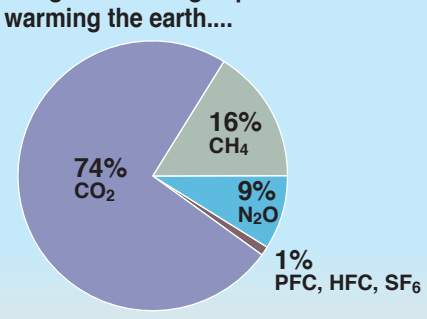
# CARBON CITY

## IDENTIFYING THE SOURCES OF CARBON DIOXIDE IN THE URBAN ENVIRONMENT

**For most US cities,** global warming pollution comes from three primary sources: electricity use in homes, businesses and factories; the burning of fossil fuels by industry; and pollution from cars, trucks SUVs and other transportation.

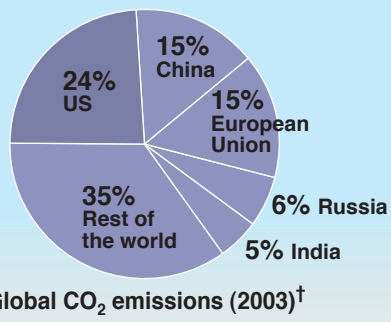
Carbon dioxide ($CO_2$) from burning fossil fuels makes up most of this pollution. Methane gas ($CH_4$) from rotting garbage at landfills and nitrous oxide ($N_2O$) from industry also contribute to global warming.*

**Carbon dioxide ($CO_2$) makes up most of the greenhouse gas pollution that is warming the earth....**



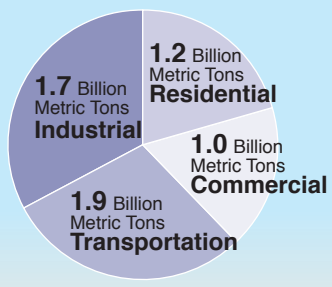

**Global Greenhouse Gas Emissions by Gas (2000)≠**

**...Among nations, the US is the single largest source of CO2 pollution...**




**Global $CO_2$ emissions (2003)†**

**...Within the US, $CO_2$ pollution is produced in four key areas.**




**US $CO_2$ Emissions by Sector (2004)§**

Coal-fired power plant

**80%** of US electricity-related $CO_2$ emissions are attributed to coal-fired power plants, or **31%** of all US $CO_2$ emissions.

Wind farms

**0** pounds $CO_2$
Emissions for one kWh from wind/solar

Powerlines

Solar panels

**232** million metric tons $CO_2$[1]
Annual emissions from a year's worth of all US household waste

Landfill

Power distribution

**129.1** million metric tons $CO_2$
US commercial aircraft emissions

**226.0** million metric tons $CO_2$
Emissions from commercial energy use

**864.5** million metric tons $CO_2$
Emissions from industrial energy use

**377.9** million metric tons $CO_2$
Emissions from diesel-powered autos, trucks and buses

## INDUSTRIAL & COMMERCIAL

**2.7** billion metric tons of $CO_2$ emissions from smokestacks, comprising **46%** of US $CO_2$ emissions

Carbon dioxide from the burning of coal in power plants is the largest single source of global warming pollution in the industrial/commercial sector.

These power plants, which typically are located outside of city boundaries, provide electricity to businesses and factories.

Industrial pollution also comes from the burning of other fossil fuels suchas oil and natural gas. Commercial pollution comes from businesses that burn fossil fuels and use electricity from coal-fired power plants to produce light and heat and to run air conditioners and machinery.

**250** billion pounds $CO_2$
Estimated emissions from US residential electricity consumption∞

**18** thousand pounds $CO_2$
Typican annual household electricity consumption (12,000 kWh)

**180** pounds $CO_2$
60 watt incandescent bulb used in home for a year

**1.5** pounds $CO_2$
Average kilowatt hour of electricity

**Public transportation:**
One-half the $CO_2$ emissions of driving or riding in a private vehicle

**17** thousand pounds $CO_2$
Driving 10,000 miles a year averaging 22 mpg

**8.5** thousand pounds $CO_2$
Driving 10,000 miles a year averaging 44 mpg

**0** pounds $CO_2$
Riding a bike or walking

**20** pounds $CO_2$
One gallon of gas

**10.6** million metric tons $CO_2$
Emissions from ships and boats

## RESIDENTIAL

**1.2** billion metric tons $CO_2$, comprising **21%** of US $CO_2$ emissions

For most homes, the largest portion of global warming pollution comes from the use of electricity produced by coal- and gas-fired power plants and used for lighting, air conditioners, washer/dryers, refrigerators and other appliances. Half of all electricity in the US is generated by coal-fired power plants which produce 2 lbs of $CO_2$ pollution for every kilowatt hour of power.

Many homes burn natural gas or oil in furnaces and water heaters, producing additional pollution. Un-recycled household garbage also causes pollution -rotting garbage in landfills creates methane, an extremely potent greenhouse gas.

## TRANSPORTATION

**1.9** billion metric tons $CO_2$ emissions, comprising **33%** of US $CO_2$ emissions

Private vehicles such as cars, SUVs and pick-up trucks, are the largest source of global warming pollution in the transportation sector. Each gallon of gasoline burned in an engine emits roughly 20 pounds of $CO_2$. Other sources include buses, trucks, trains, container ships and other vehicles with internal combustion engines.

***For the purposes of this graphic, all pollution totals are given in carbon dioxide equivalents.**

**Sources:**
Unless otherwise noted below, all data for this graphic come from the Environmental Protection Agency's Global Warming Resource Center, at http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterToolsCalculators.html
≠ EPA, www.epa.gov/methanetomarkets
† http://www.dti.gov.uk/files/file32554.pdf; http://cdiac.ornl.gov/trends/emis/em_cont.htm
§ EIA, Emissions of Greenhouse Gases in the United States 2004, DOE/EIA - 0573 (2004) (Washington, DC, December 2005)
∞ http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2002.html

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