



Low Carbon Transport - Cap-and-trade system in transport sector: advantages, challenges and barriers of implementation

Overview from Brazil

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November, 15 – IG Meeting - Hague



Summary

- Introduction

Part I

- Climate Change Policies in the national and regional level;
- GHG Emissions in Transport Sector;
- Overview on the transport sector in Brazil;

Part II

- Indicators on transport sector (Technical Discussion – WP3 and WP4).

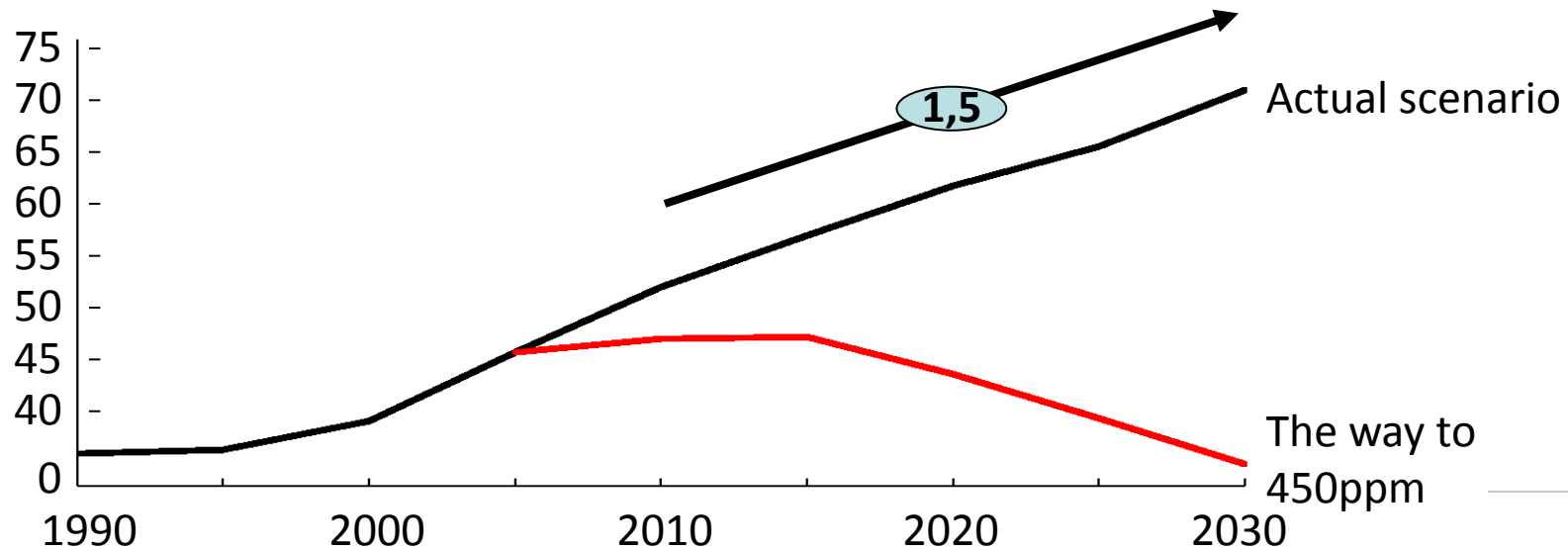
Introduction - Global commitments to reduce GHG emissions



IPCC Guidelines

- Developed Countries should reduce GHG emissions between 25 and 40% by 2020 compared to 1990;
- Developing countries should reduce their GHG emissions (deviation from the baseline scenario - BAU - Business as Usual).

Global GHG emissions
(gGt CO₂e per year)



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PART I

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Climate Change Policies - Brazil

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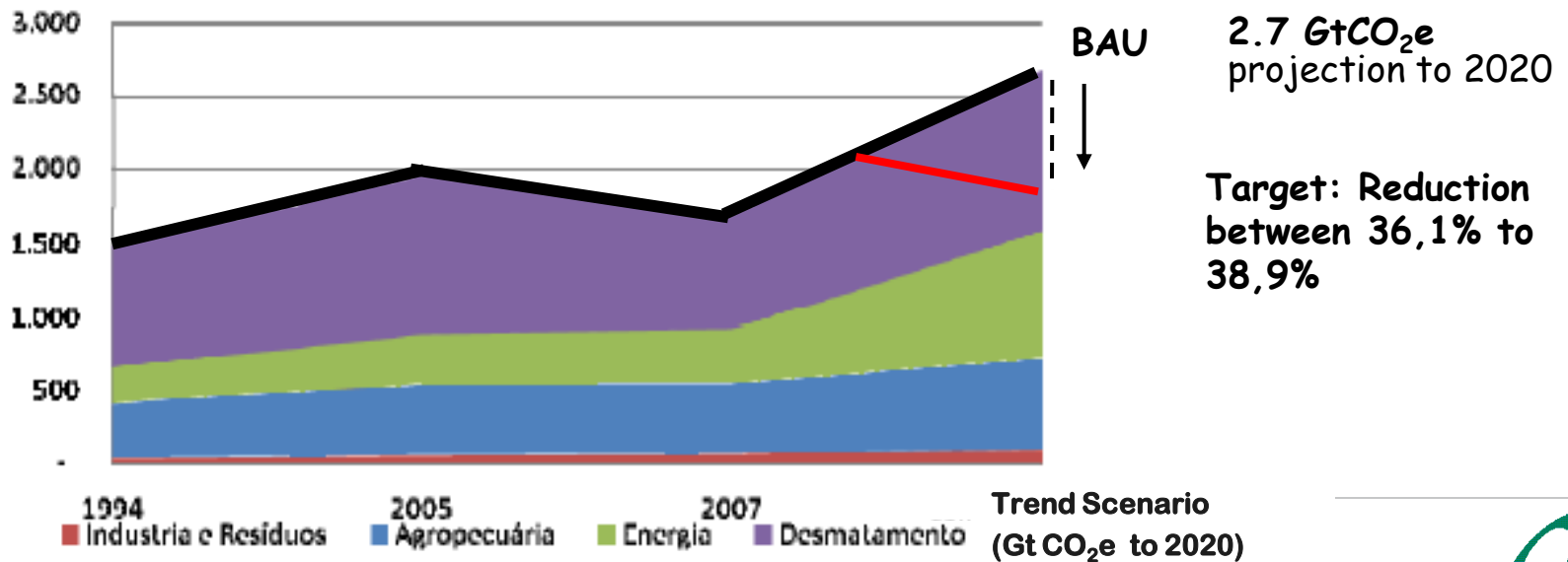
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Climate Change Policies – National Level

• Brazil's National Policy on Climate Change – Law N° 12.187/ 2009

- **Goal:** As a national voluntary commitment, Brazil is adopting actions to mitigate greenhouse gases emissions, in order to reduce from 36.1% and 38.9% of its projected emissions by 2020.

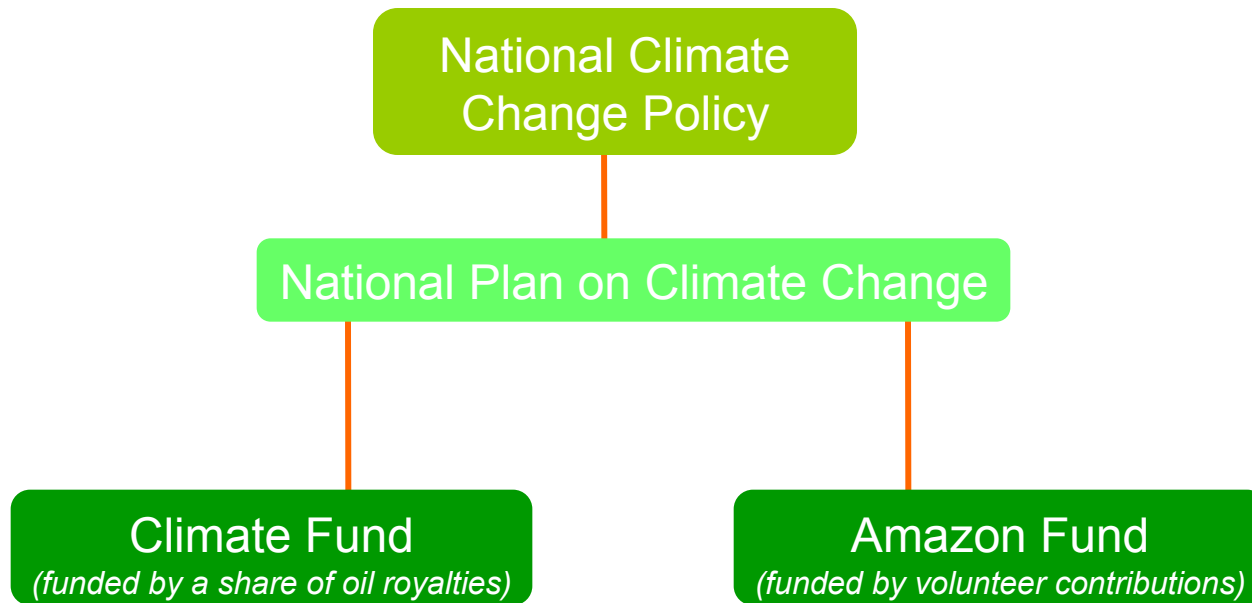


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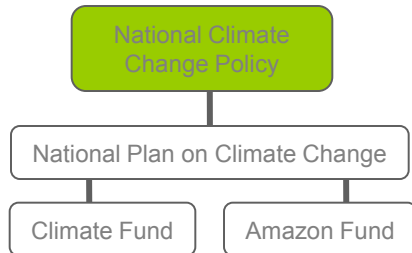




Climate Change Policies – National Level



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National Climate Change Policy

Two permanent nationwide objectives:

- **Reduce** anthropogenic **GHG emissions** and **reinforce carbon sinks** in Brazilian territory;
- Define and implement measures to **promote adaptation to climate change** by local communities, municipalities, states, regions and economic and social sectors, especially those that are more vulnerable to adverse effects.

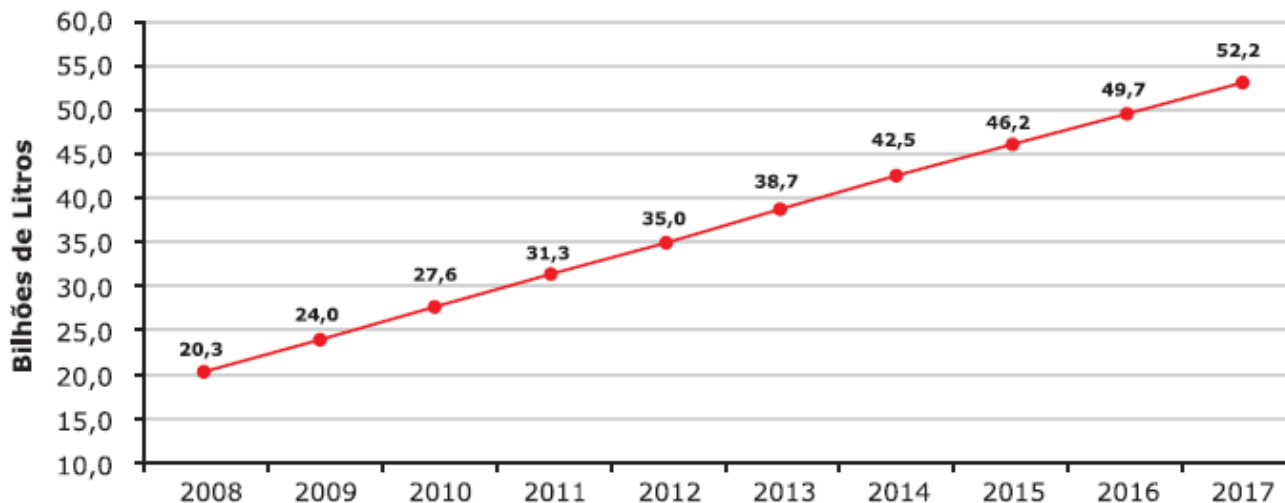
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Biofuels

Encourage the sustainable increase in the share of biofuels in the national transport matrix and also work towards the structuring of an international market of sustainable biofuels.

Demanda Nacional de Etanol Carburante



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Main Actions

Ethanol –increase of 11% per year in the next ten years avoiding the emission of 508 million tCO₂.

Stimulates an international ethanol market

Sugarcane – *phasing out of the use of fire on sugarcane plantations*

Agricultural and cattle raising – promote integrated systems and sustainable practices recovering 100 million ha of degraded pasture.

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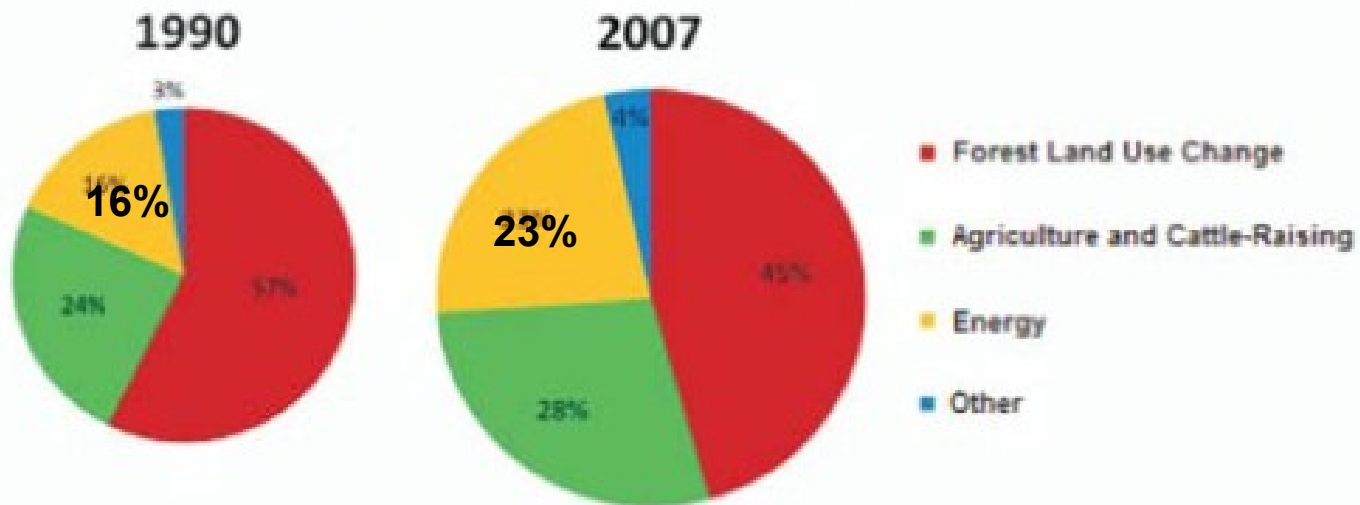


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- Share of CO₂eq emissions from the Sectors Forest Land Use Change, Agriculture and Cattle-Raising, Energy and other, for the period 1990 to 2007. for the years 1990 and 2007.

Brazilian Emissions in Mton of CO₂e (GWP AR2)



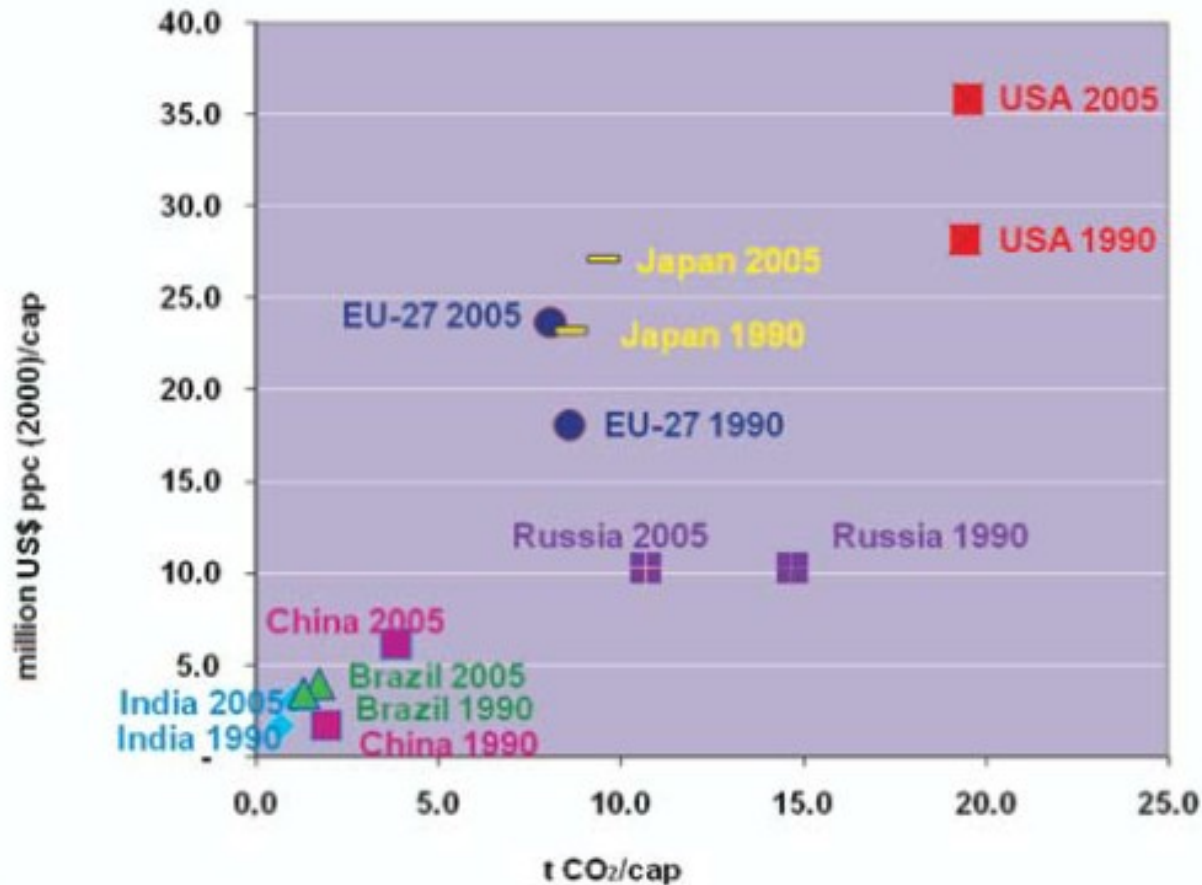
Source: MMA, 2009

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Comparison of Brazilian emissions with other economies – **only energy emissions**



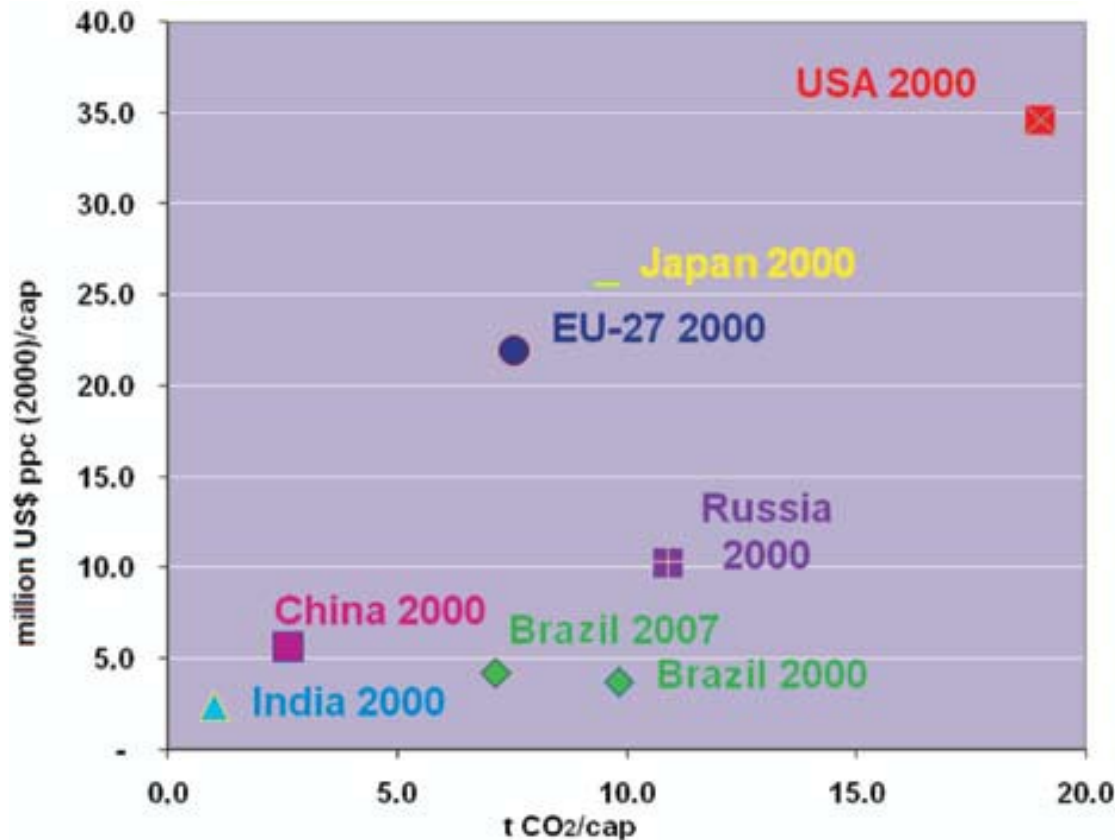
Source: International Energy Agency (IEA, 2009)

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Comparison of Brazilian emissions with other economies – energy and land use change emissions.



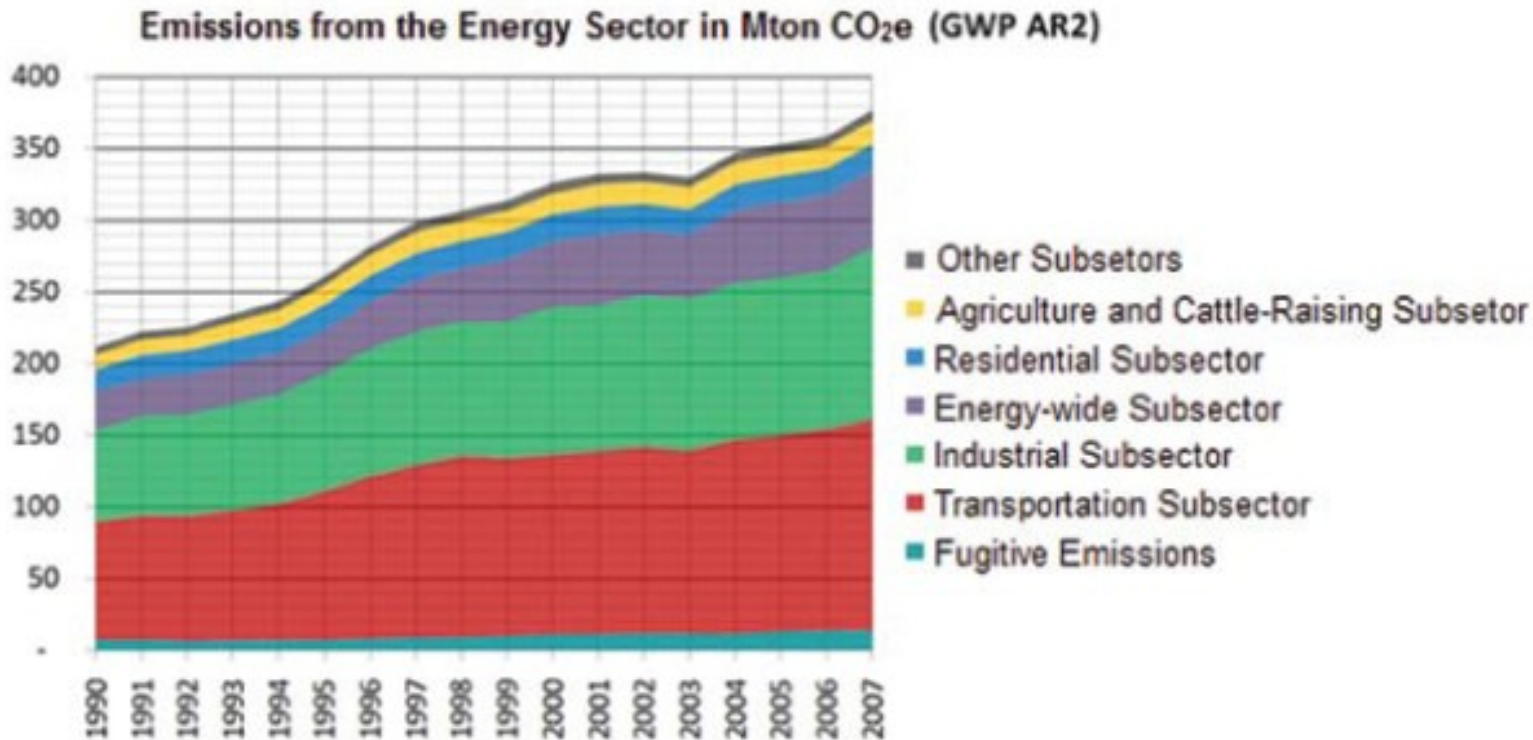
Source: IEA (2009) for GDP and Pop., World Resources Institute (WRI, 2009) for emissions in 2000 and MMA for emissions in 2007 International Energy Agency (IEA, 2009)

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CO₂e emissions from the Energy Sector from 1990 to 2007 period.



Source: Ministry of Environment, 2009

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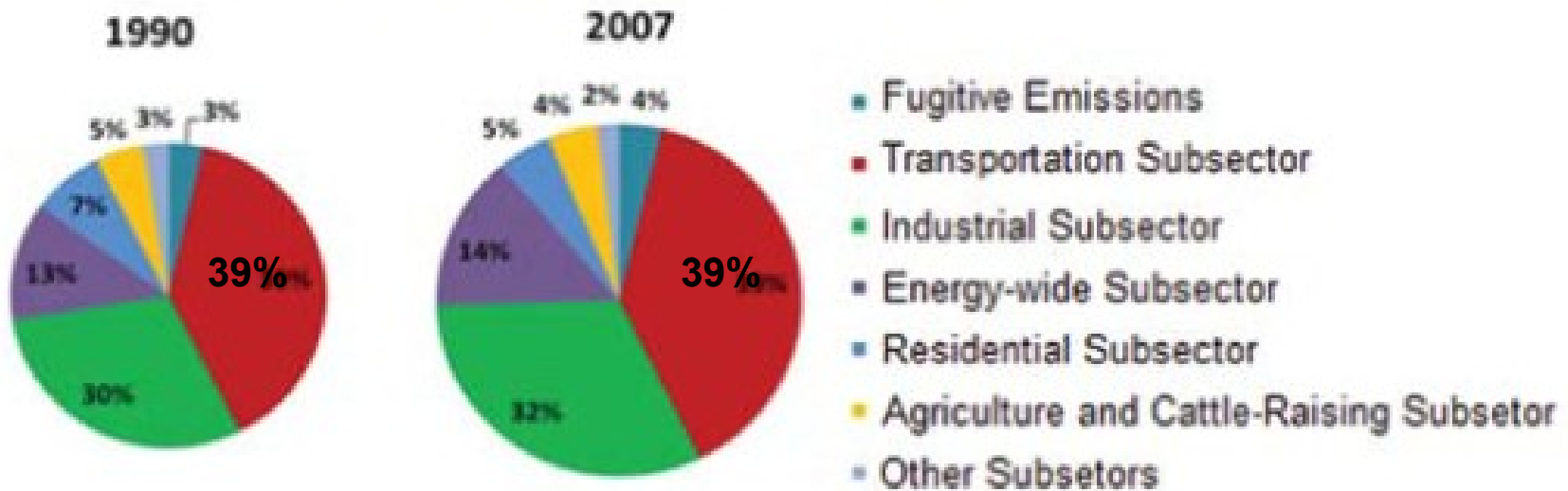


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Emissions from the energy sector include the burning fossil fuels emissions in the subsectors of transportation

Emissions from the Energy Sector



Source: MMA, 2009

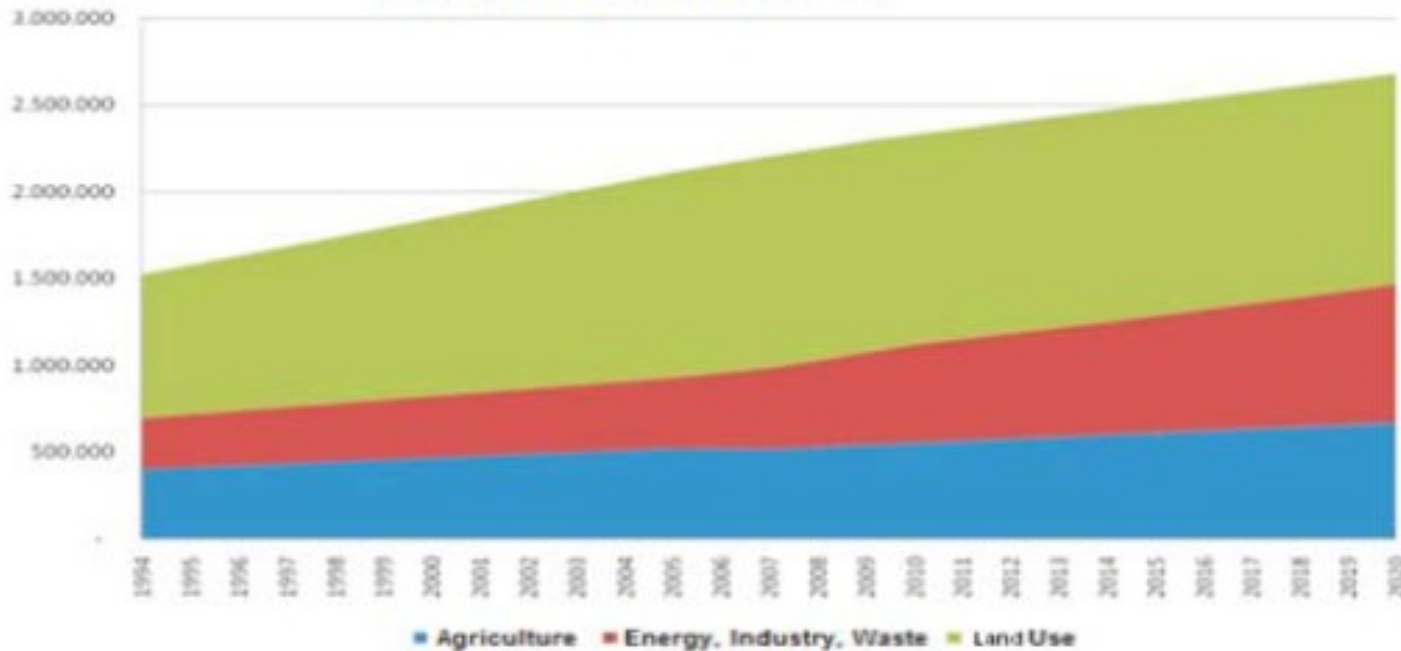
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Brazil presented, on the 13th November 2009, the voluntary commitments to mitigation of climate change and the goals to reduce around 36.1% and 38.9% on the estimates of emissions for 2020.

Basic Scenario (BAU)



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NAMAS – Nationally Appropriate Mitigation Actions

Mitigation Actions (NAMAs)	2020 (trend)	Reduction Amplitude 2020 (mi tCO _{2e})		Reduction Rate	
Land Use	1084	669	669	24,7%	24,7%
Amazon Deforestation Red. (80%)		564	564	20,9%	20,9%
Cerrado Deforestation Red. (40%)		104	104	3,9%	3,9%
Agriculture and Cattle-Raising	627	133	166	4,9%	6,1%
Pasture Recovery		83	104	3,1%	3,8%
Agriculture-Cattle Integration		18	22	0,7%	0,8%
No-till Farming		16	20	0,6%	0,7%
Biological Nitrogen Fixation		16	20	0,6%	0,7%
Energy	901	166	207	6,1%	7,7%
Energy Efficiency		12	15	0,4%	0,6%
Biofuel Implementation Use		48	60	1,8%	2,2%
Energy Supply Expansion of Hydroelectricity		79	99	2,9%	3,7%
Alternative Sources		26	33	1,0%	1,2%
Other	92	8	10	0,3%	0,4%
Ironworks - Replace coal with charcoal		8	10	0,3%	0,4%
Total	2703	975	1052	36,1%	38,9%

Source: Brasil, 2009

Brazil start to discuss about the importance of a Plan to the Transport Sector in the context of the NAMAs and sectorial plans

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National Level

Brazil, within the commitments under the Convention on Climate Change, presents its **Second National Communication of Brazil to UNFCCC.**

**SEGUNDA COMUNICAÇÃO NACIONAL
DO BRASIL À CONVENÇÃO-QUADRO
DAS NAÇÕES UNIDAS SOBRE
MUDANÇA DO CLIMA**



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Brazilian Panel on Climate Change

- On September 2009, Brazil launched the Brazilian Panel on Climate Change, an initiative inspired by the UN Intergovernmental Panel on Climate Change (IPCC);
- In order to provide scientific information on climate change for the country, the Panel will bring together about 100 scientists from different geographical regions and Brazilian universities, and should provide a better understanding about climate science and the risk of climate change observed and projected for the future;
- The reports will be available to the United Nations Framework Convention on Climate Change (UNFCCC), the governments and society. Special reports also can be requested to the Panel..

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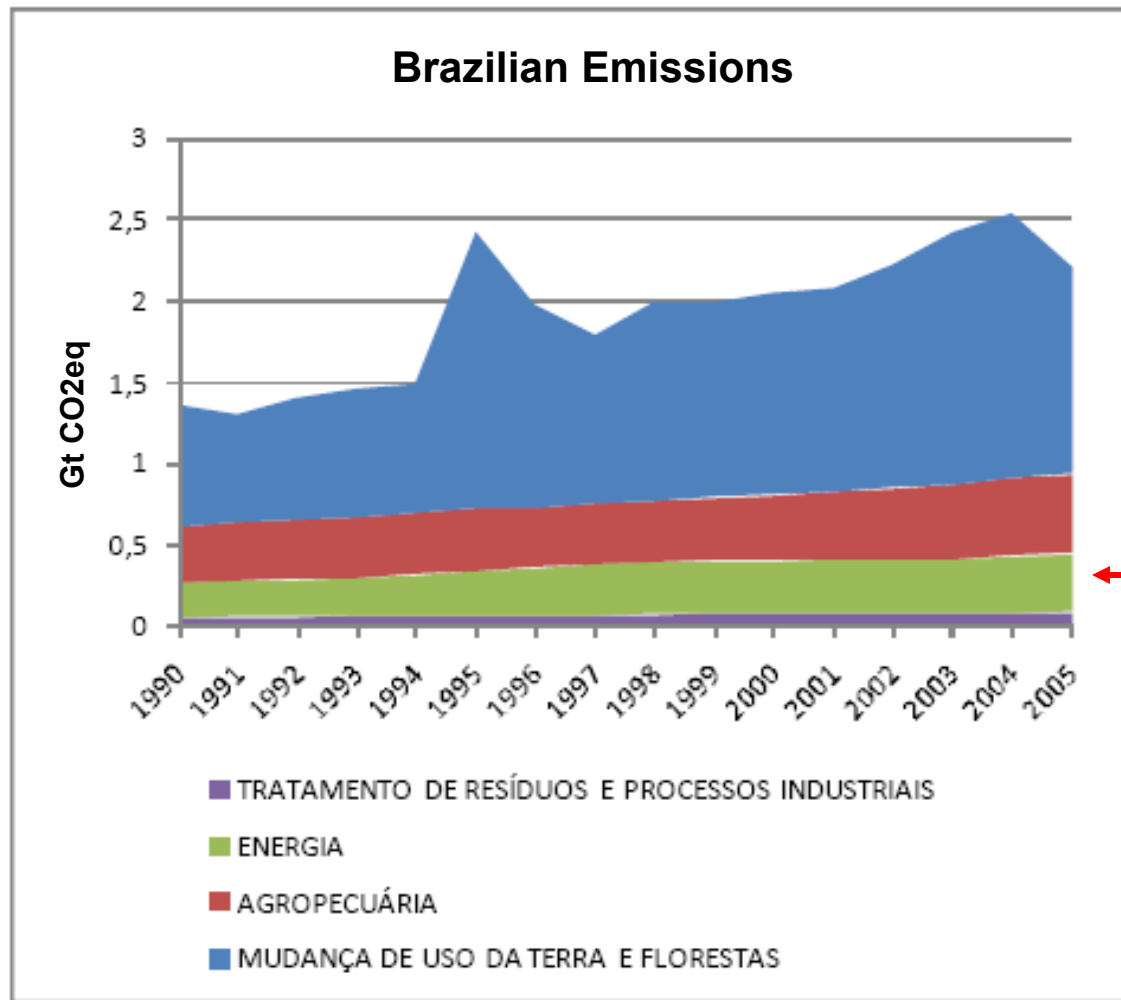




GHG Emissions - Brazil

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Energy Sector - including transport

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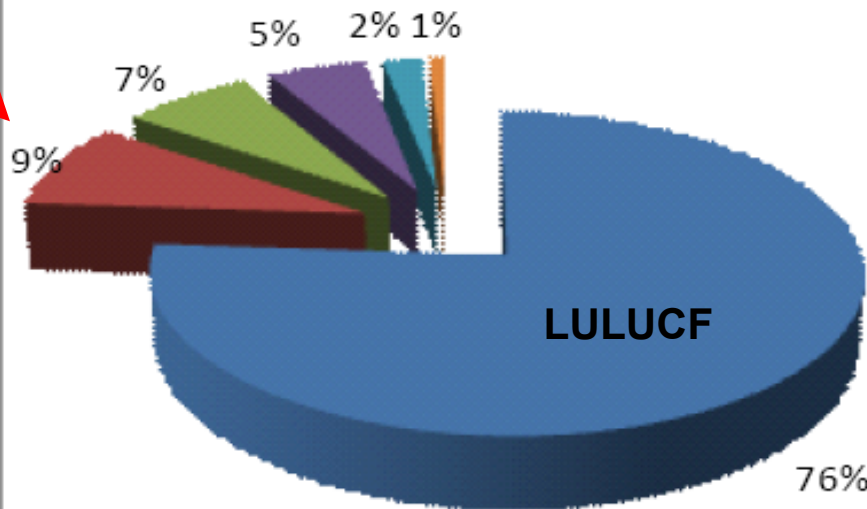


National Level



CO₂ - 1990

Transport – burning fossil fuels



- Mudança no Uso da Terra e Florestas
- Queima de Combustíveis - Transporte
- Queima de Combustíveis - Indústria
- Queima de Combustíveis - Outros Setores
- Processos Industriais
- Emissões Fugitivas

Source: MCT (2004) The Brazilian Inventory of Anthropogenic Emissions and Removals of Greenhouse Gases to the 1990 to 1995 period – First Brazil's Inventory

Date and venue of event



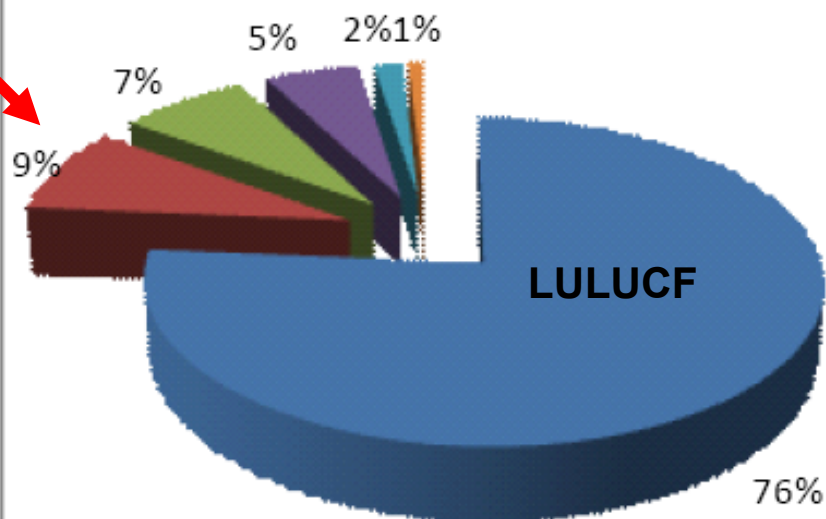
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National Level



CO₂ - 2005

Transport – burning fossil fuels



- Mudança no Uso da Terra e Florestas
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Source: MCT (2009) The Brazilian Inventory of Anthropogenic Emissions and Removals of Greenhouse Gases to the 2000 to 2005 period – Second Brazil's Inventory

Date and venue of event



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Regional level

- **Law N° 5690/ 2010 – Global Climate Change Policy and Sustainable Development — Rio de Janeiro, Brazil**

- Art. 1° - Establishes the principles, objectives, guidelines and instruments of the State to prevent and mitigate the effects and adapt to climate change state - Facilitate deployment of a low carbon economy in the state;

- Art. 3°, III - Reduce emissions per unit of production, and to implement measures that reduce GHG emissions and increase removals by sinks of carbon within the state.

**Brazilian cities that were chosen to be included in the CATCH;
Rio de Janeiro (more than 6 million inhabitants) and
Sao Paulo (approximately 19 million inhabitants)**

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Regional level

Law N° 13.798/ 2009 – Climate Change Policy of State of São Paulo – São Paulo, Brazil

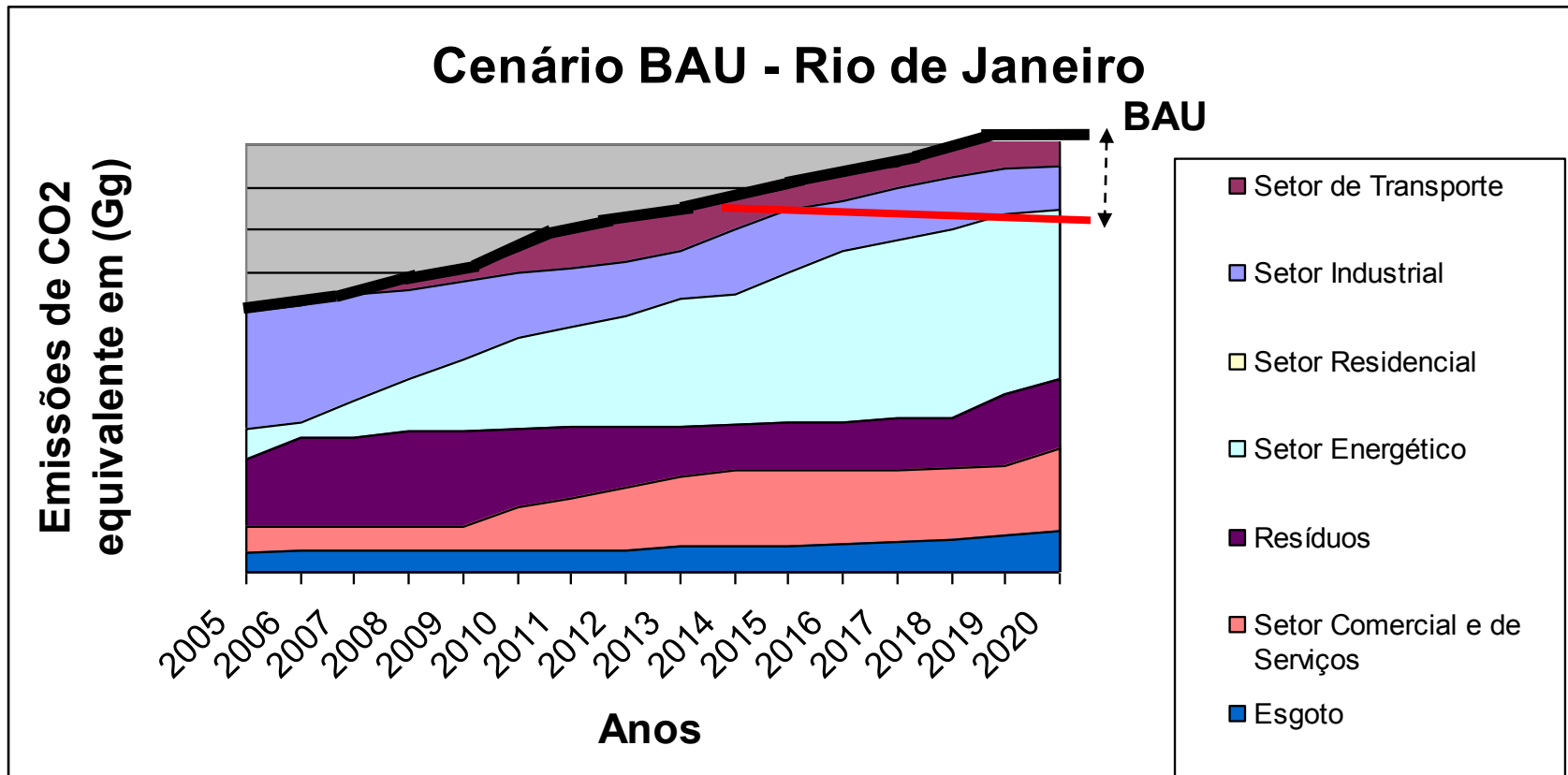
- Art. 1º - Establishes the principles, objectives, guidelines and instruments of applications;

Art. 2º - General Goal - establish the State's commitment to front challenge of global climate change, set out the conditions for the necessary adaptations to the impacts of climate change derivatives, as well as contribute to reducing or stabilizing concentrations of greenhouse gases in the atmosphere.

The potential of emissions of Rio de Janeiro to 2020 – BAU Scenario



What is the potential to reduce emissions of Rio de Janeiro?



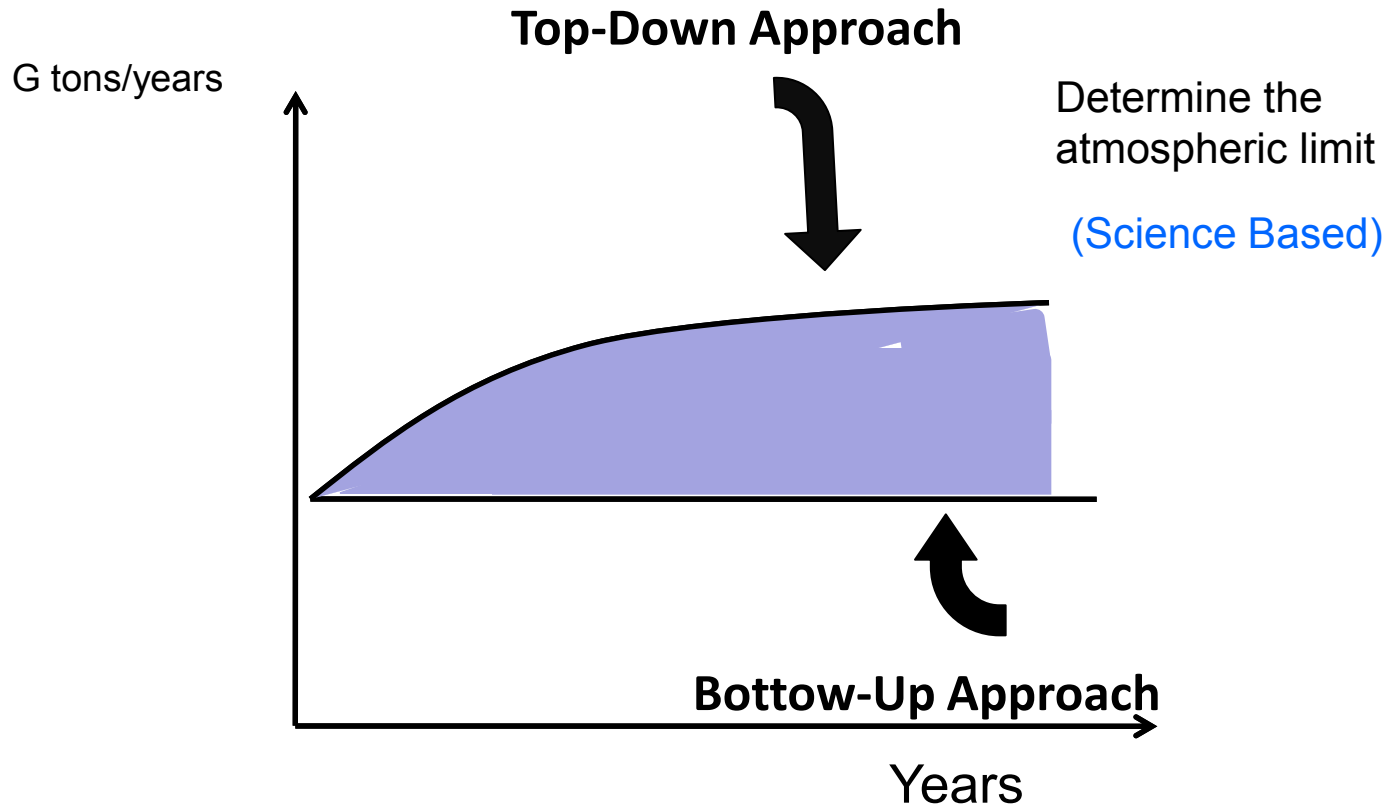


Overview on the transport sector in Brazil

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Sectorial and National Strategies for Emission



Determined by Countries Needs
(Equity Based)

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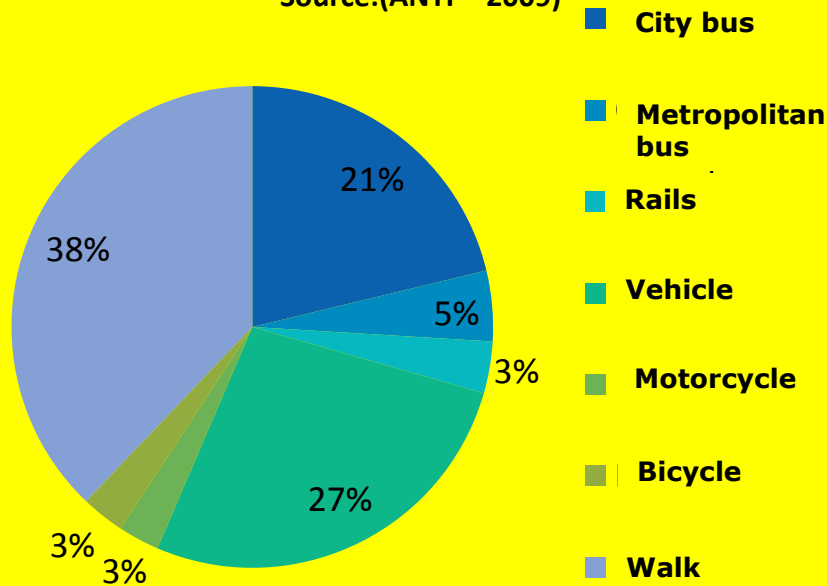
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The importance of Road Transport in Brazil



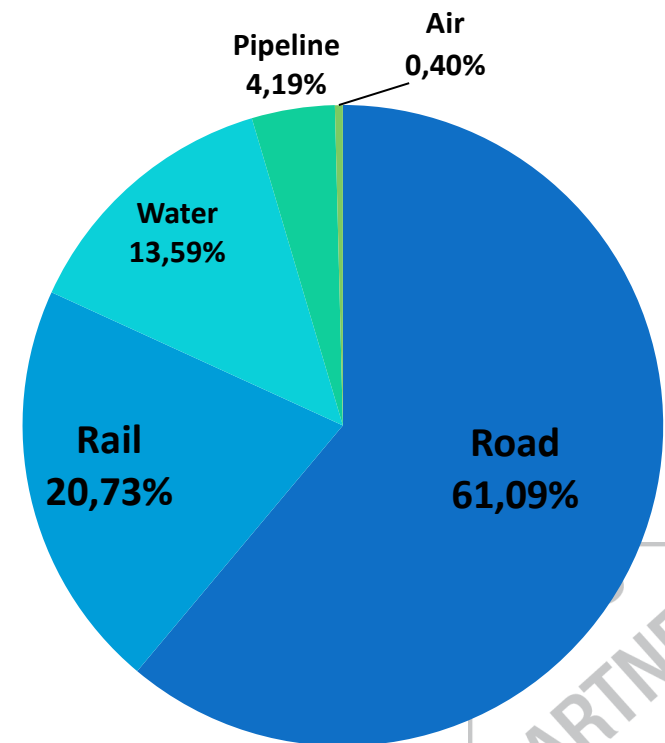
Passenger transport Cities with more than 60 000 inhabitants

Source:(ANTP - 2009)



Cargo transportation

Source: Boletim Estatístico CNT 2009



About 60% of passenger transport in major cities is done by road

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GHG and Air Emissions - Inventory

1st National Air Emissions Inventory for automotive Vehicles for Road



Ministério do
Meio Ambiente

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1st National Air Emissions Inventory for automotive Vehicles for Road

- Represents a valuable support for the actions of the Federal government, states, municipalities and society itself in the planning, implementation and monitoring of public policies aimed at improving environmental quality and mitigating climate change;
- management of air quality in the country, according to the PRONAR - **National Programme for Control of Air Quality**;
- Were included emissions of regulated pollutants by the **Program for Control of Pollution by Motor Vehicles** (PROCONVE) - carbon monoxide (CO), nitrogen oxides (NO_x), non-methane hydrocarbons (NMHC), aldehydes (RCHO), Particulate Matter (PM) and evaporative emissions, in addition to **greenhouse gases** like **carbon dioxide** (CO₂) and **methane** (CH₄).

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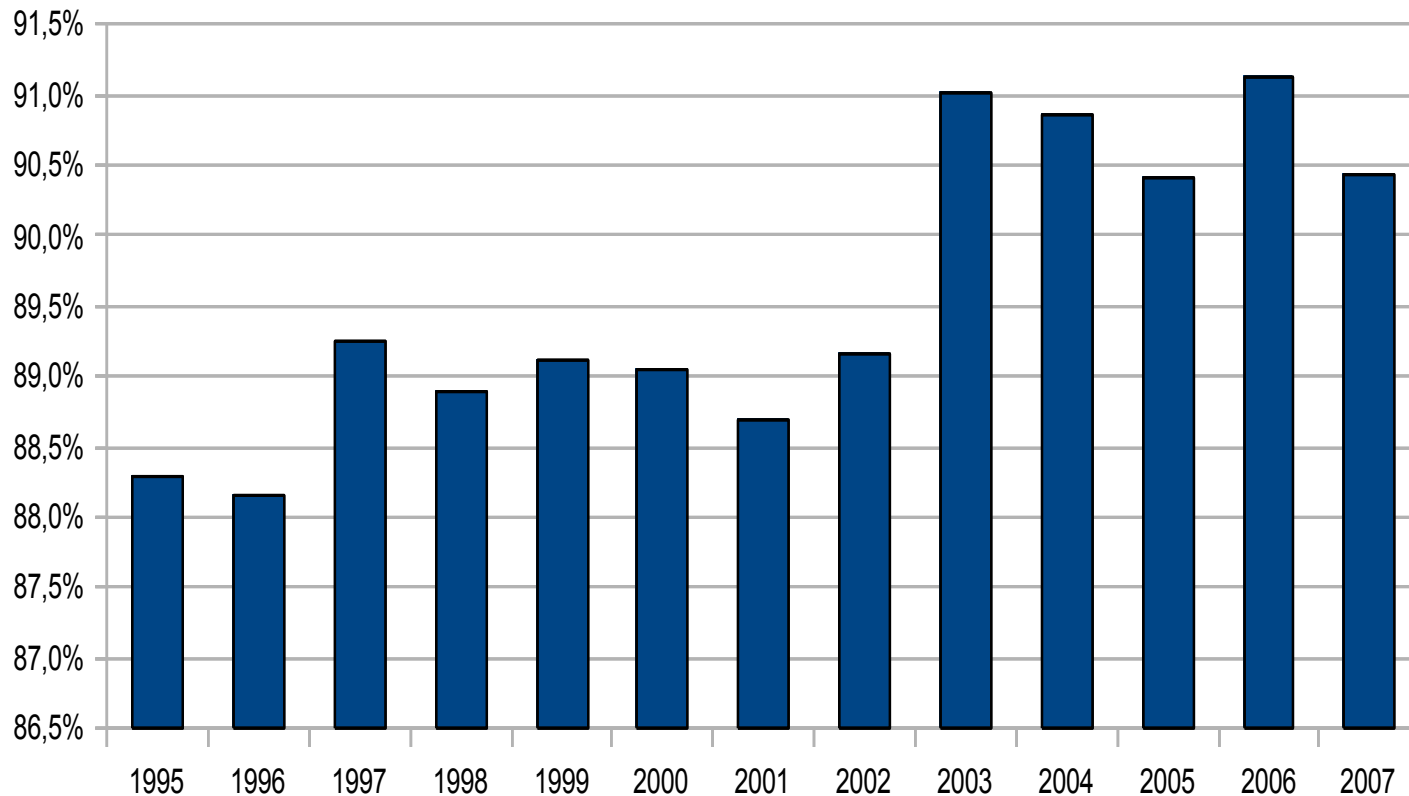
1st National Air Emissions Inventory for automotive Vehicles for Road

- The inventory also **provides information about the relative contributions of fleets of cars, light commercial vehicles, buses, trucks and motorcycles**, and how the different phases of “Program for Control of Pollution by Motor Vehicles (PROCONVE) that is responsible, since 1986, for the introduction of different fuels and automotive technologies, and had an influence and could influence this scenario yet;
- As a **tool for environmental management**, the preparation of the inventory, at local level, **contribute to the assessment of the impact of emissions on human health**, for planning and evaluation of plans (Control of Pollution from Vehicles in Use);
- It also provides valuable information for decisions on the improvement of vehicle technology and better fuels, for setting new limits and to subsidize energy efficiency programs for vehicles, as well as research and technologies aimed at reducing emissions from transport.

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% Of CO₂ emissions from the sector in the Road Transport Sector in Brazil



Source: Ministry of Environment - MMA, 2010

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Fleet

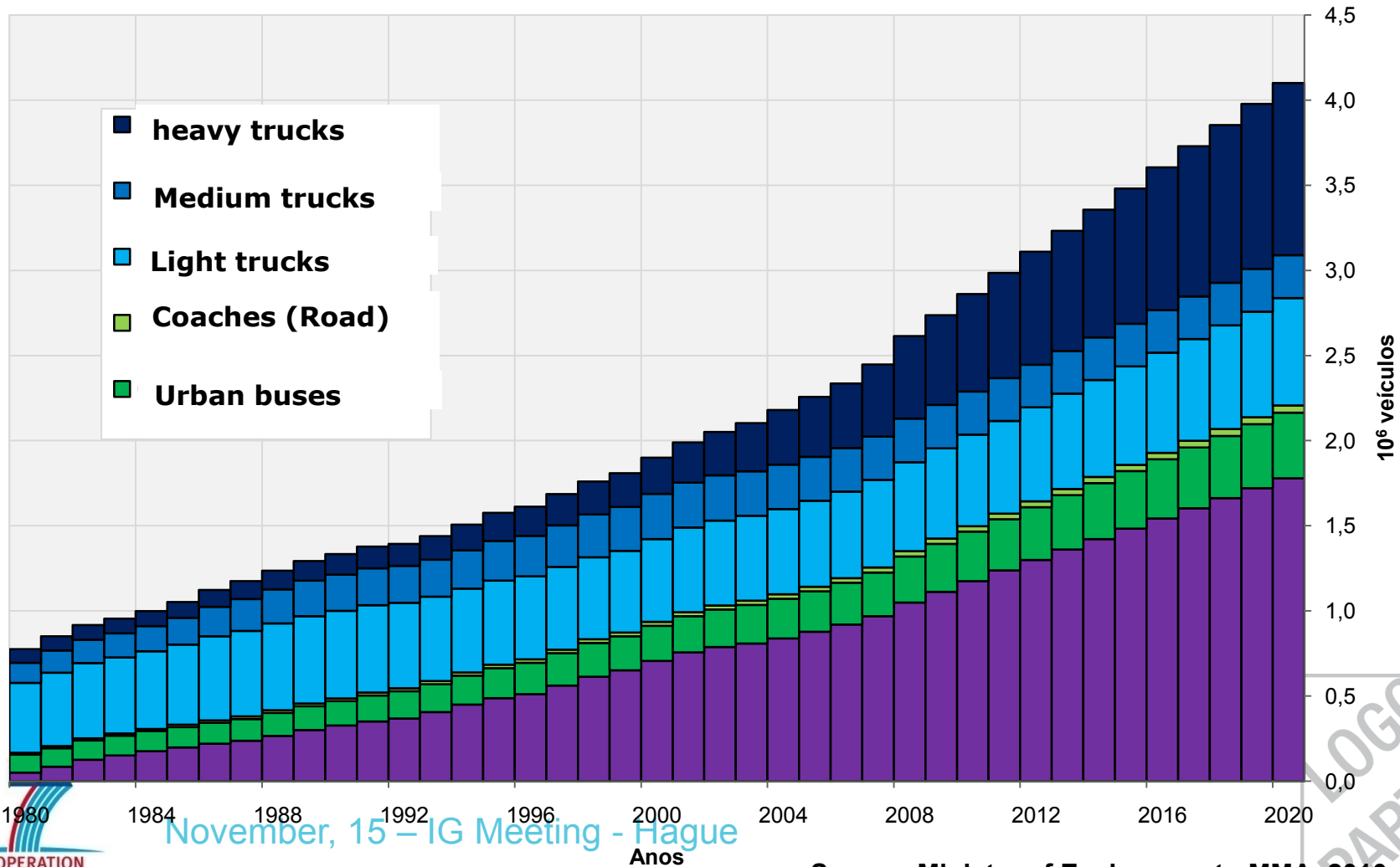
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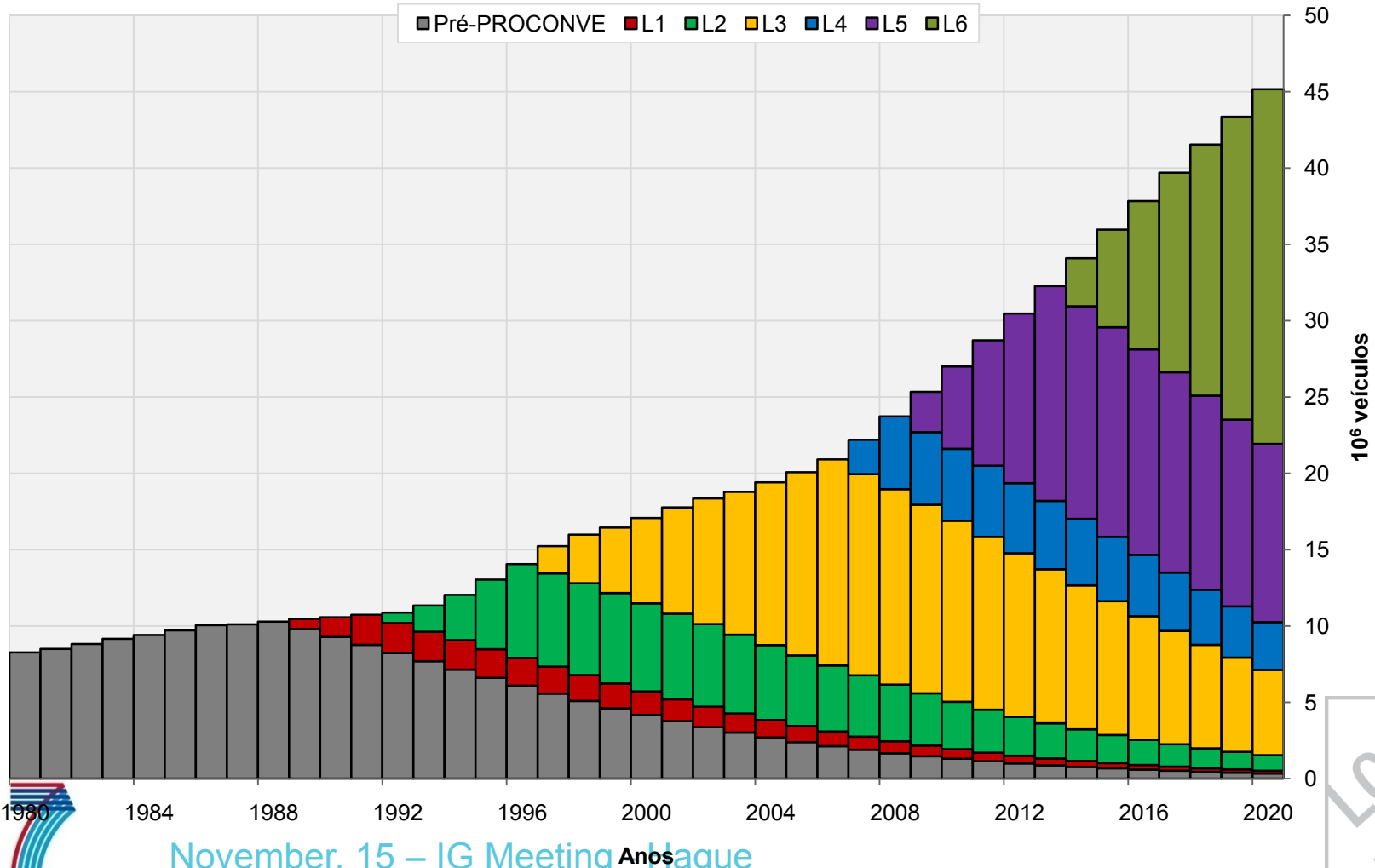
Cycle diesel - vehicle fleet



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Fleet of vehicles and light commercial Otto



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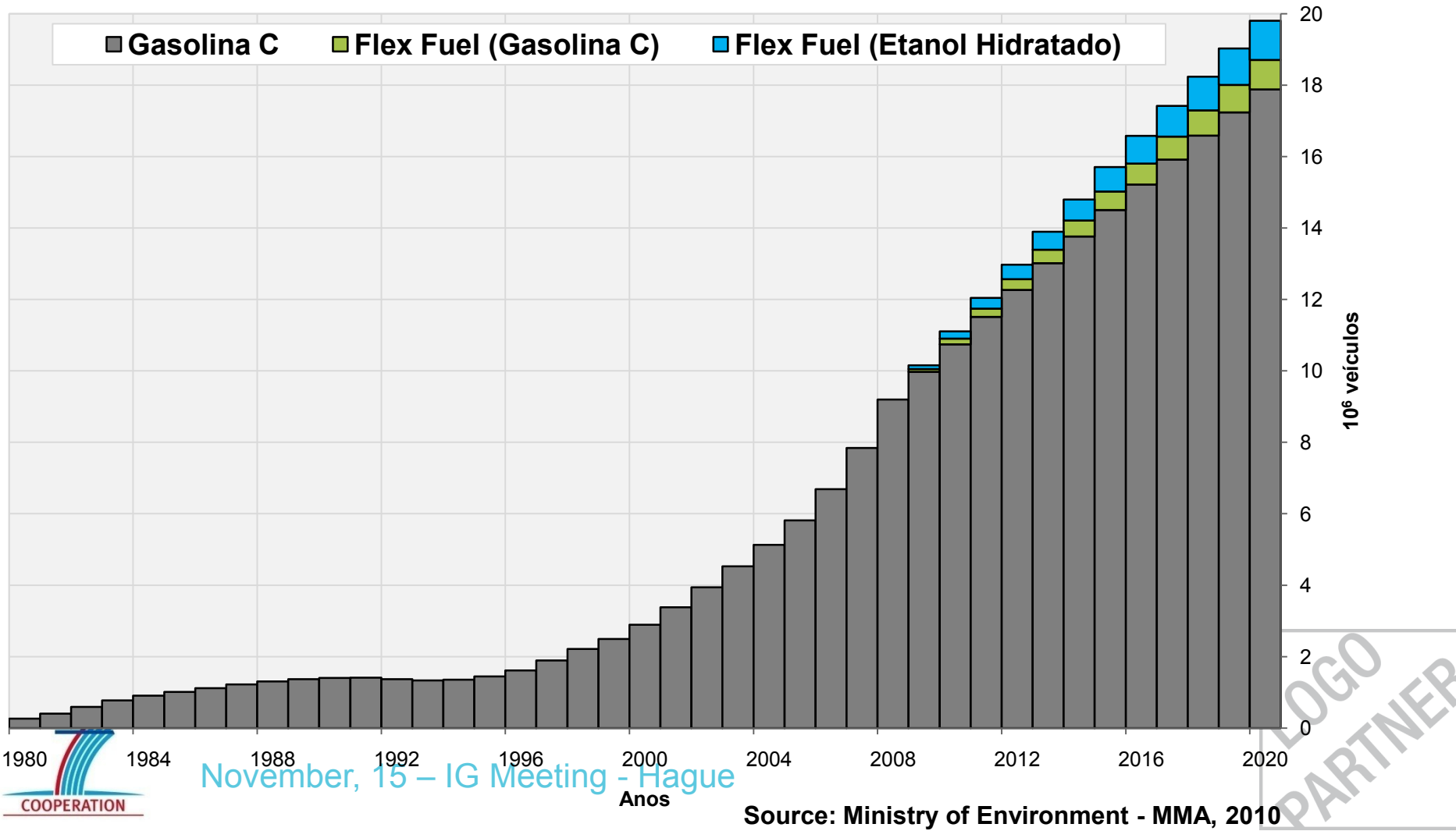
Source: Ministry of Environment - MMA, 2010



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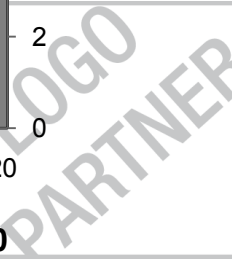


Fleet of motorcycles



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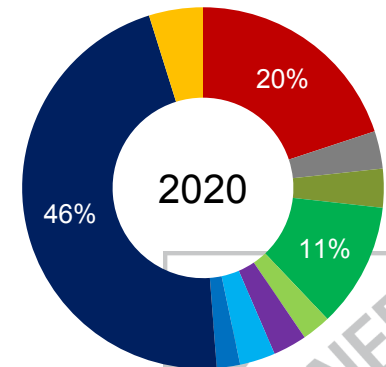
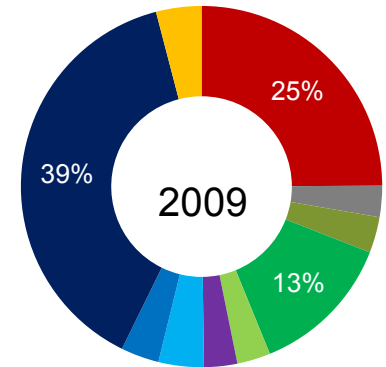
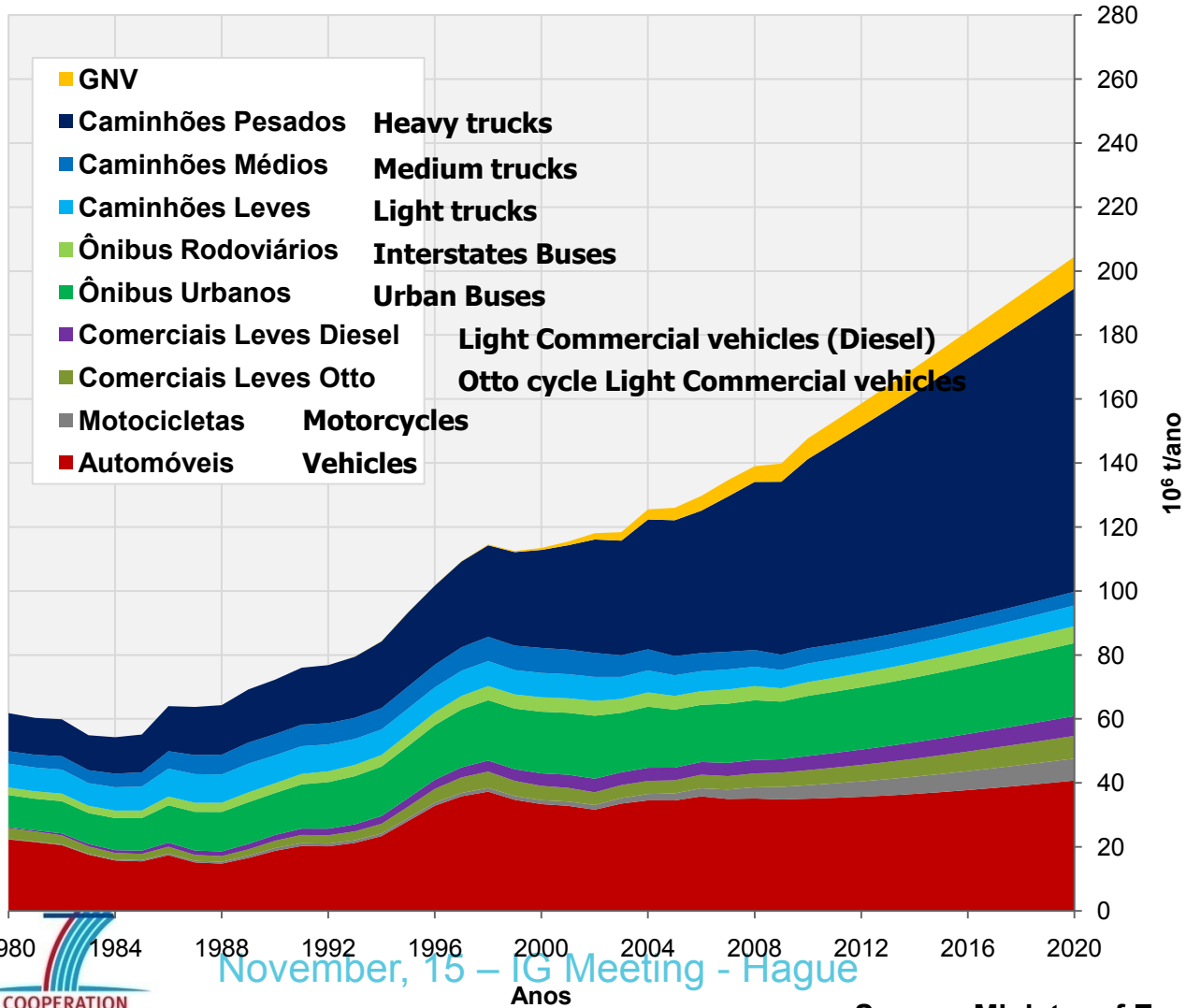
Source: Ministry of Environment - MMA, 2010



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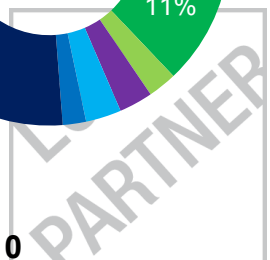


CO₂ Emissions from fossil

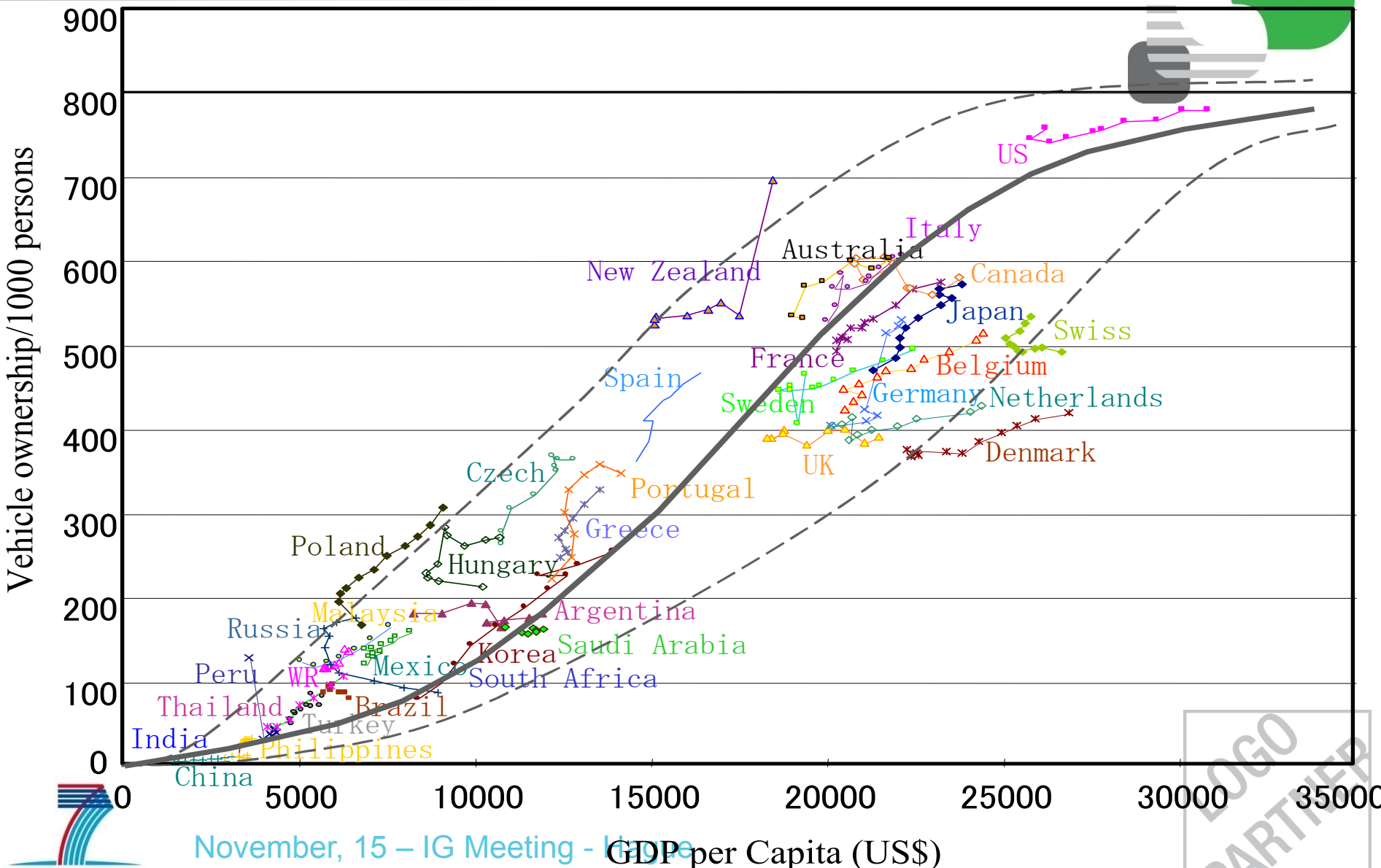
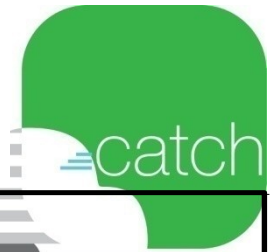


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Source: Ministry of Environment - MMA, 2010

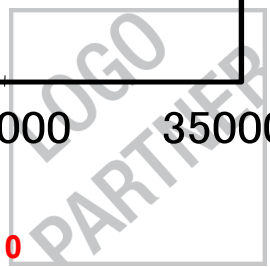


Trend: Increasing Rate of motorization is inevitable!



November, 15 – IG Meeting - **GDP** per Capita (US\$)

Source: **Ministry of Environment - MMA, 2010**



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- Fuels
 - Increase the participation of Biodiesel/Etanol
 - Improve the quality of fuels
- Vehicles/Fleet
 - Technological improvement
 - Maintenances
- Transport System
 - Model
 - Management
 - Circulation

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Possible Ways to Lower Emissions

Circulation



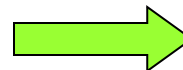
Fleet



Infra-Structure

- ✓ **Number of Trips** - reduce the number of vehicles circulating;
- ✓ **Trips Length**;
- ✓ **Transport Mode**: use more efficient modes and integration of different modes;
- ✓ **Vehicles Speed** – reduce traffic congestion;
- ✓ **Fuel used** – use renewable
- ✓ **Consumption** – increase vehicles efficiency.

Energy Consumption



Emissions

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LOGO
PARTNER

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Possibilities of Mitigation

- Weight (materials and aerodynamic)
- Load Factor
- Eco- driving
- Energy Efficiency (engine, tires, etc)
- Traffic Management
- Fuels
- Transport Demand
- Maintenance
- Transport and Urban Planning

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Alternatives for passenger Transportation BRT (*Bus Rapid Transit*)

- The use of private transport has grown
- maximizing vehicles occupancy and public space (energy efficiency, less emission and attraction of passengers)
- Basically the same infra-structure
- Flexibility according to demand
- Importance of the usage of Information Technology



Considerations for CO₂ Emissions Reduction

Definition of the Base Line: Construction on a hypothetical situation that existed in the absence of project. Base expectations of this - complex exercise with many variables;

Area of Influence : Emissions displacement;

Monitoring: Procedure to ensure that the emission behavior is the estimated;

“The reactions and feedback” : Improvement of traffic encourage the return of private vehicle usage.

These difficulties mean that a project of this type lose attractiveness when compared with other simpler



Considerations for CO₂ Emissions Reduction

Institutional Aspects: - Large numbers of staff in decision-making sector and various levels of power (local, state and federal);

Co-benefits : Improvement of air quality, reduction of trip times, Reduction of noise pollution and the importance of better use of public space.

The appreciation of the co benefits of such projects could be considered

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Advantages/Challenges/Barriers

Advantages: Promoting the transition to a more efficient transport system with huge gains for the country (cargo and passenger) and quality of life in cities;

Challenges : Institutional arrangement for implementation and control of the initiative and / or project, estimated emissions from the sector and monitoring of results;

Barriers: Definition of a "cap" for Brazil and for the industry without incurring a restriction on the development and establishment of a distributive model of emissions (budget).

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Date and venue of event

