

# Helsinki Region Travel CO2 Matrix 2015

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## WHAT IS THE HELSINKI REGION TRAVEL CO2 MATRIX?

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**Helsinki Region Travel CO2 Matrix 2015** is a dataset that contains CO2 emissions ( and some additional attributes) produced by public transportation (PT) and private car for routes between all 250 m x 250 m grid cell centroids (n = 13231) in the Capital Region of Helsinki. Calculations were done separately for two different times of the day using rush hour (08:00-09:00) and midday (12:00-13:00) schedules (for PT) and traffic conditions (for private car). The travel information in the CO2 matrix is based on the [Helsinki Region Travel Time Matrix 2015](#) dataset. The grid cells are compatible with the statistical grid cells in the YKR (*yhdyskuntarakenteen seurantajärjestelmä*) data set produced by the Finnish Environment Institute (SYKE).

The CO2 emissions are calculated based on the distance traveled with different travel modes (private car & PT) on an individual route multiplied with specific carbon emission factors. Carbon emission factors are based on the same estimates that Helsinki Region Transport (HRT) uses in their [Journey Planner service](#), more info [here](#). Public transportation emissions are a sum of emissions based on bus, tram, metro, ferry and train. More information on the method in [GitHub](#).

The dataset, produced by the [Accessibility Research Group](#), University of Helsinki, is openly available for everyone for free (under a Creative Commons 4.0 Licence). We do not take any responsibility for any mistakes, errors or other deficiencies in the data.

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## DOWNLOAD THE DATA

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The data have been divided into 13231 text files according to destinations of the routes. The files have been organized into subfolders that contain multiple (approx. 4-150) result files. Individual folders consist of all the text files that have same first four digits in their filename (e.g. 5785xxx). You can check the approximate locations of the YKR\_ID-numbers, and the name of the associated data folder from [this map](#). The data can be downloaded in a single zip-package from the following link.

**Download the Helsinki Region Travel CO2 Matrix 2015:**  
[HelsinkiRegion\\_TravelCO2Matrix2015.zip](#)

In order to visualize the data on a map, the result tables can be joined with the YKR-grid shapefile. The data can be joined by using the field 'from\_id' in the text files and the field 'YKR\_ID' in MetropAccess-YKR-grid shapefile as a common key.

Download the grid shapefile from this link:

[MetropAccess\\_YKR\\_grid.zip](#)

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## DATA STRUCTURE

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The data have been divided into 13231 text files according to destinations of the routes. One file includes the routes from all YKR grid cells to a particular destination grid cell. All files have been named according to the destination grid cell code and each file includes 13231 rows.

NODATA values have been stored as value -1.

### Abbreviations in the field names:

pt = public transport

car = car

r = rush hour

m = midday

co2 = CO2 emissions (grams)

dd = driven distance

l = lines = Number of lines used on the route by public transportation

fc = fuel consumption = Estimated fuel consumption (liters) by car

### Attributes:

<b>from_id</b>	ID number of the origin grid cell
<b>to_id</b>	ID number of the destination grid cell
<b>pt_r_co2</b>	CO2 emissions (grams/passenger) of the route by public transportation in rush hour traffic
<b>pt_r_dd</b>	Distance (meters) of the route travelled by any public transportation vehicle in rush hour traffic
<b>pt_r_l</b>	Number of lines used on the route by public transportation in rush hour traffic
<b>pt_m_co2</b>	CO2 emissions (grams/passenger) of the route by public transportation in midday traffic
<b>pt_m_dd</b>	Distance (meters) of the route travelled by any public transportation vehicle in midday traffic
<b>pt_m_l</b>	Number of lines used on the route by public transportation in midday traffic
<b>car_r_co2</b>	CO2 emissions (grams/vehicle) of the route by private car in rush hour traffic
<b>car_r_dd</b>	Distance (meters) driven by car during in rush hour traffic
<b>car_r_fc</b>	Estimated fuel consumption (liters) by car during in rush hour traffic
<b>car_m_co2</b>	CO2 emissions (grams/vehicle) of the route by private car in midday traffic
<b>car_m_dd</b>	Distance (meters) driven by car in midday

traffic

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**car\_r\_fc** Estimated fuel consumption (liters) by car  
in midday traffic

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## CITATION

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### Travel-time calculations:

Toivonen, T., M. Salonen, H. Tenkanen, P. Saarsalmi, T. Jaakkola & J. Järvi (2014). Joukkoliikenteellä, autolla ja kävellen: [Avoin saavutettavuusaineisto pääkaupunkiseudulla](#). Terra 126: 3, 127-136.

### DOI name for the dataset:

Toivonen, T., H. Tenkanen, V. Heikinheimo, T. Jaakkola, J. Järvi & M. Salonen (2016). Helsinki Region Travel CO2 Matrix 2015. DOI: 10.13140/RG.2.1.2601.0648

**Scientific examples** of the approach used here can be read from the following articles:

- Lahtinen, J., Salonen, M. & Toivonen, T. (2013). [Facility allocation strategies and the sustainability of service delivery: Modelling library patronage patterns and their related CO2-emissions](#). Applied Geography 44, 43-52.
- Salonen, M. & Toivonen, T. (2013). [Modelling travel time in urban networks: comparable measures for private car and public transport](#). Journal of Transport Geography 31, 143–153.

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## LICENSE

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If the dataset is being used extensively in scientific research, we welcome the opportunity for co-authorship of papers. Please contact project leader to discuss about the matter.