

# Scatterplot Factsheet

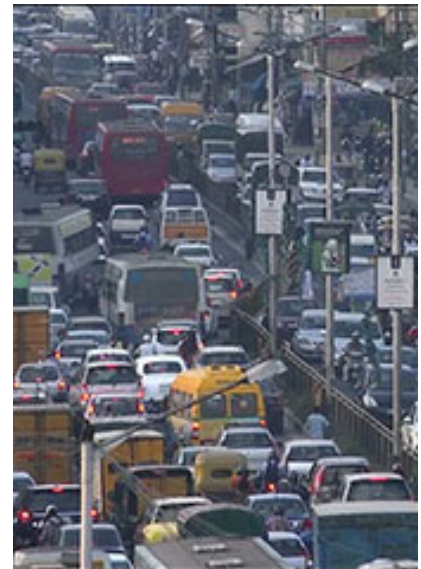
Scatter plots are charts or graphs where the values of two variables are plotted along a horizontal (x) and vertical (y) axis. Dots are used to represent individual pieces of data - the (x,y) coordinates (data points).

The patterns of the data points are used to identify trends or correlations (relationships) in the data sets.

Scatterplots are useful for displaying the relationship between two quantitative variables.

This factsheet provides a worked example of how to construct a scatterplot to determine the correlation between Australia's population (from 2000 to 2010) and the energy used by road transport over the same period of time. This is the data table:

Year	Australia's population	Energy use by road transport* (PJ)
2000	19,141,036	926.25
2001	19,386,461	917.96
2002	19,605,441	943.93
2003	19,827,155	981.25
2004	20,046,003	1017.62
2005	20,311,543	1022.93
2006	20,627,547	1040.73
2007	21,016,121	1055.49
2008	21,475,625	1068.40
2009	21,865,623	1077.41
2010	22,172,469	1095.83



Australian population numbers 2000-2010 from

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3105.0.65.0012014?OpenDocument#Data>

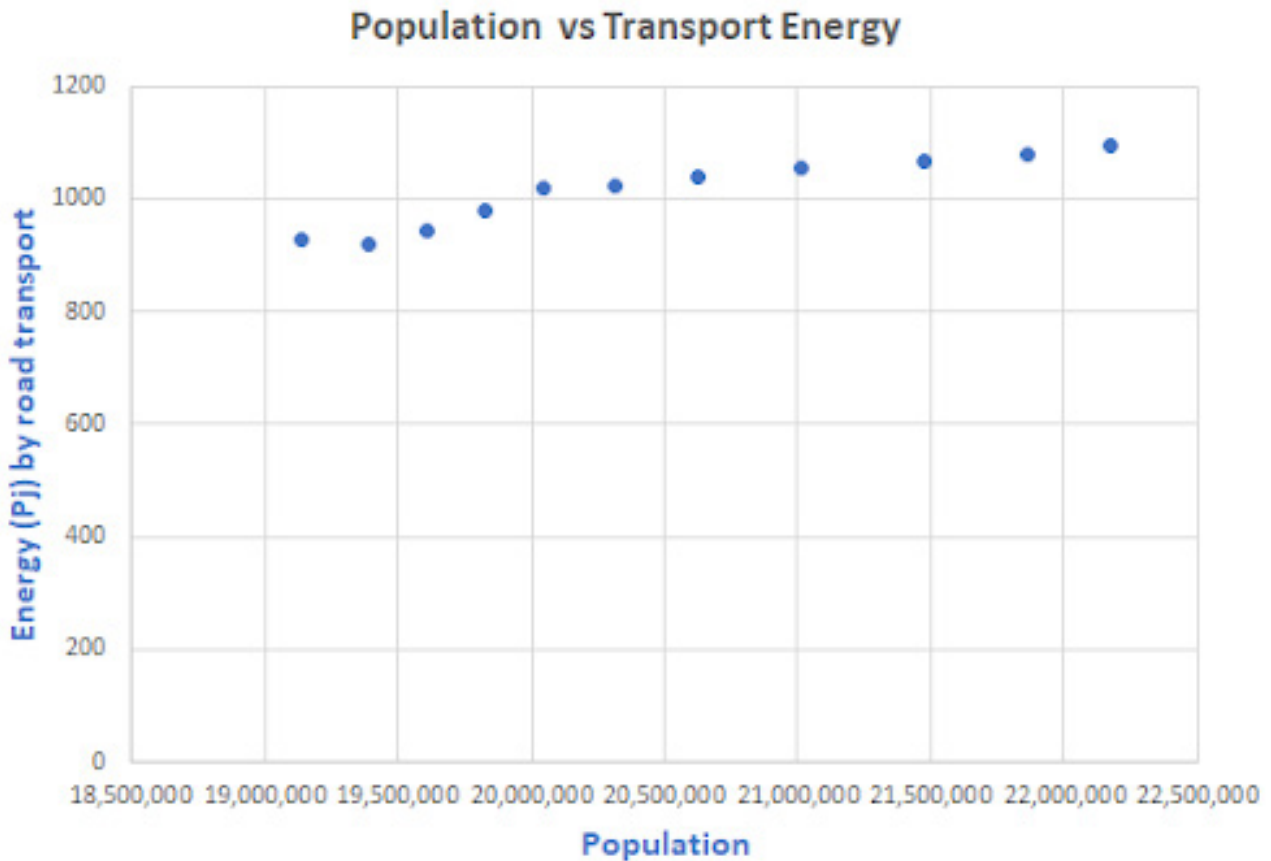
Road transport energy data from

<http://ageis.climatechange.gov.au/QueryAppendixTable.aspx>

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\*Road transport includes: cars, light trucks, heavy duty trucks, buses and motorcycles.

This scatterplot shows the data from the table. Australian population numbers from 2000-2010 are displayed on the horizontal (x) axis, while energy used (in Pj) by road transport over the same period of time is displayed on the vertical (y) axis.



Each dot on the scatterplot represents a pair of variables from the data set. The location of each dot depends on both variables.

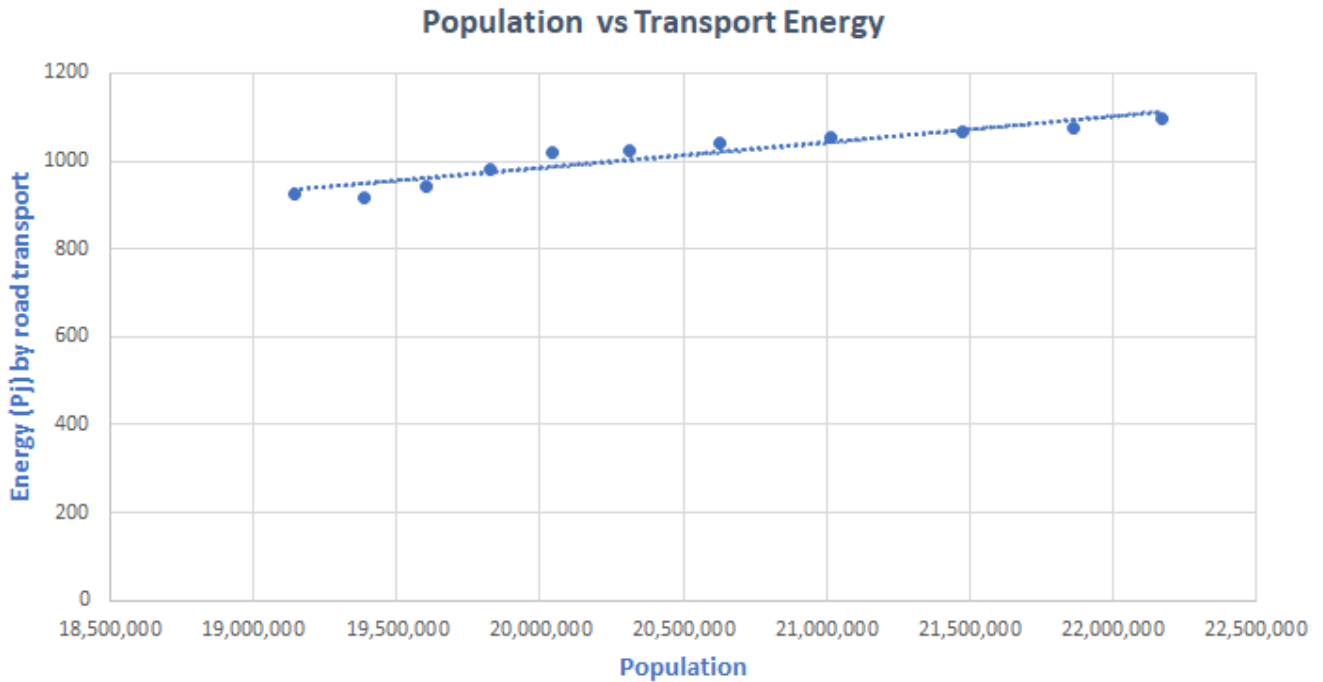
In this example, we do not plot the year, because we are trying to find the relationship (correlation) between population numbers and energy used by transport, and the year is not relevant to the correlation.

It is quite clear from the scatterplot that as Australia's population grew between 2000 and 2010, so did the energy used by road transport.

- Why do you think this is so?
- And what does this suggest for the future as our population continues to grow?

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A **line of best fit** can also be placed to represent this upward trend. These are drawn approximately through the centre of the data, attempting to have an equal number of points above and below the line as shown below.



## One petajoule (PJ) explained

The joule is the standard unit of energy in general scientific applications. One joule is the equivalent of one watt of power radiated or dissipated for one second.

One petajoule is  $10^{15}$  joules (1 million billion) or 278 gigawatt hours.

**19,000**



The energy used by 19,000 homes in a year<sup>1</sup>

**868,000**



The electricity used by 868,000 refrigerators in a year<sup>2</sup>

**2,354,000**



The electricity used by 2,354,000 televisions in a year<sup>3</sup>

<sup>1</sup>The average home uses approximately 50 gigajoules of energy in 2014–15  
<sup>2</sup>A typical 2.5 star fridge uses 320 kWh of electricity per year  
<sup>3</sup>A 50 inch 5 star label television uses 320 kWh of electricity per year

<https://www.energy.gov.au/sites/default/files/2016-australian-energy-statistics-info3.pdf>