

Coursework Description Sheet

Name: Vivan Kushal Heneger

Student ID: 250469037

Question	Description	Figure
Fit to Task/User needs		
Location task - How does the visualisation allow users to access the spread of carbon dioxide emission across the UK based on the property type?	This graphical illustration is a vivid description of how the CO2 emissions vary across regions within the UK and also the form of property. The color is used to show the areas with high emissions in color and hence it is easy to see the regional difference such as the Midlands and South East through the use of gradient color. Hover information and property type filters are interactive tools that a user can use to navigate through the role of different housing types in emissions. Overall, it is a good combination of regional data and housing data to help to see the clear picture of the environmental and housing trends.	<p>CO₂ Emissions Distribution by Region and Property Type</p> <p>Map data © OpenStreetMap contributors, Microsoft, Facebook, Esri, and others. Powered by Esri.</p>

<p>Time task - How does the visualization allow user to understand the evolution of energy efficiency based on the property type, and location?</p>	<p>The line chart illustrates the dynamics of the average scores regarding the energy efficiency by the types of properties during the time. They are color-coded and trends of all types can be easily juxtaposed- the detached houses are prone to succeed. The filters enable the user to search last year, region and type of property and find any changes. The interactive design will help in finding out the long term trends and help understand better the housing energy performance. Through the dashboard, the users can navigate in the relationship of property type, tenure, region, energy efficiency and CO2 emission..</p>	<h2>Energy Efficiency Trends Over Time by Property Type</h2> <p>Property Type ● Detached ● Flats and maisonettes ● Semi-detached ● Terraced</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Detached</th> <th>Flats and maisonettes</th> <th>Semi-detached</th> <th>Terraced</th> </tr> </thead> <tbody> <tr> <td>Q2 201...</td> <td>~750</td> <td>~750</td> <td>~750</td> <td>~750</td> </tr> <tr> <td>Q2 201...</td> <td>~740</td> <td>~740</td> <td>~740</td> <td>~740</td> </tr> <tr> <td>Q2 201...</td> <td>~730</td> <td>~730</td> <td>~730</td> <td>~730</td> </tr> <tr> <td>Q2 201...</td> <td>~720</td> <td>~720</td> <td>~720</td> <td>~720</td> </tr> <tr> <td>Q2 201...</td> <td>~710</td> <td>~710</td> <td>~710</td> <td>~710</td> </tr> <tr> <td>Q2 201...</td> <td>~700</td> <td>~700</td> <td>~700</td> <td>~700</td> </tr> <tr> <td>Q2 200...</td> <td>~690</td> <td>~690</td> <td>~690</td> <td>~690</td> </tr> </tbody> </table>	Year	Detached	Flats and maisonettes	Semi-detached	Terraced	Q2 201...	~750	~750	~750	~750	Q2 201...	~740	~740	~740	~740	Q2 201...	~730	~730	~730	~730	Q2 201...	~720	~720	~720	~720	Q2 201...	~710	~710	~710	~710	Q2 201...	~700	~700	~700	~700	Q2 200...	~690	~690	~690	~690
Year	Detached	Flats and maisonettes	Semi-detached	Terraced																																						
Q2 201...	~750	~750	~750	~750																																						
Q2 201...	~740	~740	~740	~740																																						
Q2 201...	~730	~730	~730	~730																																						
Q2 201...	~720	~720	~720	~720																																						
Q2 201...	~710	~710	~710	~710																																						
Q2 201...	~700	~700	~700	~700																																						
Q2 200...	~690	~690	~690	~690																																						
<p>Multi-dimentional data task - How does the visualization allow user to identify correlation amongst at least three of the following parameters: property type, tenure, location, energy efficiency, and carbon dioxide emission?</p>	<p>The treemap illustrates variations in regional and dwelling types of emission and pie chart illustrates variation in energy efficiency in model of ownership. When taken together, these images reveal trends, e.g. in certain regions certain types of property are less efficient and result in more emissions, which will give a balanced image of housing sustainability in the UK.</p>	<h2>Median CO₂ Emissions by Region and Property Type</h2> <p>Property Type ● Detached ● Flats and maisonettes ● Semi-detached ● Terraced</p> <table border="1"> <thead> <tr> <th>Region</th> <th>Property Type</th> <th>Median CO₂ Emissions</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Region A</td> <td>Detached</td> <td>63, 66, 64, 62, 67</td> </tr> <tr> <td>Semi-detached</td> <td>63, 62</td> </tr> <tr> <td>Terraced</td> <td>66, 63</td> </tr> <tr> <td>Flats and maisonettes</td> <td>73, 71, 74, 72</td> </tr> <tr> <td rowspan="4">Region B</td> <td>Detached</td> <td>67, 64, 65, 66</td> </tr> <tr> <td>Semi-detached</td> <td>64, 62</td> </tr> <tr> <td>Terraced</td> <td>64, 61, 65, 60</td> </tr> <tr> <td>Flats and maisonettes</td> <td>74, 71, 72</td> </tr> </tbody> </table>	Region	Property Type	Median CO ₂ Emissions	Region A	Detached	63, 66, 64, 62, 67	Semi-detached	63, 62	Terraced	66, 63	Flats and maisonettes	73, 71, 74, 72	Region B	Detached	67, 64, 65, 66	Semi-detached	64, 62	Terraced	64, 61, 65, 60	Flats and maisonettes	74, 71, 72																			
Region	Property Type	Median CO ₂ Emissions																																								
Region A	Detached	63, 66, 64, 62, 67																																								
	Semi-detached	63, 62																																								
	Terraced	66, 63																																								
	Flats and maisonettes	73, 71, 74, 72																																								
Region B	Detached	67, 64, 65, 66																																								
	Semi-detached	64, 62																																								
	Terraced	64, 61, 65, 60																																								
	Flats and maisonettes	74, 71, 72																																								

Visualisation Principles		Dashboard Analysis			
Use of colour - How does the use of colour in this dashboard enhance the readability and effectiveness of the data presentation?	Dashboard color has been used effectively in clear and consistent way to ensure the images are easy to understand. The colors of the kinds of properties are dislodged blue (#0070C0), flats and maisonettes olive green (#6B8E23), semi-determined teal (#006666), and terraced brown (#8B4513). The gradient of the CO2 emission map (that is between light orange (#F4A261) and dark brown (#5A2A0C)) is used to show increased or reduced emissions in a region. These colors are simple, transparent and they are equally applied throughout the visuals to ensure that the ones intended to use them can easily identify patterns and quick comparisons of information without losing their way.	<p>The dashboard consists of six main components:</p> <ul style="list-style-type: none"> CO2 Emissions Distribution by Region and Property Type: A choropleth map of the United Kingdom where regions are colored based on CO2 emissions. Darker shades represent higher emissions, ranging from light orange to dark brown. Energy Efficiency Trends Over Time by Property Type: A line chart showing the average energy efficiency score over time (Q2 2011 to Q2 2000) for four property types: Detached (blue), Flats and maisonettes (orange), Semi-detached (red), and Terraced (purple). Number of Dwellings by UK Region: A grouped bar chart showing the total number of dwellings across nine UK regions for each property type. Median CO2 Emissions by Region and Property Type: A heatmap showing median CO2 emissions values for each region and property type combination. Values range from 60 to 73. Energy Efficiency Distribution by Housing Tenure: A pie chart showing the distribution of energy efficiency scores across four housing tenures: Flats and maisonettes (orange), Terraced (purple), Detached (blue), and Semi-detached (red). Year and Region name dropdowns: Filter controls for the line chart and heatmap. Average Energy Efficiency Score and Total Number of Dwellings Analyzed: Summary statistics displayed at the bottom right. 			
Use of graphic design principles -How does the application of graphic design principles enhance the clarity and effectiveness of the data presentation in this dashboard?	The dashboard uses major concepts of design such as alignment, balance, contrast and consistency to make it clear and easily readable. Its grid structure provides a balanced and clean appearance of the visuals, and the presence of contrasting colors, font consistency, and spacing makes it appear professional and held together. These design features render the information interesting and user friendly.	<p>This second instance of the dashboard has identical components and layout to the first, but with different data values. For example, in the Median CO2 Emissions by Region and Property Type chart, values range from 60 to 73, while in the first version they ranged from 62 to 72.</p>			

<p>Use of interaction - How does the use of interactive design elements improve the user's ability to explore and interpret data on this dashboard?</p>	<p>Interactive filters enable the users to browse the information with ease. Slicers such as Year, Region and Property Type enable immediate focus on a specific area or time with all visuals being updated in real-time. Summary cards of Median Energy Efficiency Score and Total Dwellings also automatically update providing instant feedback. This interaction makes the dashboard less static and easy to use and informative.</p>	<p>Year All</p> <p>Region name All</p> <p>Average Energy Efficiency Score 66.16</p> <p>Total Number of Dwellings Analyzed 3.21</p> <p>Property Type</p> <ul style="list-style-type: none"> <input type="checkbox"/> Detached <input type="checkbox"/> Flats and maisonett... <input type="checkbox"/> Semi-detached <input type="checkbox"/> Terraced 																																																																																																																																																
<p>Use of text and legend - How do the use of text and legends contribute to the clarity and user comprehension of the data presented in this dashboard?</p>	<p>Dashboard is easy to read due to clear titles, labels, and legends. The name of every chart is plain and clear like the CO2 Emissions Distribution by Region and Property Type or Energy Efficiency Trends Over Time and makes the user able to know what it is without incurring any costs yet using it. Colors of the legends are similar with blue color being used to show Detached and olive green is used to show Flats and teal is used to show Semi-detached and brown is used to show Terraced, one can easily compare the data provided in various visuals. This consistency of the text and colour allows the dashboard to be readable and helps a user to render the essential insights fast..</p>	<p>CO2 Emissions Distribution by Region and Property Type</p> <p>Energy Efficiency Trends in UK Residential Properties</p> <p>Energy Efficiency Trends Over Time by Property Type</p> <p>Property Type: Detached (Blue), Flats and maisonettes (Olive Green), Semi-detached (Teal), Terraced (Brown)</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Q2 201...</th> </tr> </thead> <tbody> <tr> <td>Sum of Efficiency</td> <td>800</td> <td>780</td> <td>760</td> <td>740</td> <td>720</td> <td>700</td> <td>680</td> <td>660</td> <td>640</td> <td>620</td> <td>600</td> </tr> </tbody> </table> <p>Number of Dwellings by UK Region</p> <p>Property Type: Detached (Blue), Flats and ... (Olive Green), Semi-detached (Teal), Terraced (Brown)</p> <table border="1"> <thead> <tr> <th>Region</th> <th>Detached</th> <th>Flats and ...</th> <th>Semi-detached</th> <th>Terraced</th> </tr> </thead> <tbody> <tr> <td>South East</td> <td>180</td> <td>150</td> <td>120</td> <td>100</td> </tr> <tr> <td>East of England</td> <td>140</td> <td>130</td> <td>110</td> <td>90</td> </tr> <tr> <td>North West</td> <td>130</td> <td>120</td> <td>100</td> <td>80</td> </tr> <tr> <td>East Midlands</td> <td>120</td> <td>110</td> <td>90</td> <td>70</td> </tr> <tr> <td>West Midlands</td> <td>110</td> <td>100</td> <td>80</td> <td>60</td> </tr> <tr> <td>South West</td> <td>100</td> <td>90</td> <td>70</td> <td>50</td> </tr> <tr> <td>London</td> <td>90</td> <td>80</td> <td>60</td> <td>40</td> </tr> <tr> <td>Wales</td> <td>80</td> <td>70</td> <td>50</td> <td>30</td> </tr> <tr> <td>Yorkshire and The H...</td> <td>70</td> <td>60</td> <td>40</td> <td>20</td> </tr> <tr> <td>North East</td> <td>60</td> <td>50</td> <td>30</td> <td>10</td> </tr> </tbody> </table> <p>Median CO2 Emissions by Region and Property Type</p> <p>Property Type: Detached (Dark Blue), Flats and maisonettes (Olive Green), Semi-detached (Teal), Terraced (Brown)</p> <table border="1"> <thead> <tr> <th>Region</th> <th>Detached</th> <th>Flats and maisonettes</th> <th>Semi-detached</th> <th>Terraced</th> </tr> </thead> <tbody> <tr> <td>South East</td> <td>63</td> <td>73</td> <td>62</td> <td>72</td> </tr> <tr> <td>East of England</td> <td>66</td> <td>71</td> <td>67</td> <td>74</td> </tr> <tr> <td>North West</td> <td>64</td> <td>74</td> <td>65</td> <td>66</td> </tr> <tr> <td>East Midlands</td> <td>62</td> <td>72</td> <td>64</td> <td>65</td> </tr> <tr> <td>West Midlands</td> <td>67</td> <td>70</td> <td>66</td> <td>68</td> </tr> <tr> <td>South West</td> <td>69</td> <td>67</td> <td>64</td> <td>65</td> </tr> <tr> <td>London</td> <td>63</td> <td>66</td> <td>62</td> <td>64</td> </tr> <tr> <td>Wales</td> <td>62</td> <td>64</td> <td>61</td> <td>63</td> </tr> <tr> <td>Yorkshire and The H...</td> <td>66</td> <td>65</td> <td>64</td> <td>67</td> </tr> <tr> <td>North East</td> <td>63</td> <td>61</td> <td>60</td> <td>63</td> </tr> </tbody> </table> <p>Energy Efficiency Distribution by Housing Tenure</p> <p>Property Type: Flats and m... (Blue), Terraced (Purple), Detached (Orange), Semi-detached (Green)</p> <table border="1"> <thead> <tr> <th>Property Type</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Flats and m...</td> <td>24.22%</td> </tr> <tr> <td>Terraced</td> <td>24.37%</td> </tr> <tr> <td>Detached</td> <td>27.32%</td> </tr> <tr> <td>Semi-detac...</td> <td>24.09%</td> </tr> </tbody> </table>	Year	Q2 201...	Sum of Efficiency	800	780	760	740	720	700	680	660	640	620	600	Region	Detached	Flats and ...	Semi-detached	Terraced	South East	180	150	120	100	East of England	140	130	110	90	North West	130	120	100	80	East Midlands	120	110	90	70	West Midlands	110	100	80	60	South West	100	90	70	50	London	90	80	60	40	Wales	80	70	50	30	Yorkshire and The H...	70	60	40	20	North East	60	50	30	10	Region	Detached	Flats and maisonettes	Semi-detached	Terraced	South East	63	73	62	72	East of England	66	71	67	74	North West	64	74	65	66	East Midlands	62	72	64	65	West Midlands	67	70	66	68	South West	69	67	64	65	London	63	66	62	64	Wales	62	64	61	63	Yorkshire and The H...	66	65	64	67	North East	63	61	60	63	Property Type	Percentage	Flats and m...	24.22%	Terraced	24.37%	Detached	27.32%	Semi-detac...	24.09%										
Year	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...	Q2 201...																																																																																																																																							
Sum of Efficiency	800	780	760	740	720	700	680	660	640	620	600																																																																																																																																							
Region	Detached	Flats and ...	Semi-detached	Terraced																																																																																																																																														
South East	180	150	120	100																																																																																																																																														
East of England	140	130	110	90																																																																																																																																														
North West	130	120	100	80																																																																																																																																														
East Midlands	120	110	90	70																																																																																																																																														
West Midlands	110	100	80	60																																																																																																																																														
South West	100	90	70	50																																																																																																																																														
London	90	80	60	40																																																																																																																																														
Wales	80	70	50	30																																																																																																																																														
Yorkshire and The H...	70	60	40	20																																																																																																																																														
North East	60	50	30	10																																																																																																																																														
Region	Detached	Flats and maisonettes	Semi-detached	Terraced																																																																																																																																														
South East	63	73	62	72																																																																																																																																														
East of England	66	71	67	74																																																																																																																																														
North West	64	74	65	66																																																																																																																																														
East Midlands	62	72	64	65																																																																																																																																														
West Midlands	67	70	66	68																																																																																																																																														
South West	69	67	64	65																																																																																																																																														
London	63	66	62	64																																																																																																																																														
Wales	62	64	61	63																																																																																																																																														
Yorkshire and The H...	66	65	64	67																																																																																																																																														
North East	63	61	60	63																																																																																																																																														
Property Type	Percentage																																																																																																																																																	
Flats and m...	24.22%																																																																																																																																																	
Terraced	24.37%																																																																																																																																																	
Detached	27.32%																																																																																																																																																	
Semi-detac...	24.09%																																																																																																																																																	

References

- Net Zero. (2023). *Department of energy security. England and Wales Buildings Data Energy Performance*. UK Government. Accessed on 7th February, 2015.
- ONS. (2023). *Emission of Carbon Dioxide in the Region, UK*. Accessed on 14th August, 2017.
- Microsoft Power BI. (2025). *Power BI Desktop User Guide*. Retrieved at learn.microsoft.com/power-bi.
- Few, S. (2012). *Show Me the Numbers: How to make Tables and Graphs to be enlightening* (2 nd edition). Analytics Press.
- Kirk, A. (2019). *Data Visualisation: A Handbook in Data Driven Design* (2nd ed.). Sage Publications.
- Ware, C. (2019). *Information Visualization: Perception to Design* (4 th edition). Morgan Kaufmann.
- Tufte, E. R. (2001). *Visual Display of Quantitative Information* (2 nd ed.). Graphics Press.
- Evergreen, S. D. H. (2017). *Finding out How to create good Data Visualizations: The Right Chart on the Right Data*. Sage Publications.
- * Few, S. (2009). *Now You See it Simple Techniques of quantitative analysis*. Analytics Press.
- Munzner, T. (2014). *Visualization Analysis and Design*. CRC Press..