

## CARBON AND GREENHOUSE POLLUTION — WHERE DOES IT COME FROM?

The extra load of human-made greenhouse gases heating up the Earth and altering the climate is spread all over the world. Before the total amount can be reduced properly, it is important to measure whether they come from human industry or from natural activities. However, because these gases come from so many different places in different countries, it is sometimes very difficult to measure them accurately. There are also many different ways to measure carbon pollution.

**Volume method:** One simple way of calculating the problem is to look at the total volume of gas in the world and then measure the total percentage of carbon pollution which comes from each country. For example, China and the United States are the biggest carbon polluters in the world because they each produce almost 20% of the total greenhouse pollution in the world — whereas South Africa only produces about 1.5% of total world greenhouse gases.

**Per capita method:** Not all countries are the same size. Some have many people living in a smaller area of land (eg China) and some countries are bigger, but have fewer people (eg United States). So another way of measuring the carbon problem is the per capita method (the total carbon pollution from each country divided by the number of people in that country). One way to understand this method is to think of how much carbon pollution is produced by each person in a country.

If we use this method to measure the same problem, you can end up with a very different picture. For example, even though China and the United States each produce about 20% of the total volume of climate gases, each Chinese person only produces about 5.6 tons per person a year using the per capita method. However, each American is said to produce about 24 tons of greenhouse pollution a year. Interestingly, South Africans produce about 10.6 tons of gas pollution (double the amount generated by Chinese people). Using the same per capita method we find that the tiny country of Qatar is one of the world's "worst" polluters because each person in this country is estimated to produce nearly 59 tons of gas pollution, but using the volume method Qatar only produces a tiny 0.1% of the total amount of greenhouse gases.

**Unequal measurements:** The truth is that not all South African, Chinese or American people produce exactly the same amount of climate pollution. For example, a poor person in South Africa (or China or USA) does not produce greenhouse gases when walking or riding a bicycle to work. However, a richer South African driving a big 4x4 vehicle produces a large amount of climate gases from the exhaust pipe. The per capita method also hides the fact that the largest volume of climate gas pollution in South Africa comes from big factories making petrol, electricity, aluminium and other products. Richer people generally use more petrol, electricity or aluminium than poor people, so the per capita method is not always a fair way to measure climate gas pollution.

**Shifting carbon:** There are also many factories in South Africa and other nations which produce large volumes of climate gas pollution, but many of the products they make are exported overseas. So is it fair to measure some of these emissions as coming from China or South Africa, when the final products might be sold in Australia, Germany or America?

# PLANET IN PERIL

## THE CARBON PUZZLE

### Who are the biggest polluters?

#### HOW DOES SOUTH AFRICA SHAPE UP?

South Africa is by far the biggest climate gas polluter in Africa, and also a major polluter on a world-scale. Though South Africans make up only 5% of the continent's population, the country produces nearly 40% of the human-generated carbon dioxide emissions from Africa.

South Africans make up less than 1% of the world's human population, but the country is ranked among the Top 15 CO<sub>2</sub> polluters in the world and among the Top 20 greenhouse gas polluters. South Africa also ranks among the Top 6 greenhouse gas polluters in the developing world (behind China, India, Brazil, Mexico and Iran). Most of South Africa's climate gases come from burning massive volumes of coal for electricity and industrial heating. The Sasol factory in Secunda, which makes synthetic petrol and other chemicals from coal, is also one of the biggest single sources of human-made greenhouse gases in the entire world.

Yet, instead of reducing the amount of human-made carbon gases from coal, South Africa is busy building two of the biggest and most expensive coal-fired power stations in the world. The new Medupi and Kusile power stations will create massive, extra volumes of greenhouse gases for at least 50 years.

Two years ago, President Jacob Zuma announced at the COP 15 meeting in Copenhagen that South Africa would reduce its greenhouse emissions by 34% before 2020 and by 42% before 2025, but this has been criticised as an inflated and non-binding (voluntary) target which is also subject to several pre-conditions.

Reducing current greenhouse emissions to meet these targets will require a massive re-organisation of the country's energy-intensive economy. For example, a study of 15 South African cities shows that, on average, large manufacturing industries caused about half of the greenhouse gas emissions (compared to a worldwide city average of about 9%).

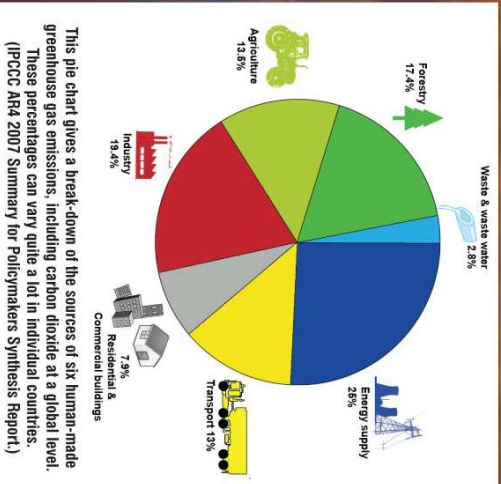
One of the worst examples was Mthlathuze (Richards Bay) where ordinary homes produced only 1.5% of carbon emissions compared to the 95% from industry and commerce in this small industrial city which includes two aluminium smelters, a fertilizer plant and a paper mill.

The per capita CO<sub>2</sub> emissions in Mthlathuze/Richards Bay were an astonishing 46.7 tons, compared to 5.6 tons each for Durban and Johannesburg, and way above the African cities per capita average of 1.1 tons.

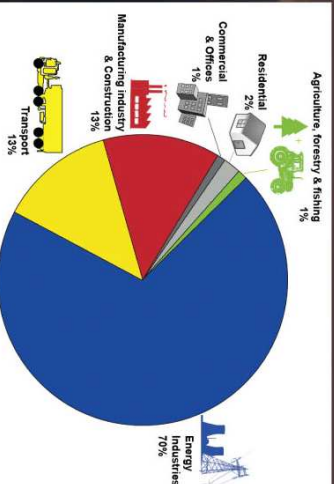


South Africa's No 13 global ranking in this graph is based on carbon dioxide emissions from burning fossil fuels. However, if the country is judged using one of many other methods, the ranking can change. For example, South Africa is ranked as No 42 for CO<sub>2</sub> emissions on a per capita basis.

Graph adapted from Carbon Dioxide Information Analysis Centre, Oak Ridge National Laboratory, US Dept of Energy.



This pie chart gives a break-down of the sources of six human-made greenhouse gas emissions, including carbon dioxide at a global level. These percentages can vary quite a lot in individual countries. (IPCCC AR4 2007 Summary for Policymakers Synthesis Report)



This pie chart gives a break-down of the sources of human-made greenhouse gas emissions, including carbon dioxide in South Africa in 2000, based on fuel combustion. (The South African 2000 GHG Inventory, Data and Source Description. Compiled for DEAT by Energy Research Centre (UCI) and CSR).

#### The Top 10 carbon Polluters in SA

Entity	Own emissions	Indirect from electricity	TOTAL (CO2e)
ESKOM	224,700,000	0	224,700,000
Sasol	61,678,000	9,553,000	71,231,000
BHP Billiton	21,355,000	27,688,000	49,043,000
Anglo American	8,850,000	10,252,000	19,102,000
Arco/Mittal SA	10,730,360	4,330,419	15,060,779
Sappi	4,776,598	2,116,889	6,893,487
Gold Fields	1,306,764	5,093,511	6,400,275
Mondi	4,420,810	1,447,991	5,868,801
Pretoria Portland Cement	5,129,030	577,990	5,707,020
Anglo Gold Ashanti	1,183,000	3,489,000	4,672,000

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# THE MERCURY

Information compiled by Tony Carnie  
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