



## BRAZIL AND CO2 EMISSIONS

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What is the contribution of Brazil to the greenhouse effect with emissions of carbon dioxide (CO2) from fossil fuels into the Earth’s atmosphere? The media accuses Brazil of being one of the great emitters of CO2. We are ranked as the world’s fourth largest CO2 emitter without explaining what is being compared, from what data, and by what criteria. Yet, according to data from the US Energy Information Administration of 2005 and the *Balanço Energético Nacional* (National Energy Balance), taking into account four homogeneous indicators of comparison, namely the absolute value of CO2 emissions, the relative values per inhabitant and per square kilometer, and the wealth produced, Brazil is among the countries that contribute the least to this phenomenon.



### Absolute Total Emissions

In absolute terms, in 2005 the world emitted a total of 28,193 billion tons of fossil-based CO2. The United States accounted for 21% of world emissions with 5.957 billion tons, followed by China with 5.323 billion (19%). Then came Russia with 1.696 billion (6%), Japan with 1.230 billion (4.4%) and India with 1.166 billion (4%). Together, these six countries alone accounted for 55% of planetary emissions. Brazil was in 18th place with 360 million tons (1.3%), well behind Germany, Canada, England, South Korea, Italy, South Africa, France, Australia, Mexico and other countries. For Brazil to become the world’s fourth largest emitter, right after Russia, we would have to multiply our annual emissions by five, something unimaginable even taking into account our non-fossil fuel derived emissions. And in this case, in order to compare we should aggregate this type of emissions to the accounts of all other countries.

### Emissions per Inhabitant



Map of oil and gas pipelines from Russia

The United States of America is the leader in CO<sub>2</sub> emissions, with more than 20 tons per capita / year, and only loses to some oil producing countries like Qatar (62t) or the United Arab Emirates (33t). Australia, with 20t, is almost even with the Americans, followed by Canada (19t), Russia (12t) and Germany (10t). The European average is 8t / CO<sub>2</sub> / inhabitant / year. At 16.4t, the Netherlands is one of the European emission champions.

Except for Germany and Denmark, European countries have increased their CO<sub>2</sub> emissions in the last ten years. Some, like Spain, by more than 50%. And all are signatories to the Kyoto Protocol! Europe is building huge gas pipelines from Russia. Gas consumption will increase by about 50% in the short term. European emissions are twice the world average of 4.4 t / CO<sub>2</sub> / inhabitant / year.

China, deemed as a major CO<sub>2</sub> emitter due to its increasing use of coal and petroleum products, at 4t / CO<sub>2</sub> / inhabitant / year is still below the world average. China's total CO<sub>2</sub> emissions surpassed the U.S. in 2007, but it alone accounts for 25% of the world's population.

Latin America has an average CO<sub>2</sub> emission of 3.1 tons per inhabitant, led by Venezuela (6t), Chile (4.4t), Mexico (3.8t) and Argentina (3.7t). What about Brazil?

Each Brazilian emits 1.9 tons of CO<sub>2</sub> per year. Planting only two or three trees per person is not enough to remove this carbon from the atmosphere. But we emit twelve times less than the Americans, four times less than Europeans, and half the world average. And even less than Latin Americans (3.1t), Asia and Oceania (2.87t), and the Middle East (7.9t).

## Emissions per square kilometer

The estimation of CO<sub>2</sub> emissions per square kilometer is also very favorable to Brazil. Here emissions are in the order of 42 tons of CO<sub>2</sub> / km<sup>2</sup> / year while in Canada they are 69t, in China 555t, in the USA 710t, in Germany 2,365t, in Japan 3,256t, in the Netherlands 6,493t / CO<sub>2</sub> / km<sup>2</sup> / year!

## Emissions to Generate Wealth

The quotient between the total tons of CO<sub>2</sub> emitted by a country and its Gross Domestic Product (GDP) gives a measure of its national economy's energy and environmental efficiency in the generation of wealth. Roughly, the more efficient a country is, the smaller the figure. Given the variation in the dollar exchange rate between countries, GDP was calculated based on the purchasing power of national currencies, the so-called Purchasing Power Parity (PPP).

The leaders in CO<sub>2</sub> emissions to generate wealth are China (0.63) and the Netherlands (0.62). The latter stands out on the three counts (emissions per capita, per area and per unit of GDP), followed by Canada with 0.61. The world average is 0.49, and the European average is 0.39. High use of nuclear energy and good efficiency

THE WORLD AVERAGE IS 0.49, AND THE EUROPEAN AVERAGE IS 0.09. HIGH USE OF NUCLEAR ENERGY AND GOOD EFFICIENCY GENERATE LOWER INDICES SUCH AS JAPAN'S (0.36) AND FRANCE'S (0.26).

With a quotient of 0.24, Brazil is more efficient than all those mentioned above, more than the Latin American average (0.32) and very far ahead of Bolivia (0.40), Venezuela (0.80), the Netherlands Antilles (3.34) and Surinam (5,10)!

## Culprit or Victim?

What explains Brazil's excellent performance is its energy matrix, with one of the largest percentages of renewable energy on the planet: 46.4% versus a world average of 13.9%. Brazilian agriculture guarantees 28.5%

of this renewable energy. Yet, in this area the country is unjustly accused and placed on the defensive both in the media and in classrooms here and abroad. This treatment is quite different from the one given to the Netherlands, for example, which uses and abuses fossil fuels despite being seriously threatened by rising sea levels.

In any case, while Brazil's exceptional performance is not a license to irresponsibly increase its CO2 emissions, in this area we are more victims than culprits.

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