



Section 2

Climate change in Brazil.

GUILHERME CASTRO
PEDRO MATOS

Summary



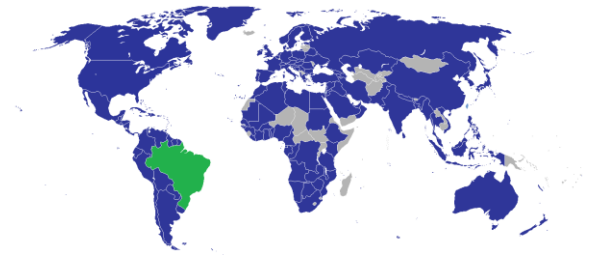
- Recap
- How Brazil is Contributing to Climate Change
- How climate change is affecting Brazil
- What has been done to face climate change
- Strategies to disseminate the sustainable model in Brazil

Recap

Who Brazil is

REMEMBER

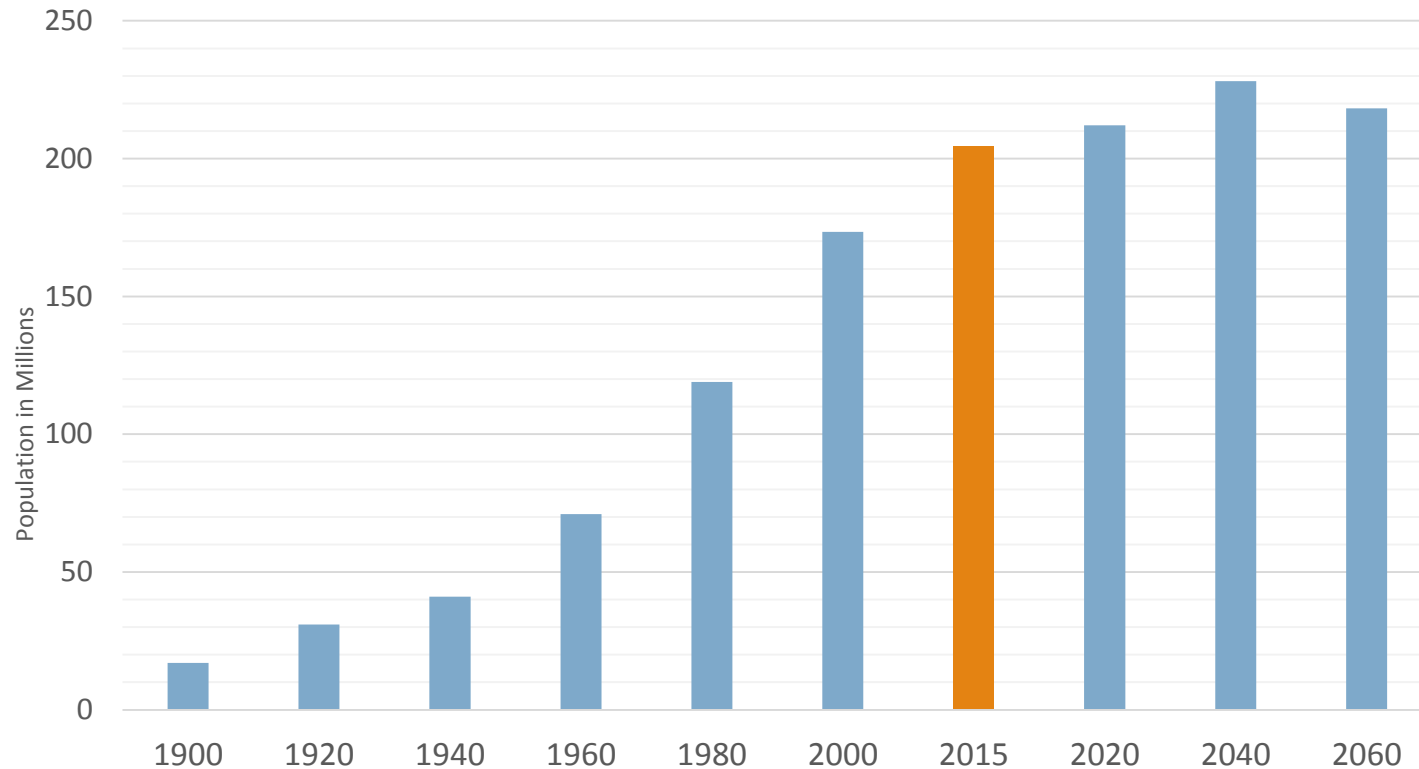
- Fifth largest country, both by geographical area and by population.
- Eighth largest economy in the world.
- It belongs to the BRICS countries.
- More than 70% of its electrical energy is produced through hydropower.
- Severe drought in 2014 in its most populated area - Southeast.



Population Forecast

We are growing!

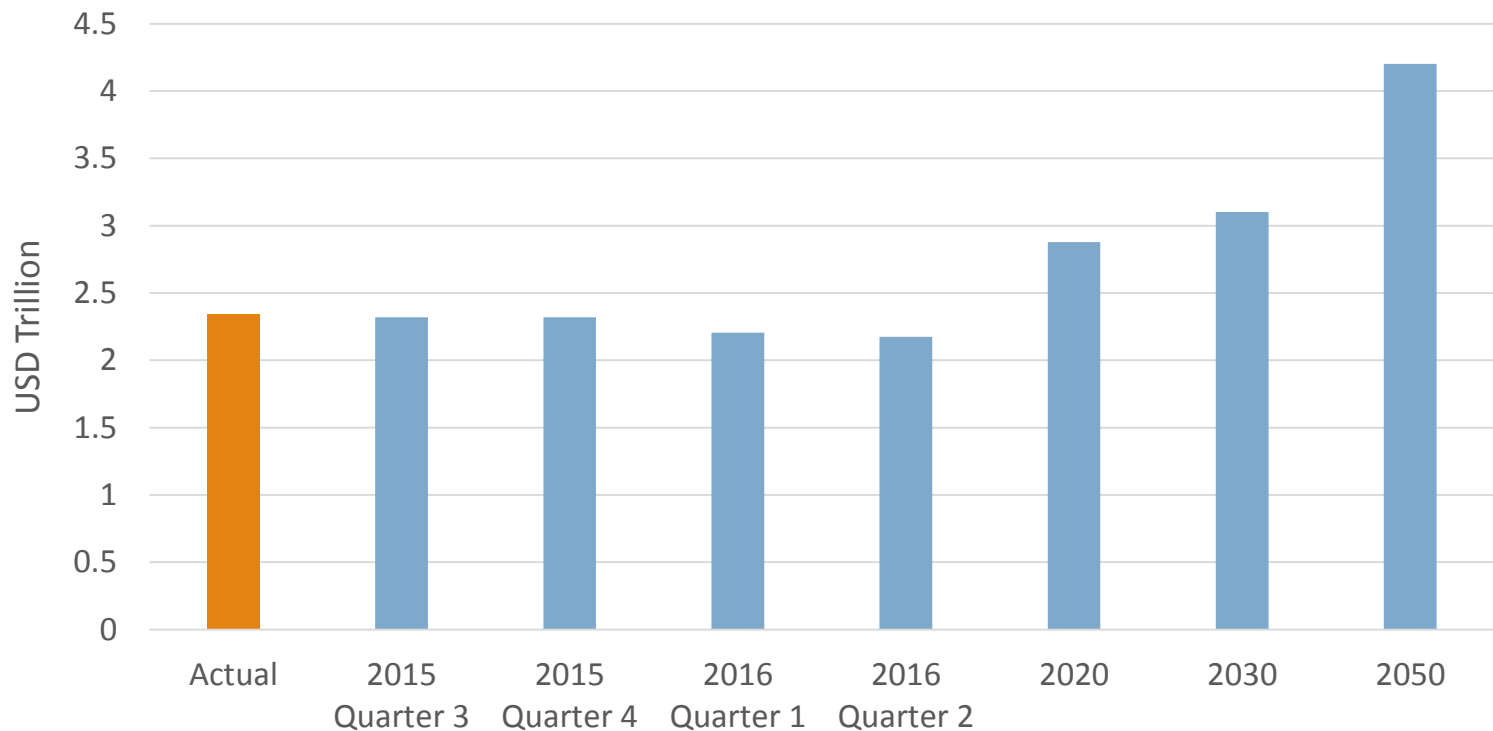
It is expected to peak at 225 million people.



Source: Brazilian Institute of Geography and Statistics (IBGE) - 2013

GDP Forecast

A current recession is projected through 2016.
Growth in the future is projected to be 86% by 2050.

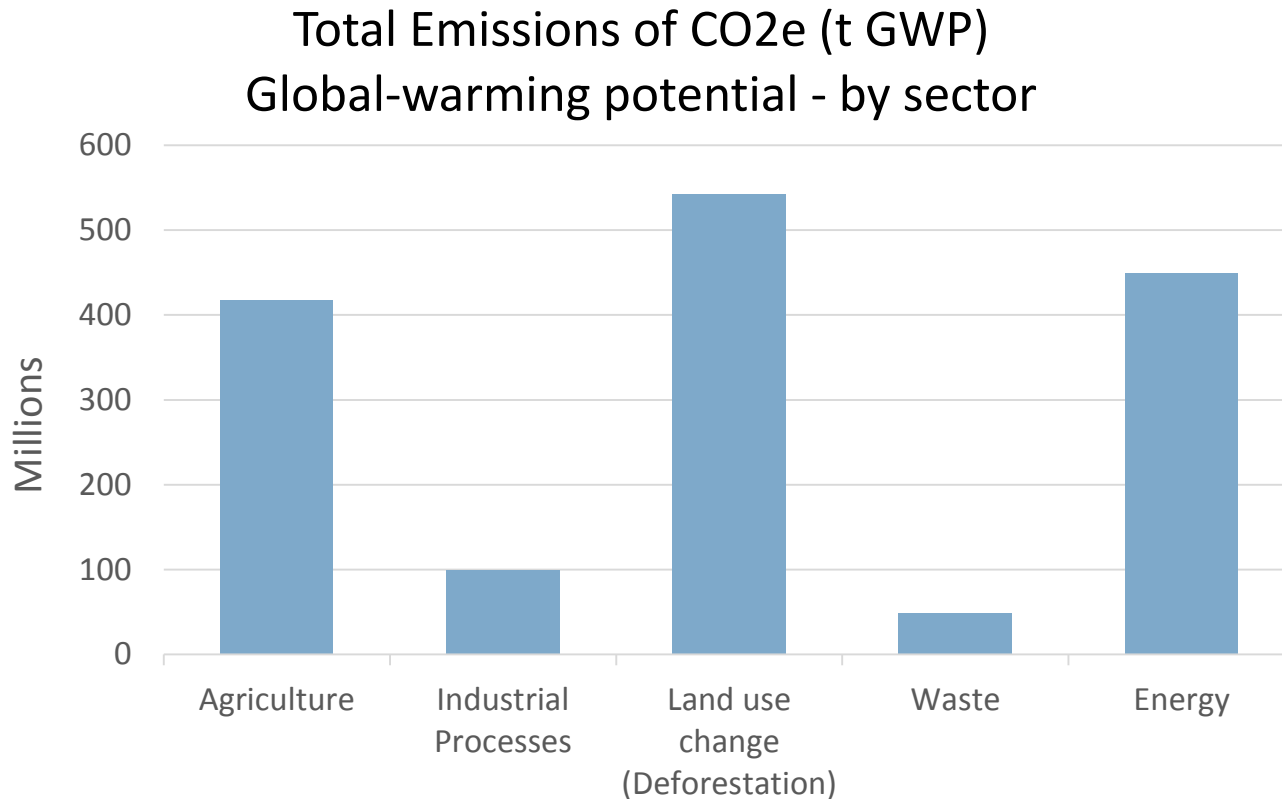


Source: Trading Economics - Last Prediction July 7, 2015.



How Brazil is Contributing to Climate Change

Main Sources of Carbon Emissions



Deforestation - 35%
Agriculture - 29%
Transportation - 14%



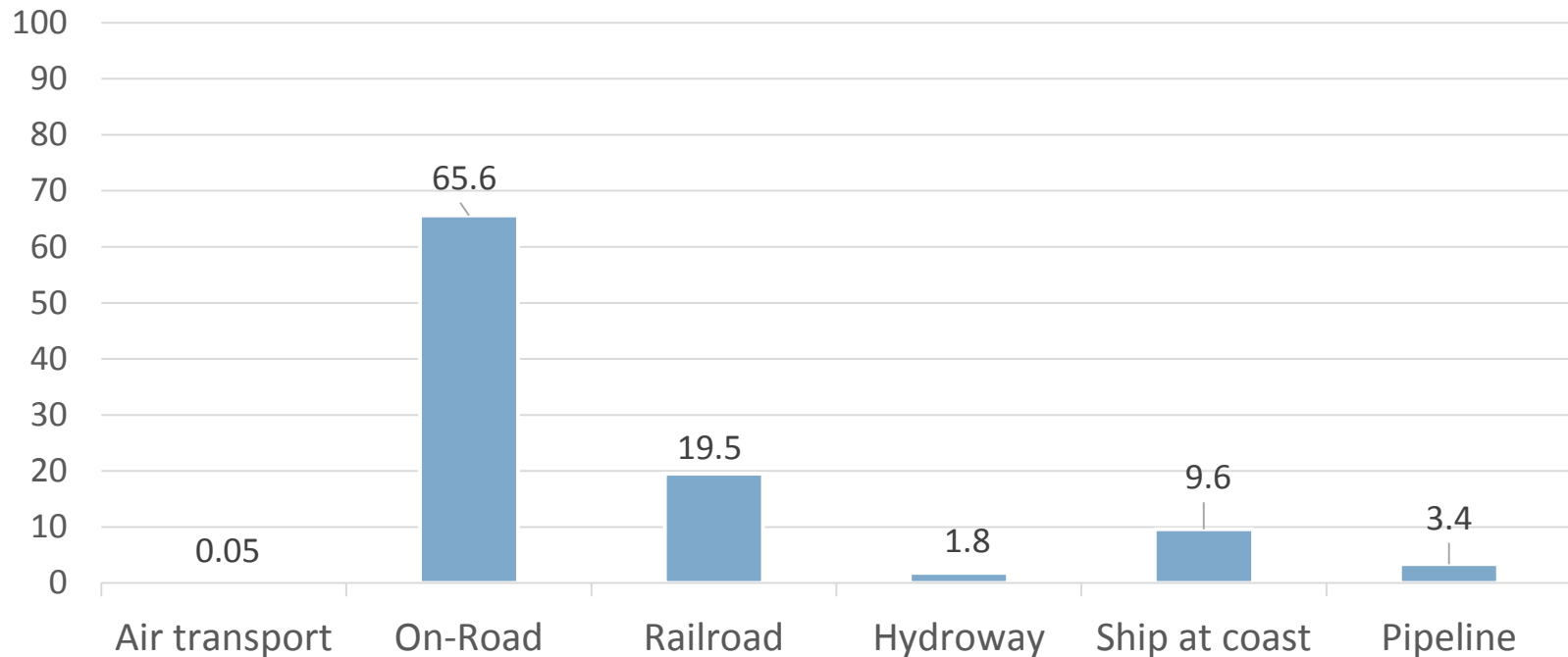
Source: Greenhouse Gas Emission Estimate System (SEEG) - 2013

Transportation

The largest percentage of pollution from transportation in Brazil comes from cars, trucks, and buses.

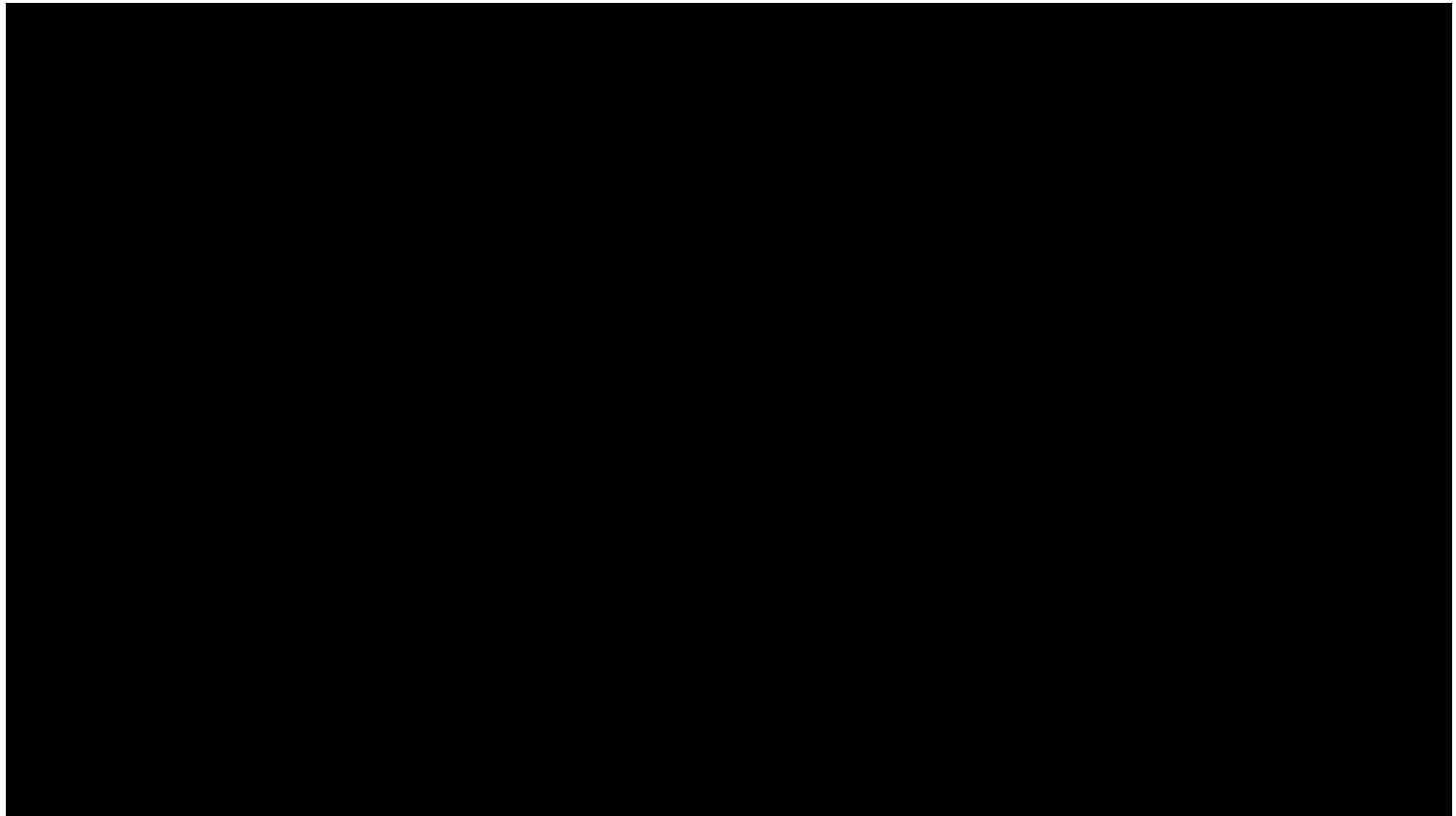


Transportation Matrix in Brazil (%)



Source: US Bureau of Transportation - 2010

Amazon Deforestation



Deforestation, Climate Change, and Food insecurity



- Human encroachment and logging destroys forests

- 20% of global CO2 emissions are caused by deforestation



- Trees cool the atmosphere and "store" GHG



- Flood and soil erosion result from deforestation

- Billions of pollinator bees have lost their habitat



- 1.6 billion people living in poverty depend on forests for their food, fuel, and livelihoods

How Climate Change is Affecting Brazil

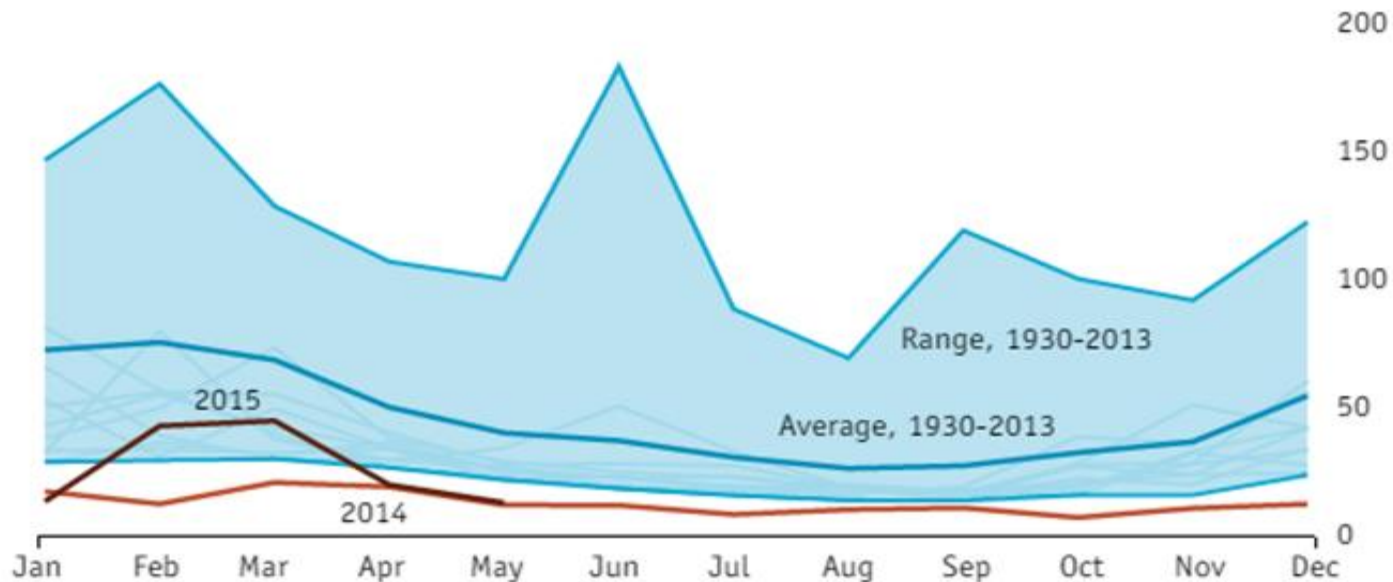
Droughts

São Paulo's drought is the most severe in the last century.

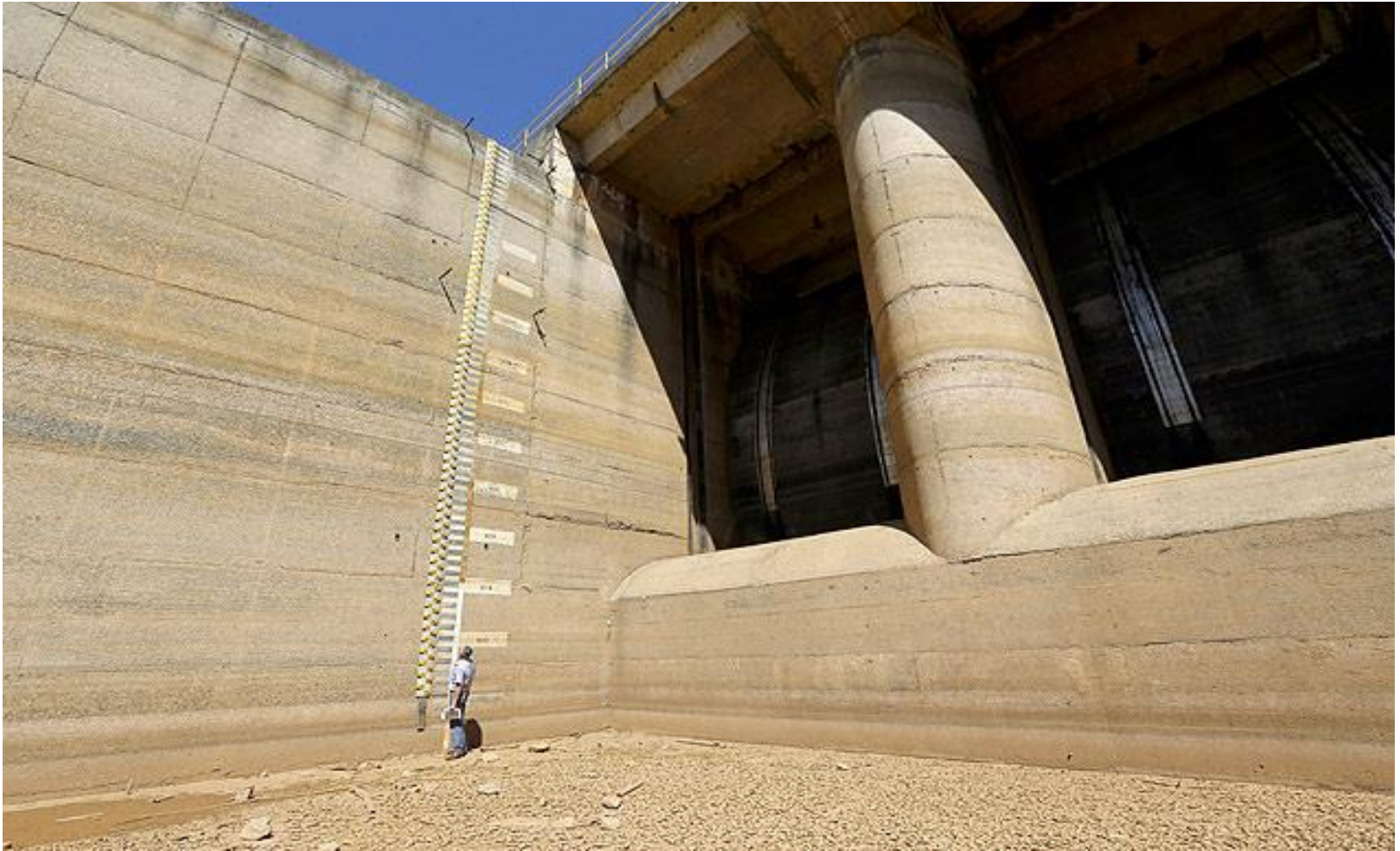
Flows into the Cantareira reservoir system, São Paulo, Brazil

Cubic metres per second

Ten driest years since 1930:	1944	1953	1955	1964	1969	2001	2003	2012	2013	2014
Average, m3/s:	30,3	24,5	28,6	31,6	27,2	31,6	29,4	30,9	30,9	10,9



Source: CEMADEN



Level of water in Cantareira in 2014 – One of the main water's supply for São Paulo.

Floods

Intense rainfall in a short period of time.

NEWS

Floods hit Sao Paulo in midst of Brazil drought

17/04 04:27 CET



Energy Crisis



- More than 70% of Brazil's electricity is produced through hydropower.
- A lack of water affects the production of electricity.
- Brazil's last drought in 2001 forced energy restrictions.



Itaipu – Second largest hydropower in the world

Economic Impacts



Other Impacts...



Agriculture



Coastal
Erosion



Infrastructure
damage

Air Quality



Housing



What Has Been Done to Face Climate Change

Transportation System

- Ethanol
 - Biodiesel
- } Biofuels



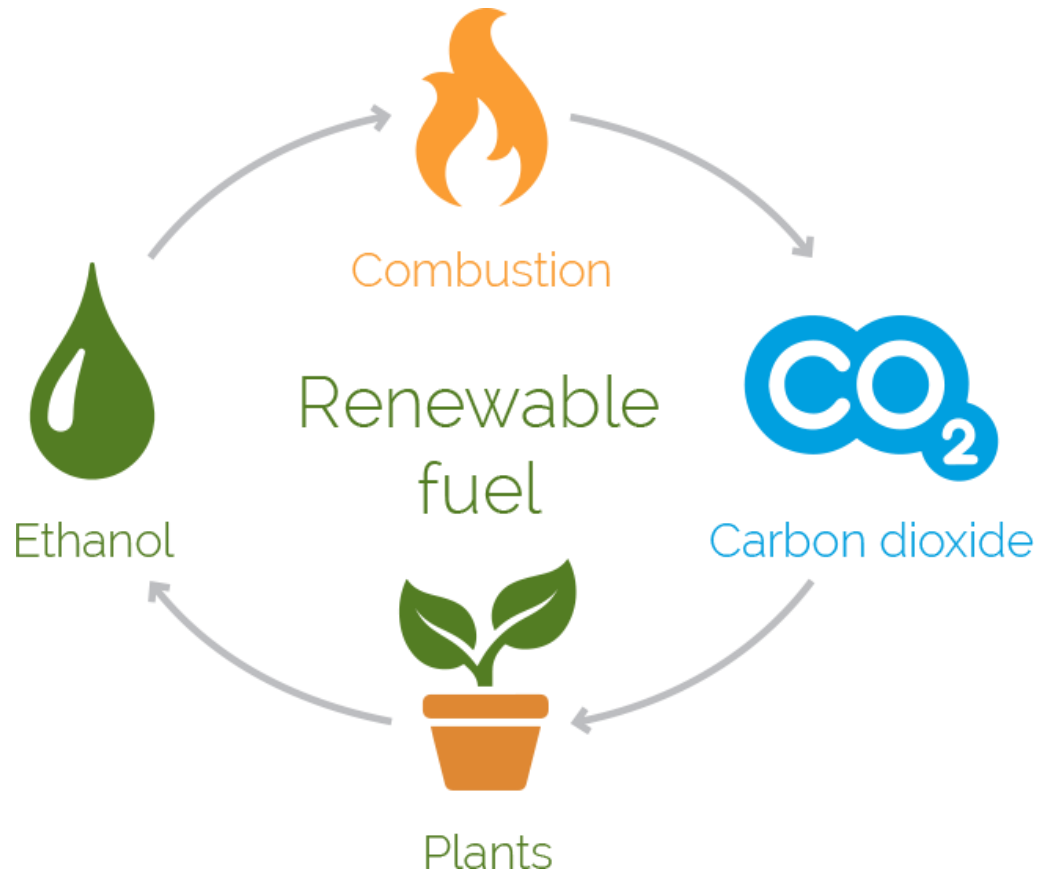
Transportation System

Biofuel benefits

- Carbon dioxide is taken up by the growing plants and is released when the bioethanol is burnt, with a zero theoretical net contribution.
- *“In some circumstances does better than just ‘zero emission.’ If grown and processed correctly, it has negative emission, pulling CO₂ out of the atmosphere, rather than adding it.” - United Nations.*

Transportation System

Biofuels - Carbon Cycle



Transportation System

Ethanol fuel

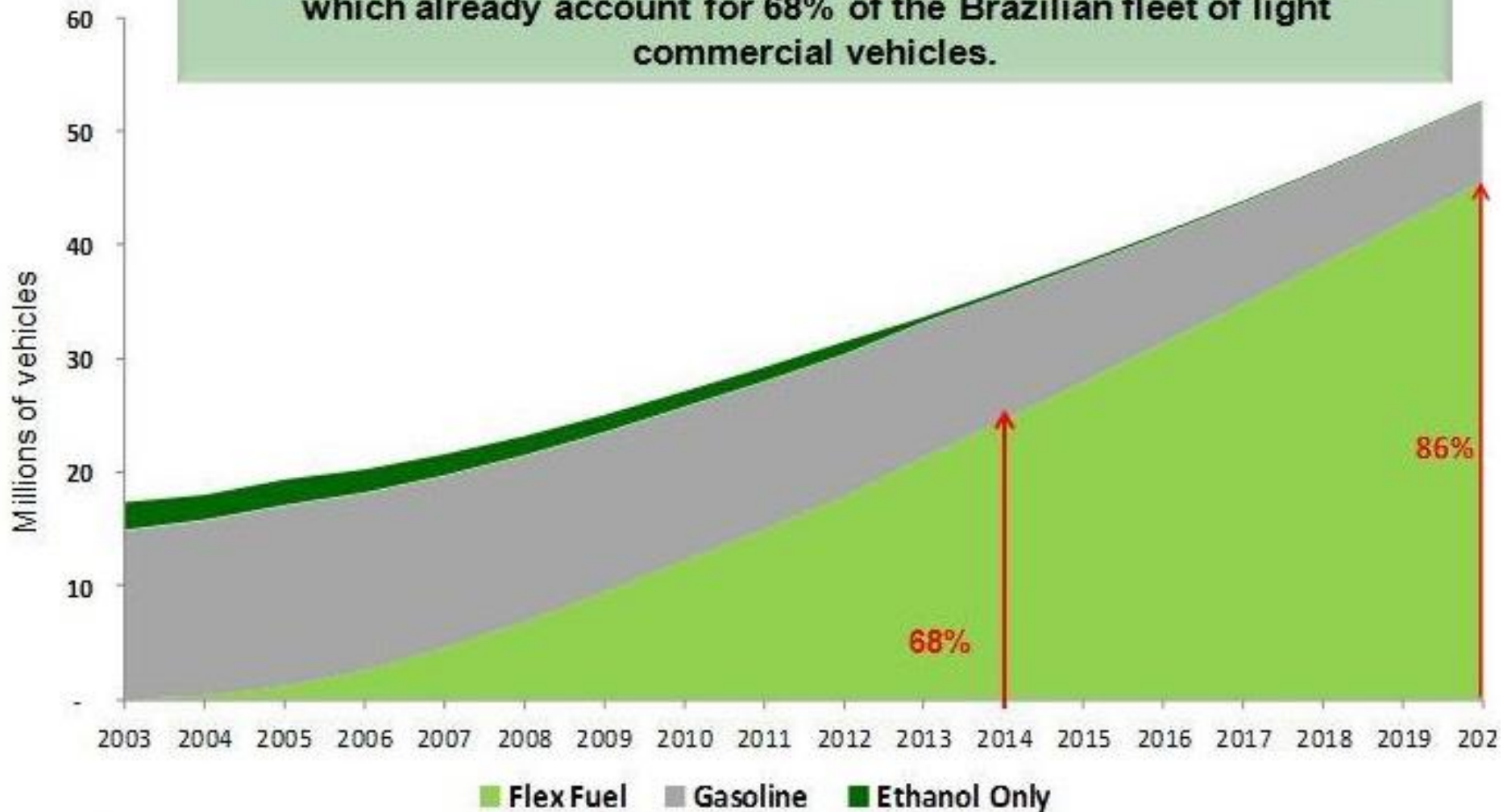
- As a response to the 1973 oil crisis, the Brazilian government began promoting bioethanol as a fuel.
- Today Brazil is a key leader in the sustainable use of bioethanol.
- **There are no longer any light vehicles in Brazil running on pure gasoline.**



Brazilian sugar cane

NATIONAL AUTOMOBILE AND LIGHT VEHICLE FLEET

Today, 16 automakers offer over 242 models of flex fuel vehicles, which already account for 68% of the Brazilian fleet of light commercial vehicles.



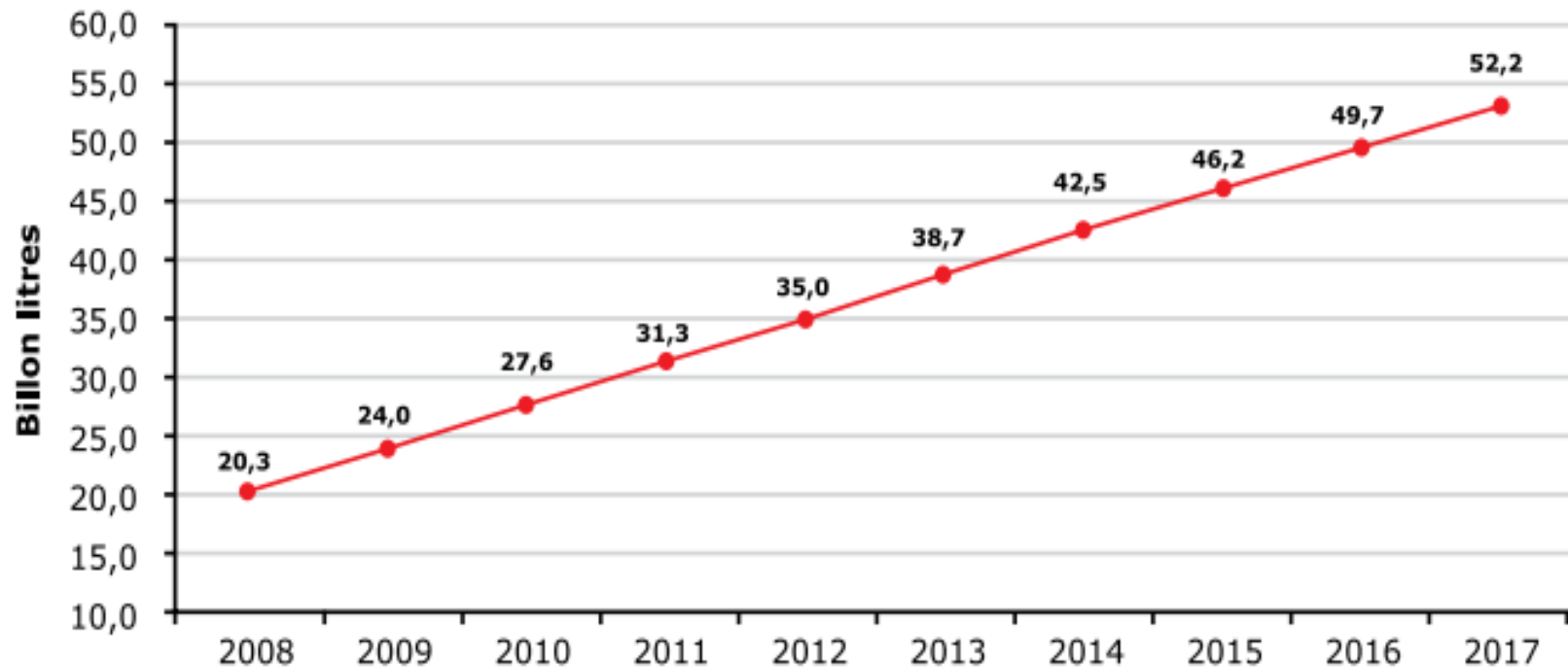
Source: UNICA

Transportation System

The Brazilian National Climate Change Plan (NCCP)

Prevent the emission of 508 million tCO₂e by 2017 encouraging the use of ethanol.

Ethanol domestic demand



Source: Interministerial Committee on Climate Change

Transportation System

Brazilian Biodiesel Plan - 2004

- Integrate the drive for energy security in the electricity generation and transportation fuel sectors with sustainable rural development in combination with advanced transportation technology.

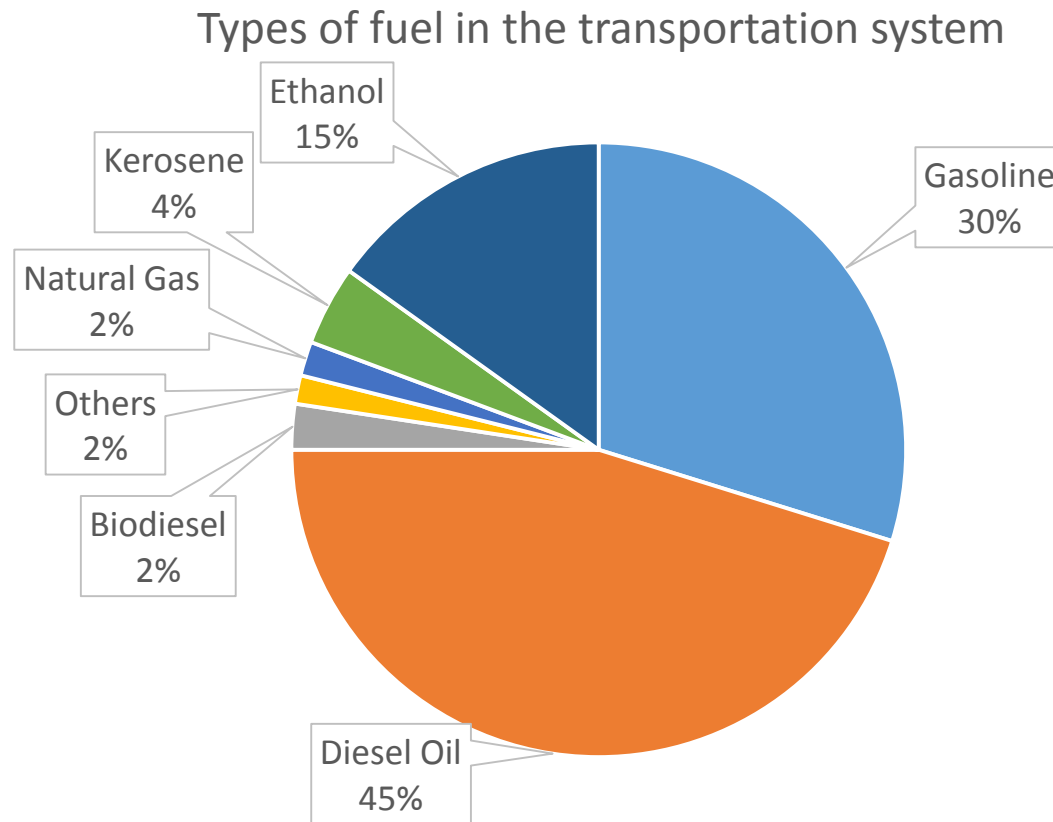


Hybrid bus = electric + biodiesel
Hybrid bus emits 35% less CO₂ and 89% less NO_x.

Transportation System

We still have a long way to go!

Fossil fuels still dominating the transportation system in Brazil.



Source: Research Energy Company, Brazil - 2014

Deforestation

PPCDAM Plan

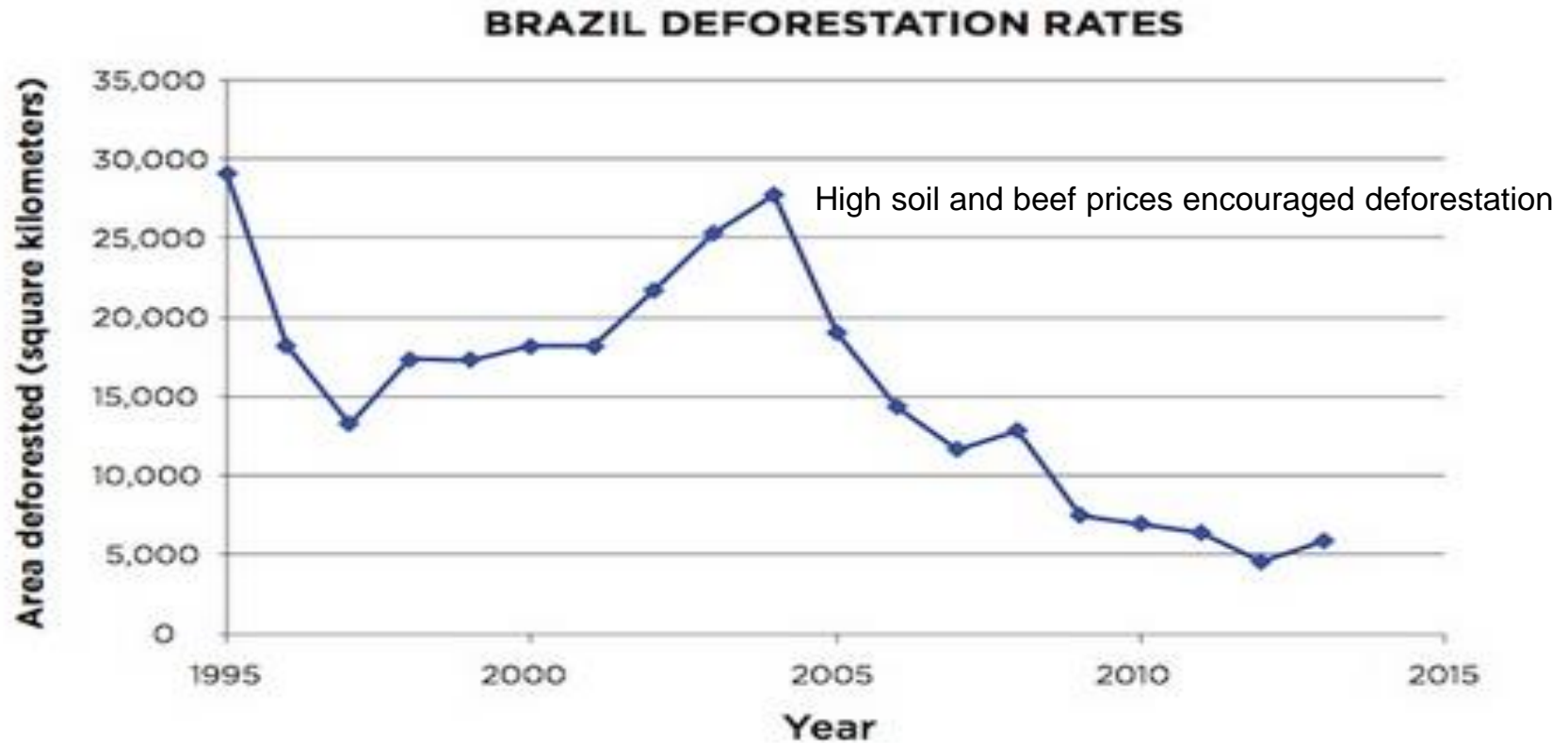


- Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM) - Created in 2003.
- Higher impact actions
 - Command and control in the rainforest.
 - Creation of 148 new protected areas covering 640,000 km² (about the size of France) from 2003-2008.
 - Jailed over 700 people for illegal logging, including government employees.

Deforestation

“Brazil leads world in reducing carbon emissions by slashing deforestation.”

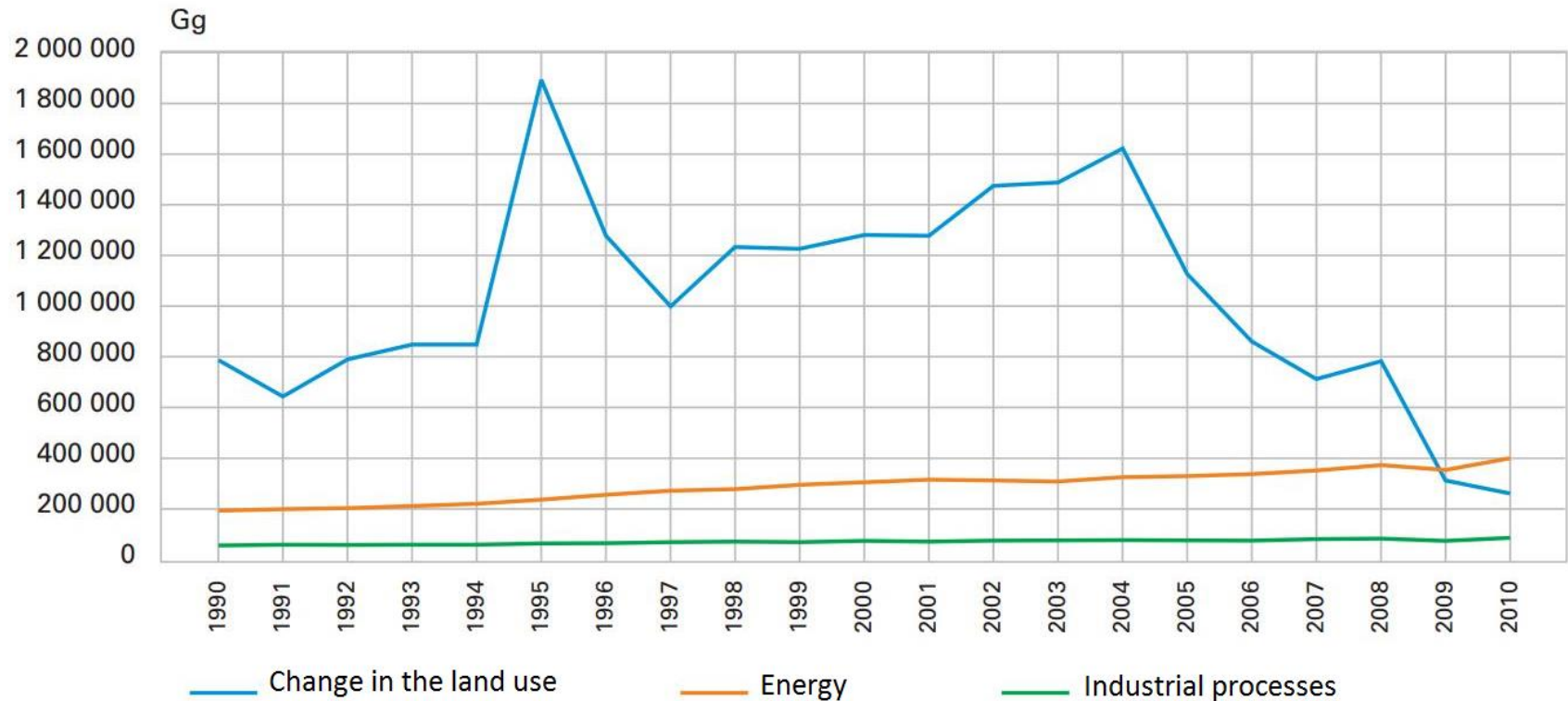
Brian Clark Howard



Source: INPE

Deforestation

Reducing deforestation resulted in CO2 reduction.
Brazilian CO2 emissions 1990-2010.



Source: Science, technology and Innovation Ministry

Deforestation

Accomplishments



- Brazil has reduced deforestation by 70 percent and prevented 3.2 billion tons of carbon dioxide to be released in the atmosphere.
- This cut is more than three times bigger than the effect of taking all the cars in the U.S. off the road for a year.



Different countries with a common goal...



Strategies to Disseminate the Sustainable Model in Brazil

Curious?



- Next presentation in 2 weeks

- Thursday, July 23 - 6:00pm to 8:00pm

- “Maps tell the story of San Diego and Northern Baja. We are Connected”

Questions



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