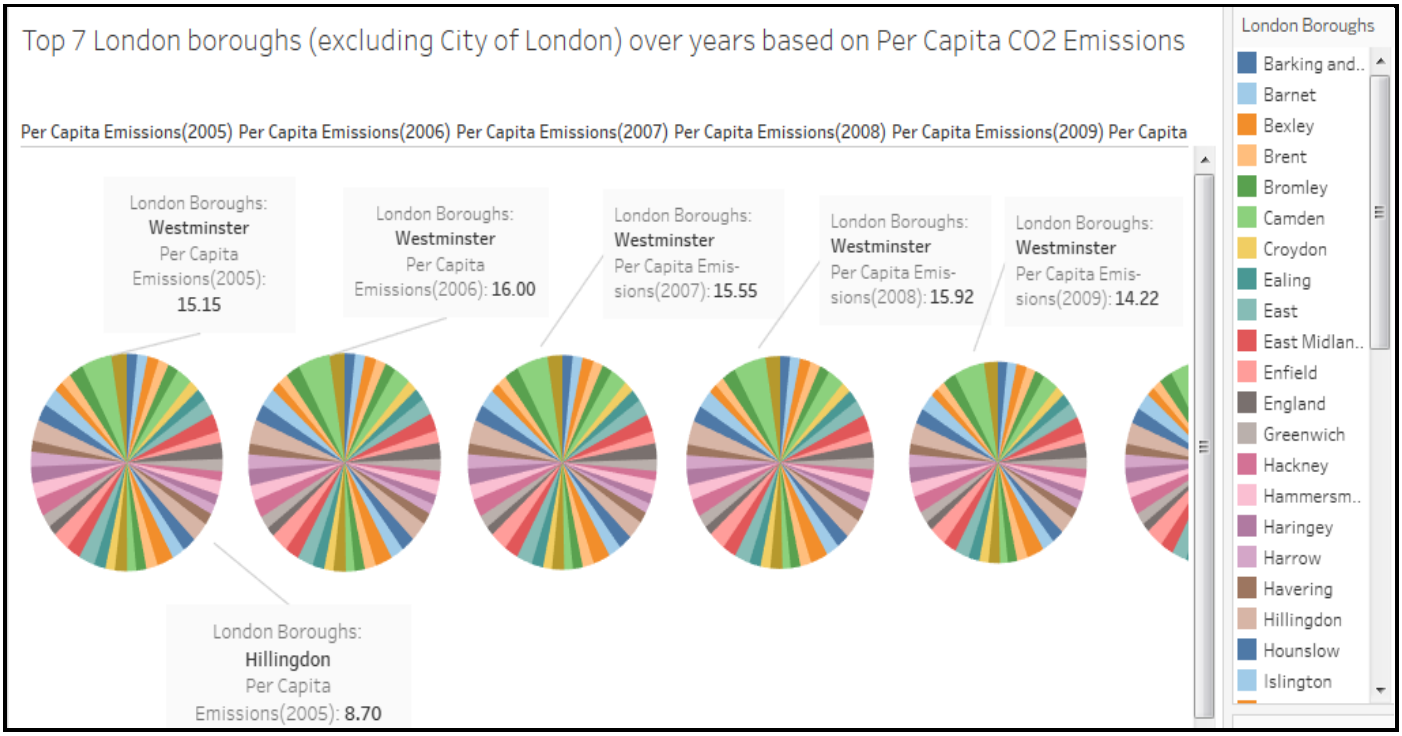


Changes made:

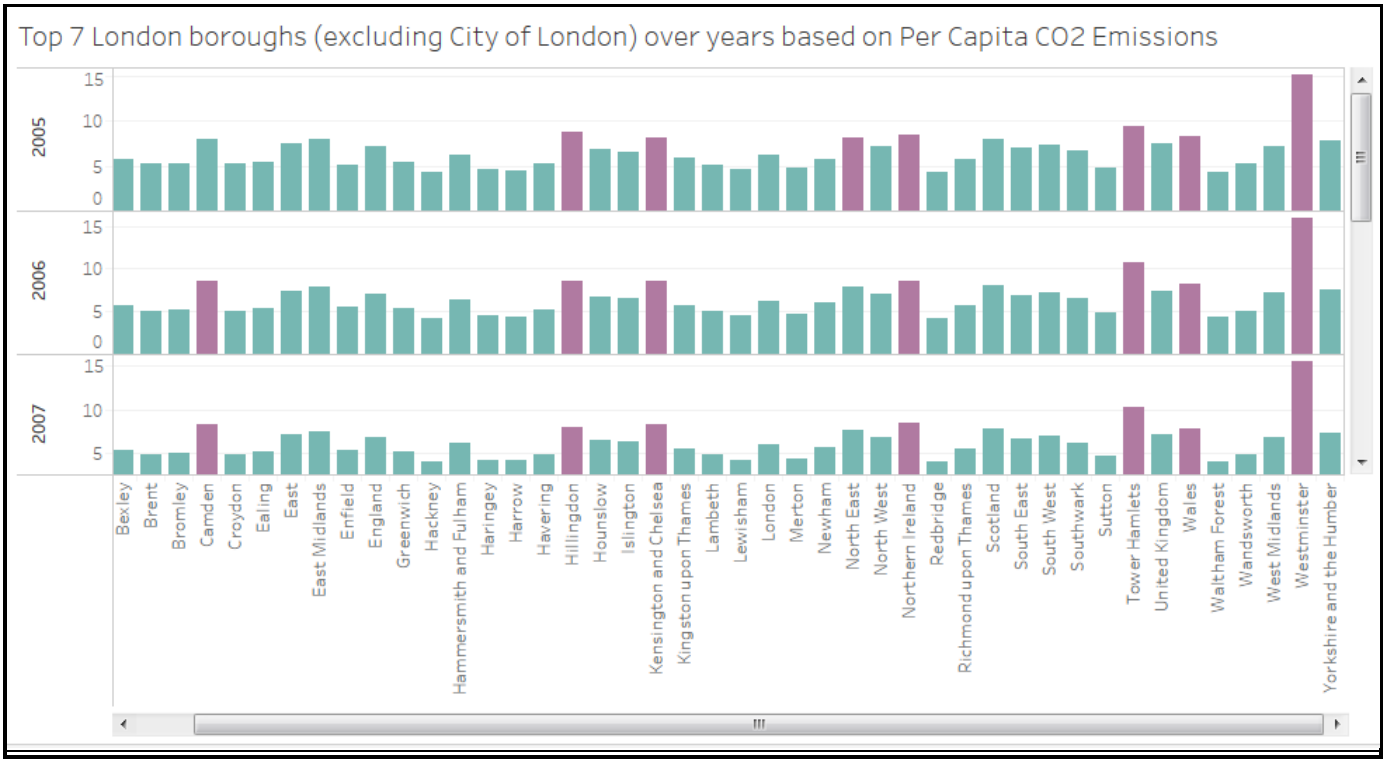
- Legends box has been removed from 'before' graph as there is no useful information being depicted from calculated fields as legends. The colour coding that the top 7 London boroughs based on Per capita emissions are highlighted through purple bars is evident from the graph, thus this increases data-ink ratio.
- Title for y-axis i.e. Per Capita CO2 Emissions, as can be seen from 'before' graph, has been removed as this is evident from the title of the graph itself thus eliminating duplicate information.
- Title for x-axis i.e. London Boroughs, as can be seen from 'before' graph, has been removed as this is evident from the title of the graph itself thus eliminating duplicate information

- Iteration 4:

Before:



After:

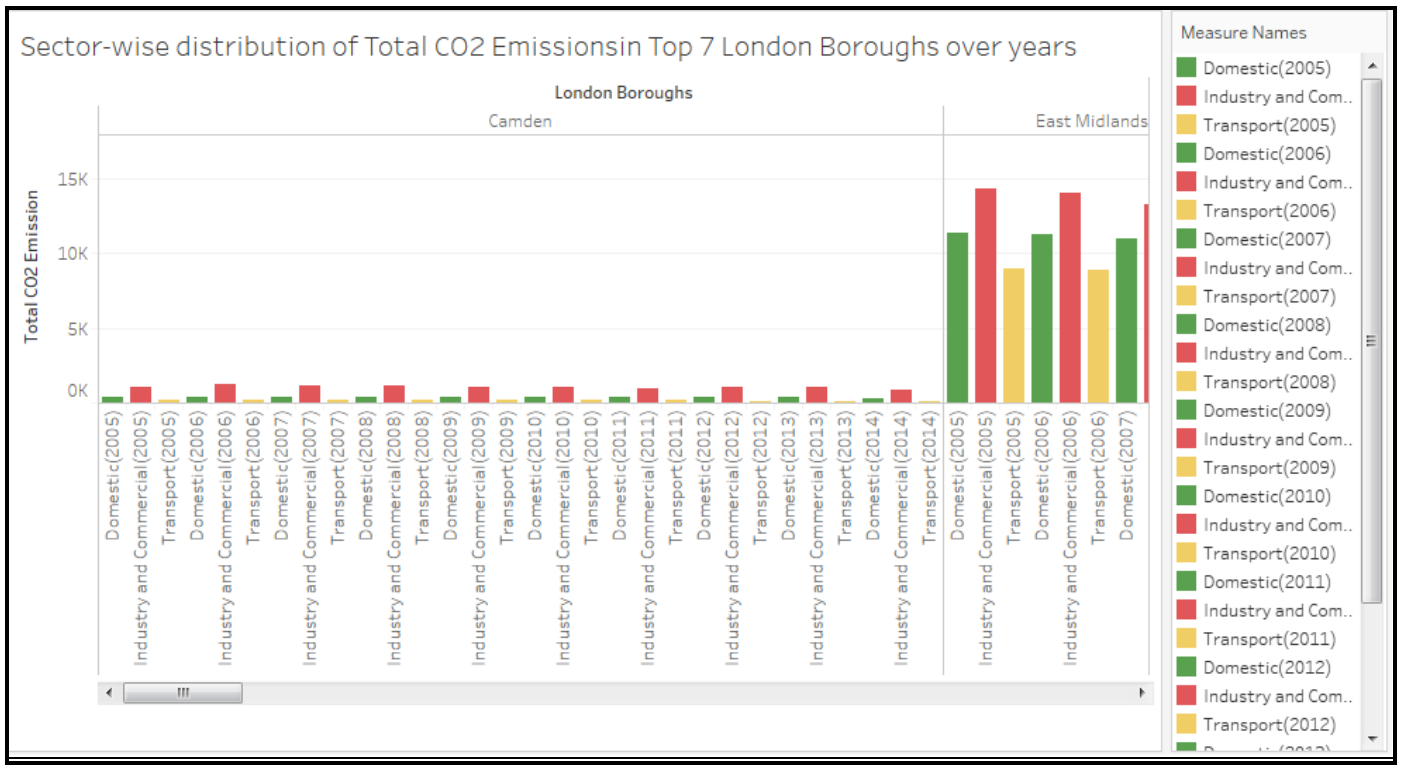


Changes made:

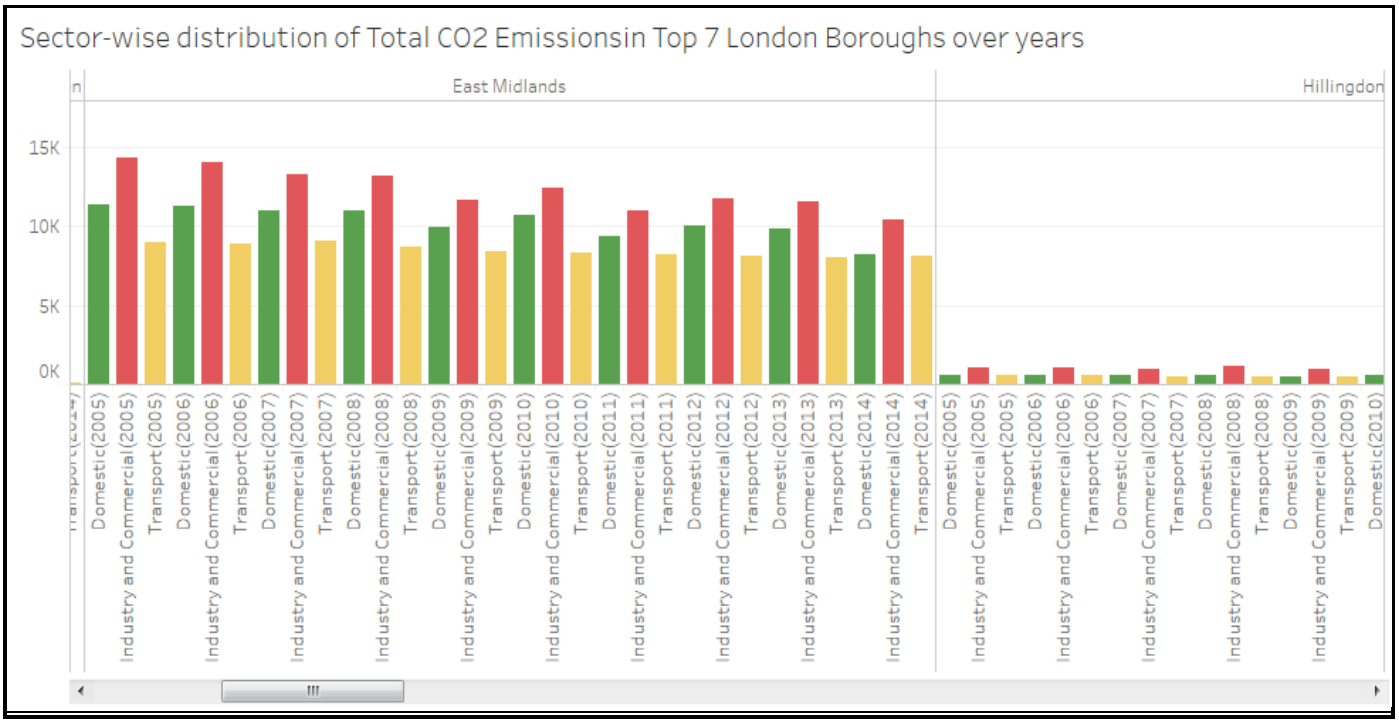
- The pie charts, as can be seen from 'before' graph, have been replaced by bar-charts, as they were not successful in representing the top 7 London boroughs based on Per Capita CO_2 emissions. This is so because in pie-charts, the size of each of the sectors of pie representing various London Boroughs for any year appears almost similar. Also, annotations with pie-charts is very difficult to accommodate as it occupies a lot of space in representing data regarding top 7 boroughs for each of the years which makes interpretation very difficult.
- Also, since 10 pie charts are required to represent top 7 London Boroughs for each of the 10 years, this seems to be too much ink wastage as compared to the bar chart when pie chart without annotations is not sufficient in representing the data. Bar chart information, as seen from 'after' graph thus becomes a good visualization for reading required data thereby increasing data-ink ratio.

➢ Iteration 5

Before:



After:

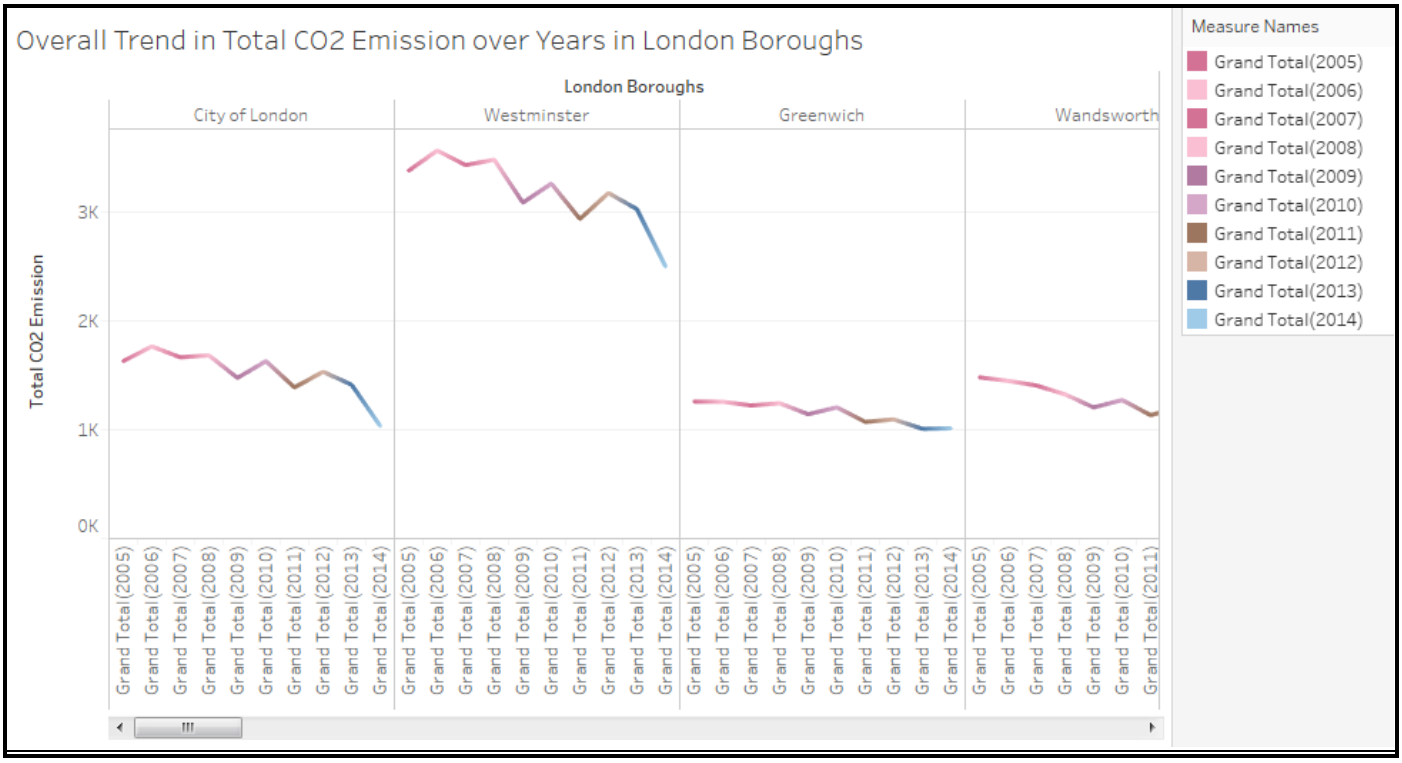


Changes made:

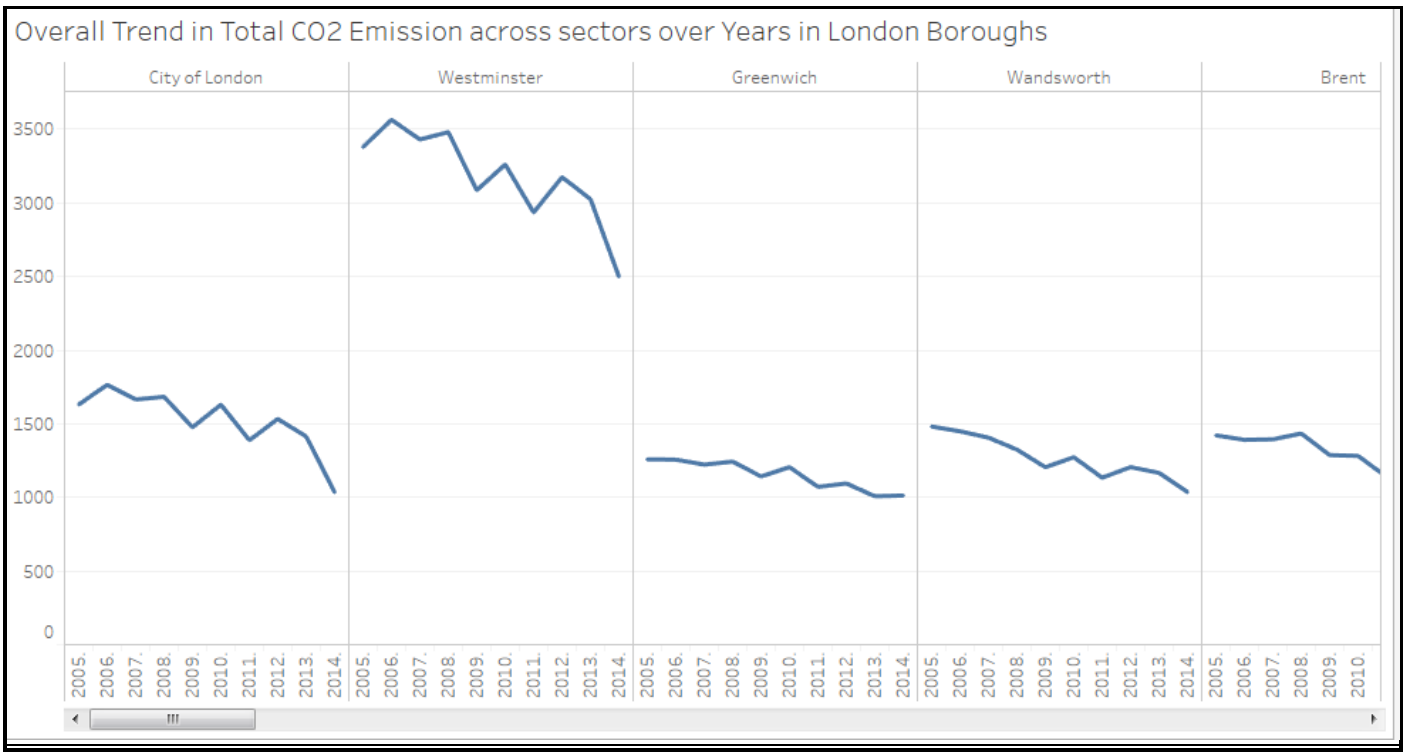
- Legends box has been removed from ‘before’ graph as the colour coding of the bar charts is evident from the x-axis labels thus improving data-ink ratio.
- Title for y-axis i.e. Total CO_2 Emissions, as can be seen from ‘before’ graph, has been removed as this is evident from the title of the graph itself.
- Title for x-axis i.e. London Boroughs, as can be seen from ‘before’ graph, has been removed as this is redundant information which can be seen from graph title.

- Iteration 6

Before:



After:

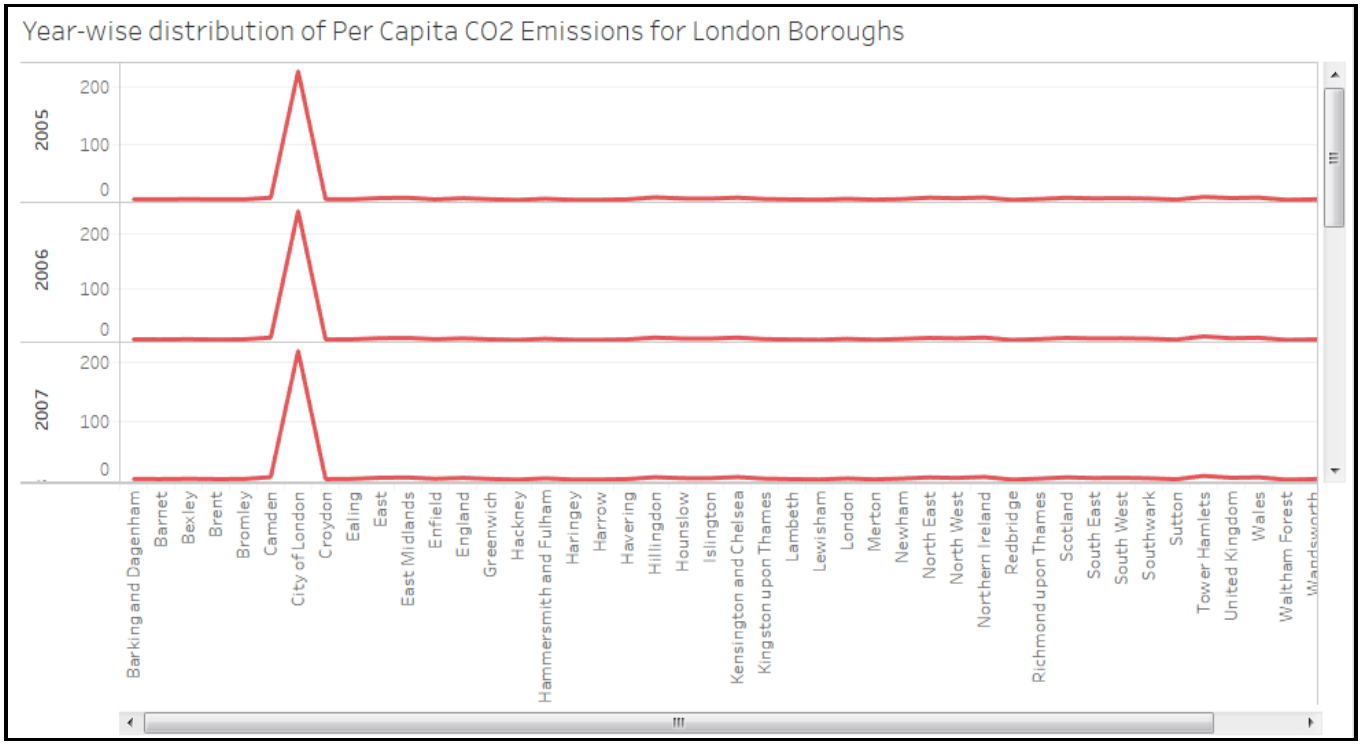


Changes made:

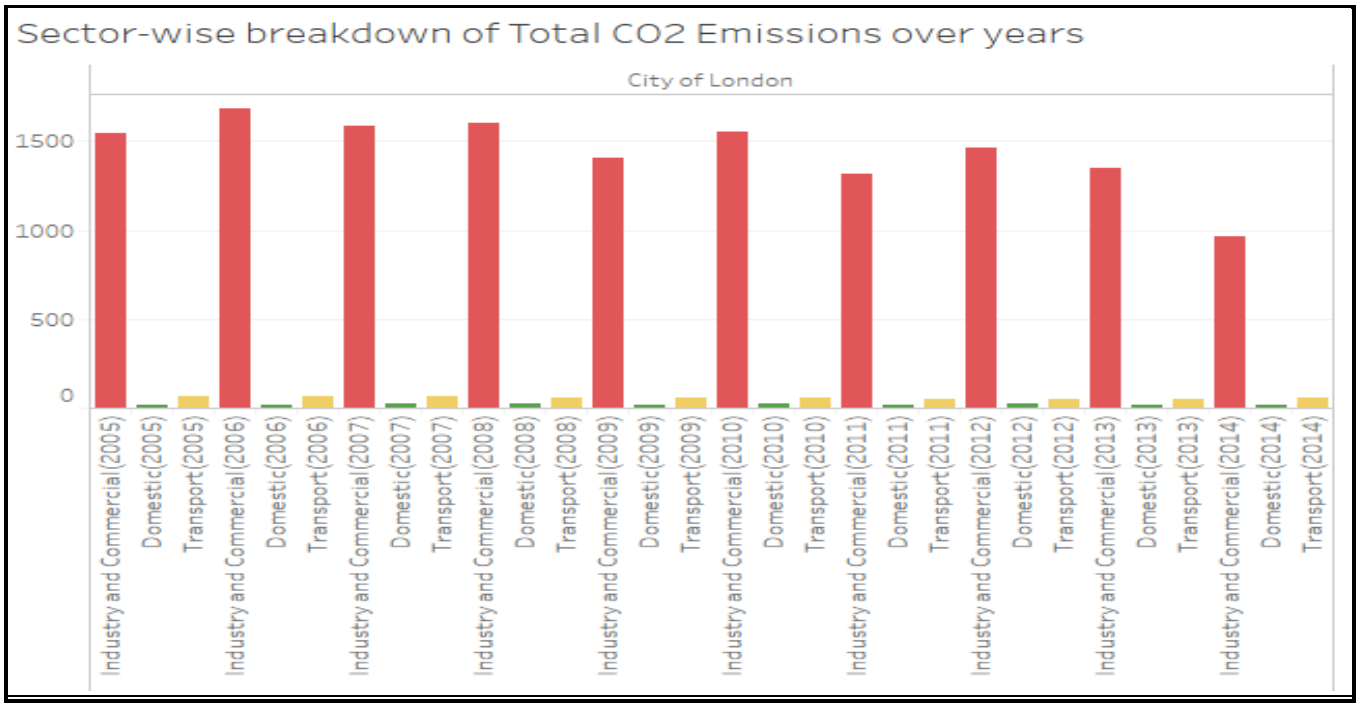
- Different color coding for various years within each London Borough block has been removed as we want to see general trend in Total CO_2 emissions, thus eliminating irrelevant information through label block.
- Title for y-axis i.e. Total CO_2 Emissions, as can be seen from 'before' graph, has been removed as this is evident from the title itself thus increasing data-ink ratio.
- Title for x-axis i.e. London Boroughs, as can be seen from 'before' graph, has been removed as this is redundant information which can be seen from graph title.
- The y-axis subtitles, as can be seen from 'before' graph, have been modified to just represent the years as it is evident from the title of the graph that the information represented is Total CO_2 Emissions across all sectors within each borough, thus eliminating irrelevant information.

4. All graphs used to design Dashboard

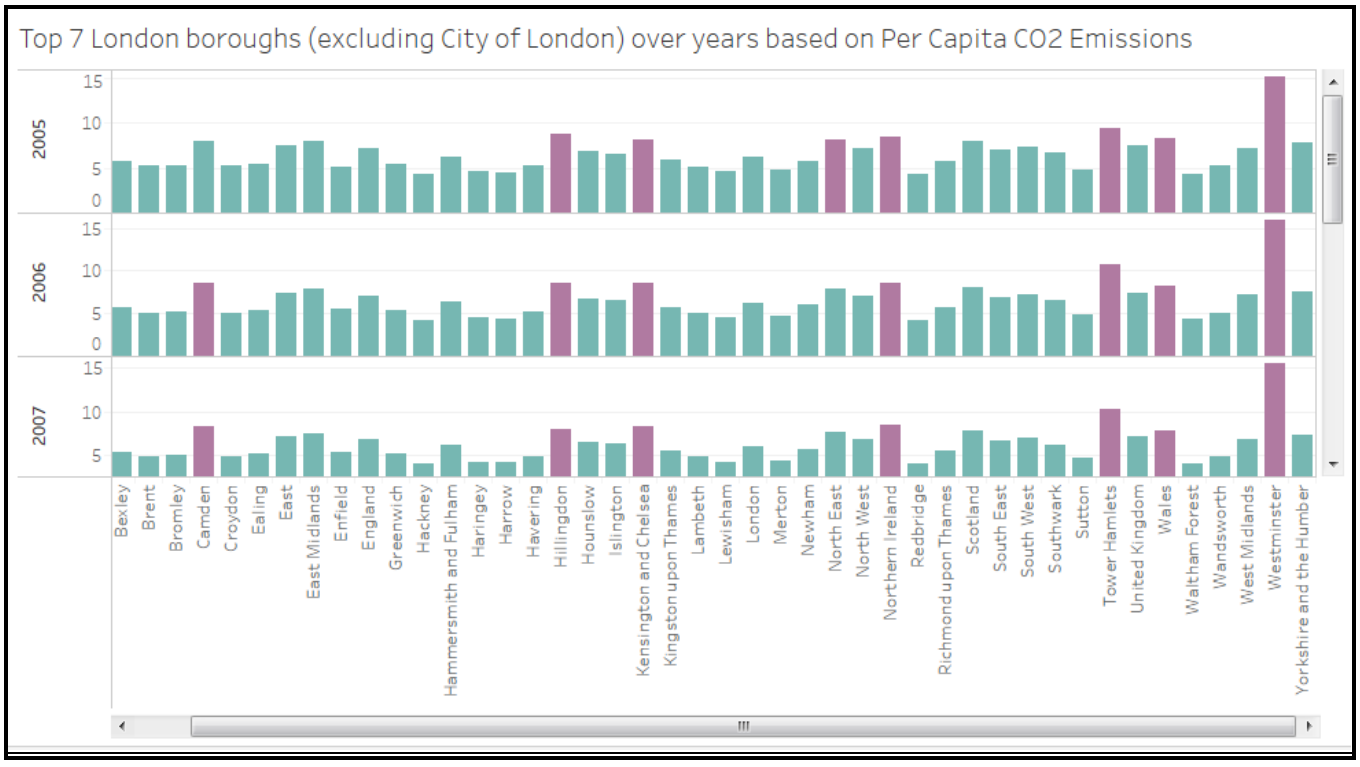
Sheet1:



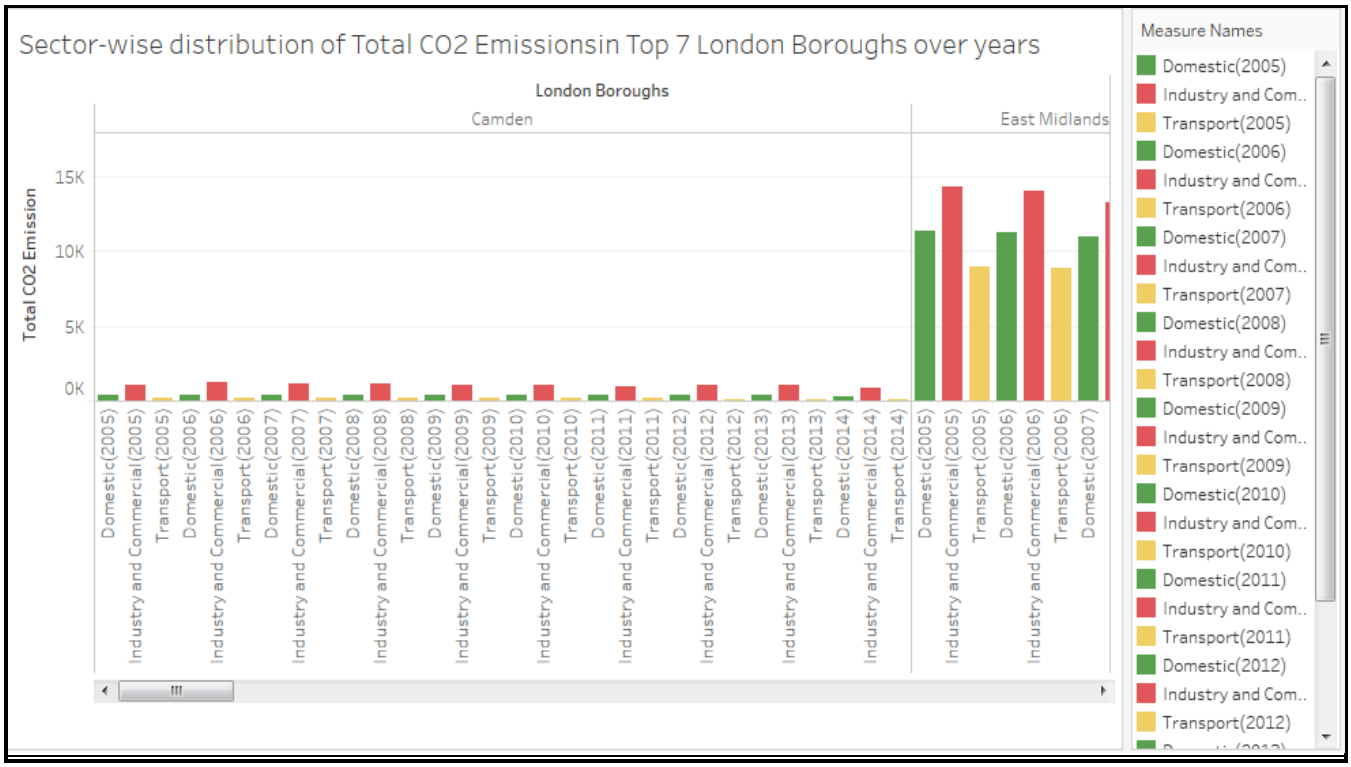
Sheet 2:



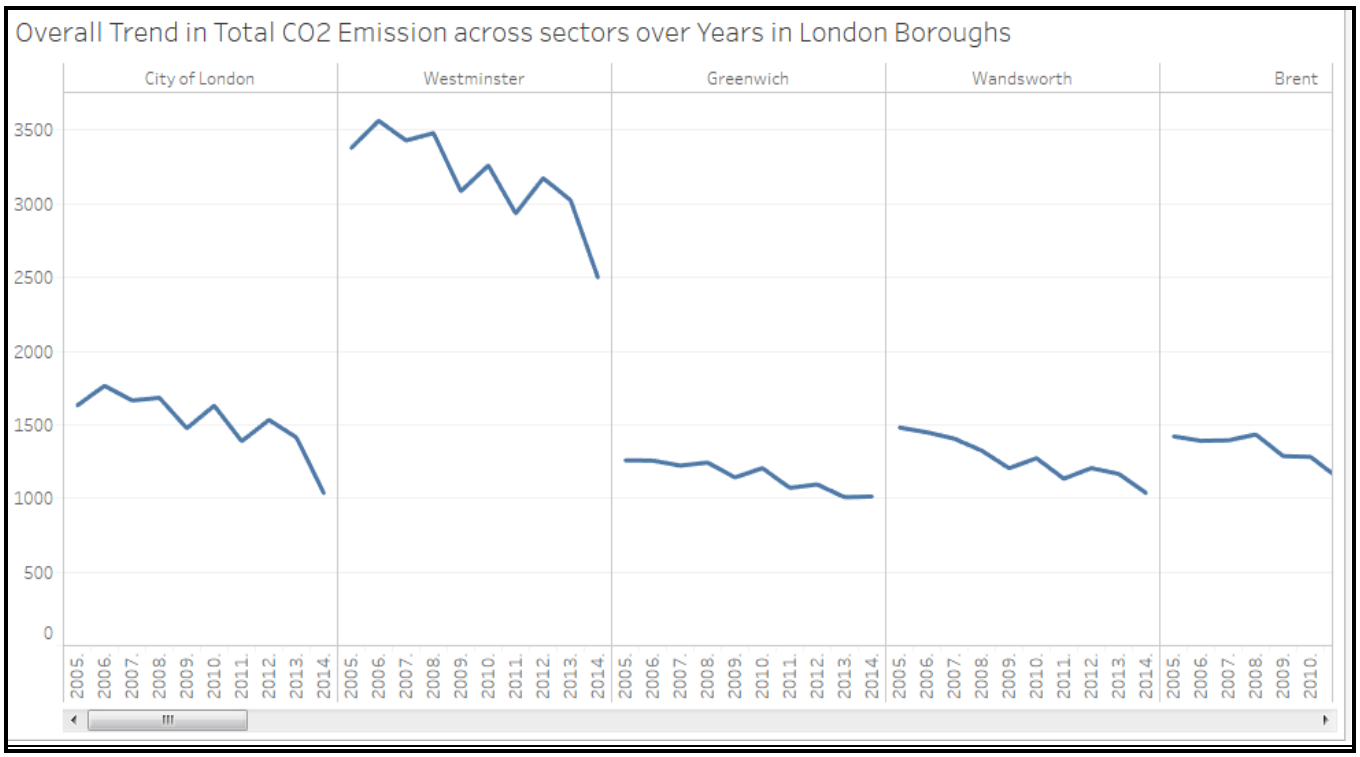
Sheet 3:



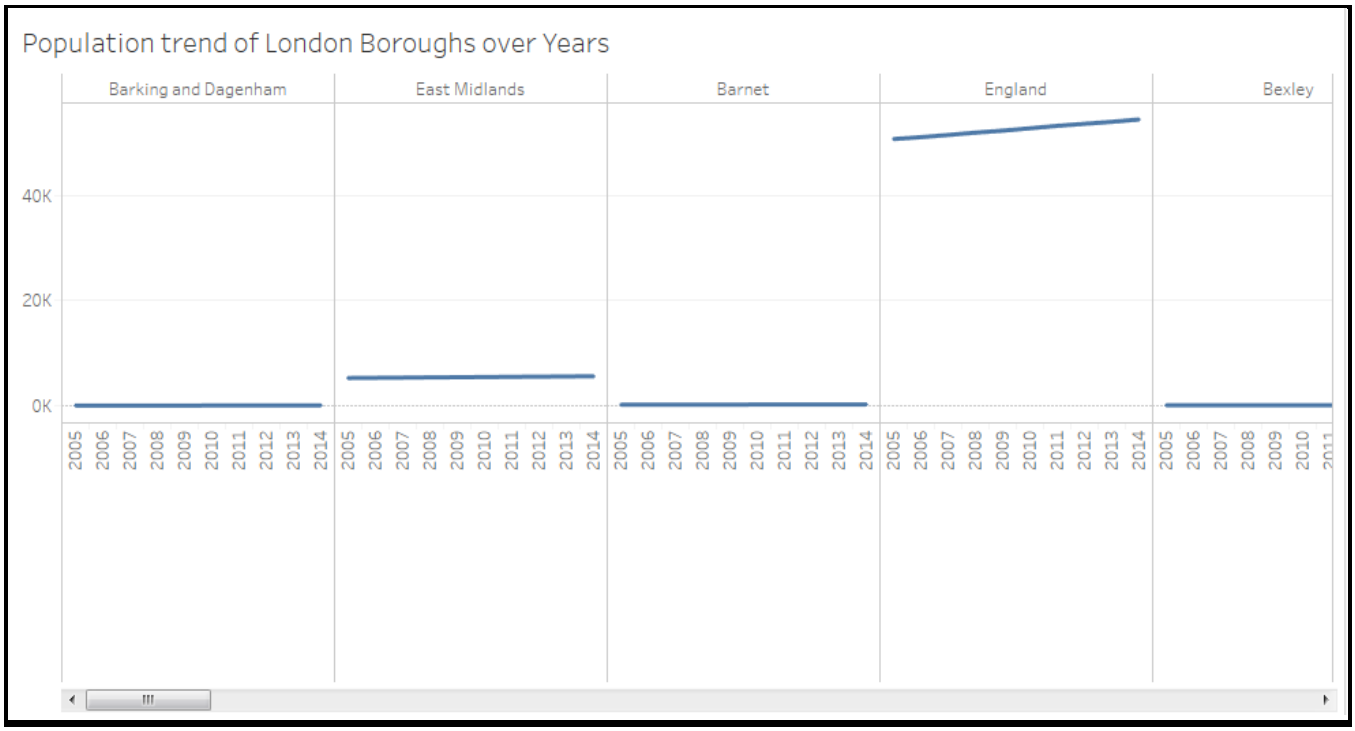
Sheet 4:



Sheet 5:



Sheet 6:


Population trend of London Boroughs over Years
Barking and Dagenham
East Midlands
Barnet
England
Bexley
40K
20K
0K
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014