Urbanization and CO2 emissions

 Large part of CO2 emissions comes from

 Household consumption

 Household transportation

Both sources vary across and within countries

Weather conditions responsible for substantial part of variation in household energy use

 Heating in winter

 Cooling in summer

Difference in commuting distance across areas is a large determinant of variation in household transportation

[The Greenness of Cities: Carbon Dioxide Emissions and Urban Development](http://milesfinney.net/434/articles/green_cities.pdf%22%20%5Co%20%22The%20Greenness%20of%20Cities%3A%20Carbon%20Dioxide%20Emissions%20and%20Urban%20Development) by Glaeser and Kahn

 examines how the location and form of US cities affect CO2 emissions

Relationship between transportation and CO2 comes mainly in form of burning fossil fuels (gas)

 Using data from the National Household Transportation Survey

 study finds gasoline consumption positively related to the household income and size

 Also finds relationship between the population density of urban area and gasoline consumption

 Uses the average family with 2.62 members and income of $62,500

 predicts gasoline usage for the family in each urban area

 Variation in gas usage caused by differences in urban density

 [Graph](http://milesfinney.net/434/handouts/CO2.pdf)

 A gallon of gas consumed converted to 23.46 lb of CO2 (direct and indirect effects)

Household use of natural gas, electricity estimated by urban area

 Home heating, electricity influenced by climate

 Relationships generated by placing the average American household in the various urban areas [Graph](http://milesfinney.net/434/handouts/CO2.pdf)

 Western urban areas more likely to consume electricity from nuclear, hydro, wind

Conversion of household energy use to CO2 takes source and region into account

[Table ranking urban areas](http://milesfinney.net/434/handouts/urban_ranking.xlsx)