Centro Clima
CENTRO DE ESTUDOS INTEGRADOS SOBRE MEIO AMBIENTE E MUDANÇAS CLIMÁTICAS

Center for Integrated Studies on Climate Change and the Environment

Federal University of Rio de Janeiro – Brazil

www.centroclima.org.br

Brazil LCS Scenarios

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William Wills

ww@ufrj.br

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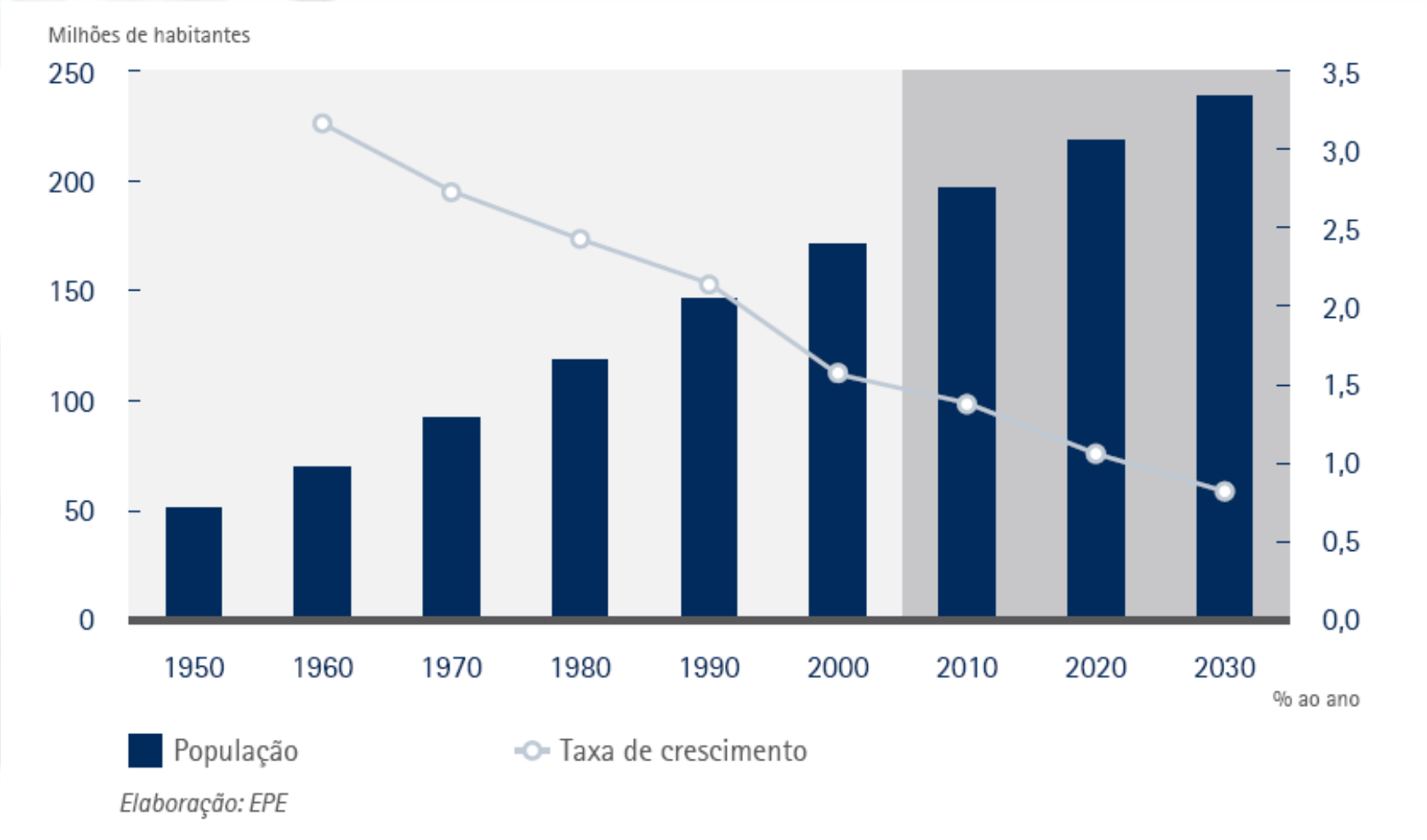
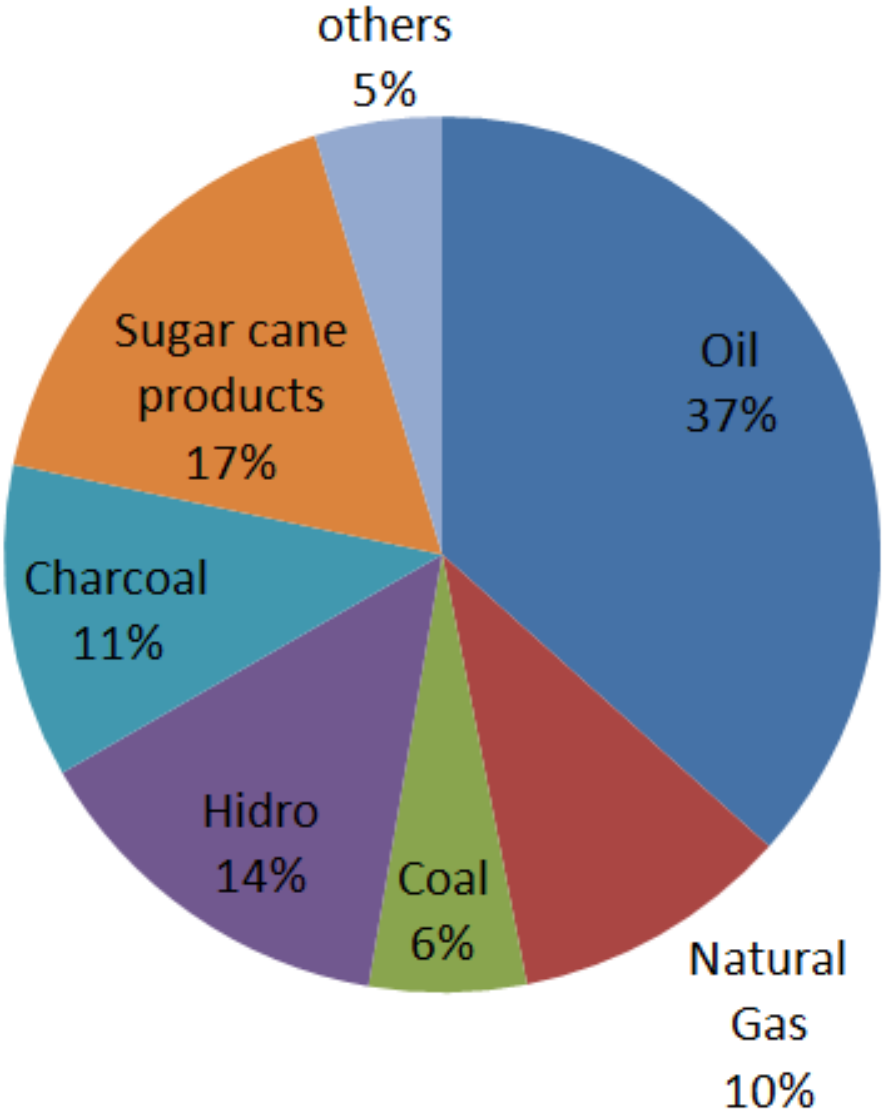
1 – Background

Population



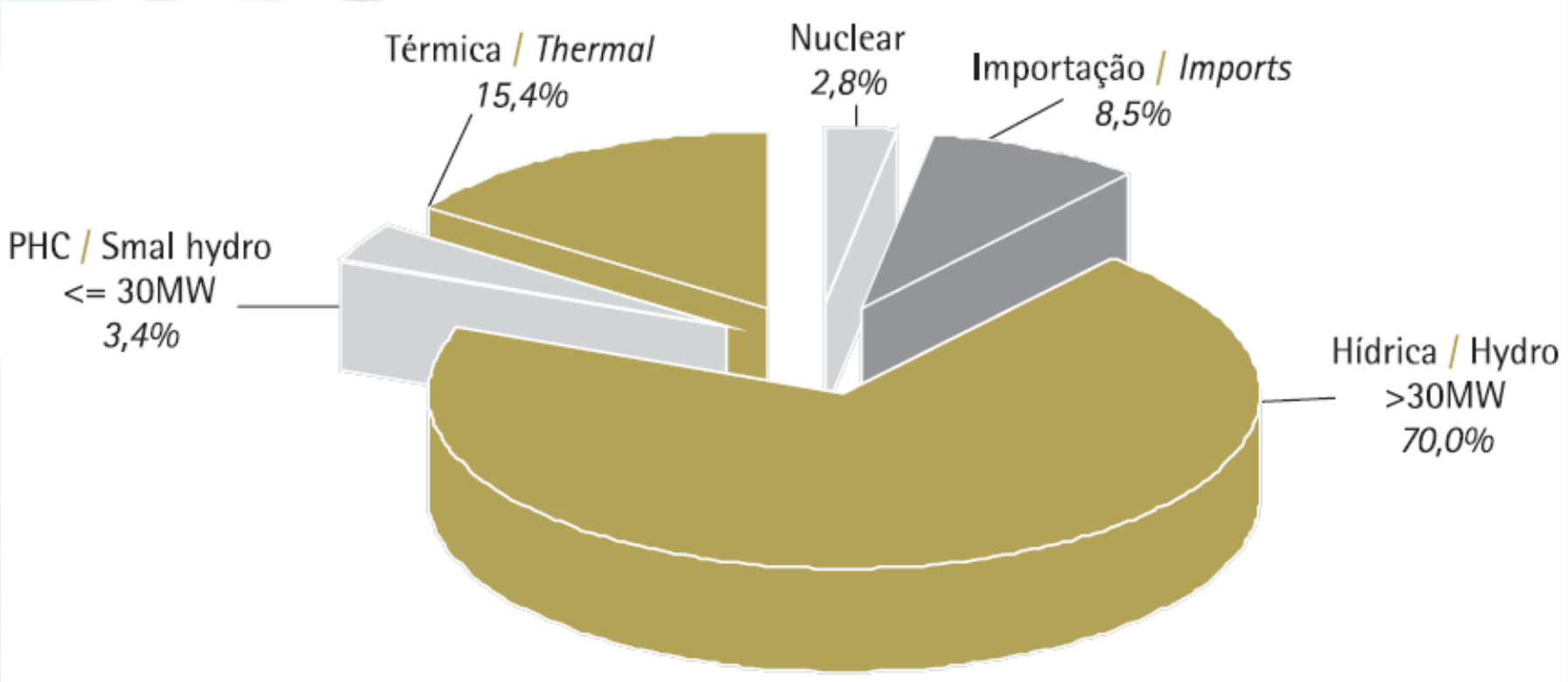
Total Energy Consumption

Around 45% of renewable energy!



Source: BEN, 2009

Electricity



- 0,0246 ton CO_2/MWh in 2009

Source: BEN, 2009

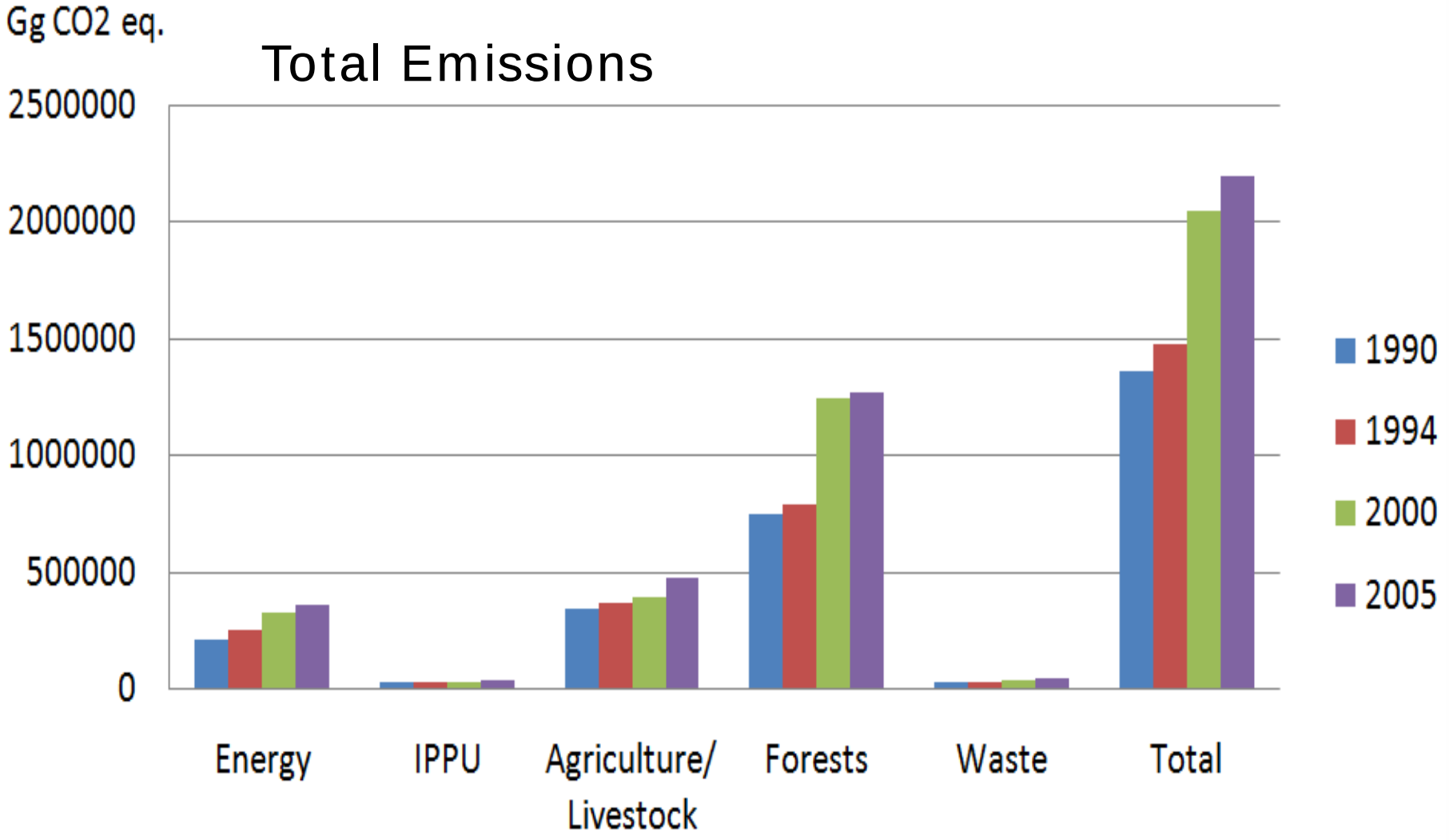
Key information

	2000	2008	2030
Population, total	174.2 million	188.7 million	238 million
Population growth (annual %)	1.4	1.0	0.8
GDP per capita, (current 1000 US$)	3.8	4.7	7.8 - 15
GDP (current US$)	644.7 billion	1.6 trillion	3.8 – 5.8 trillion
GDP growth (annual %)	4.3	5.1	4.0 – 6.0

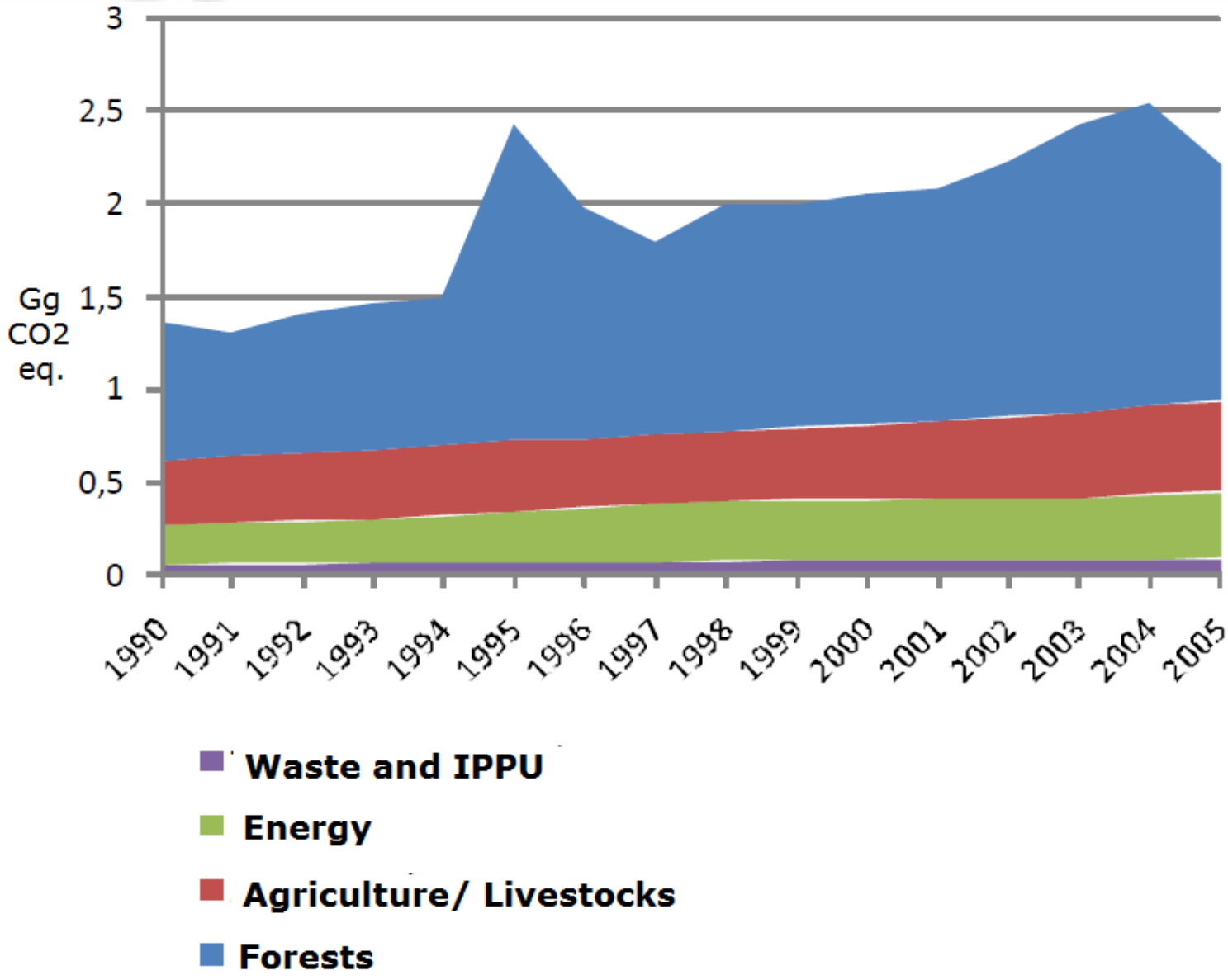
Source: World Development Indicators database, September, 2009

2 – Second National Communication

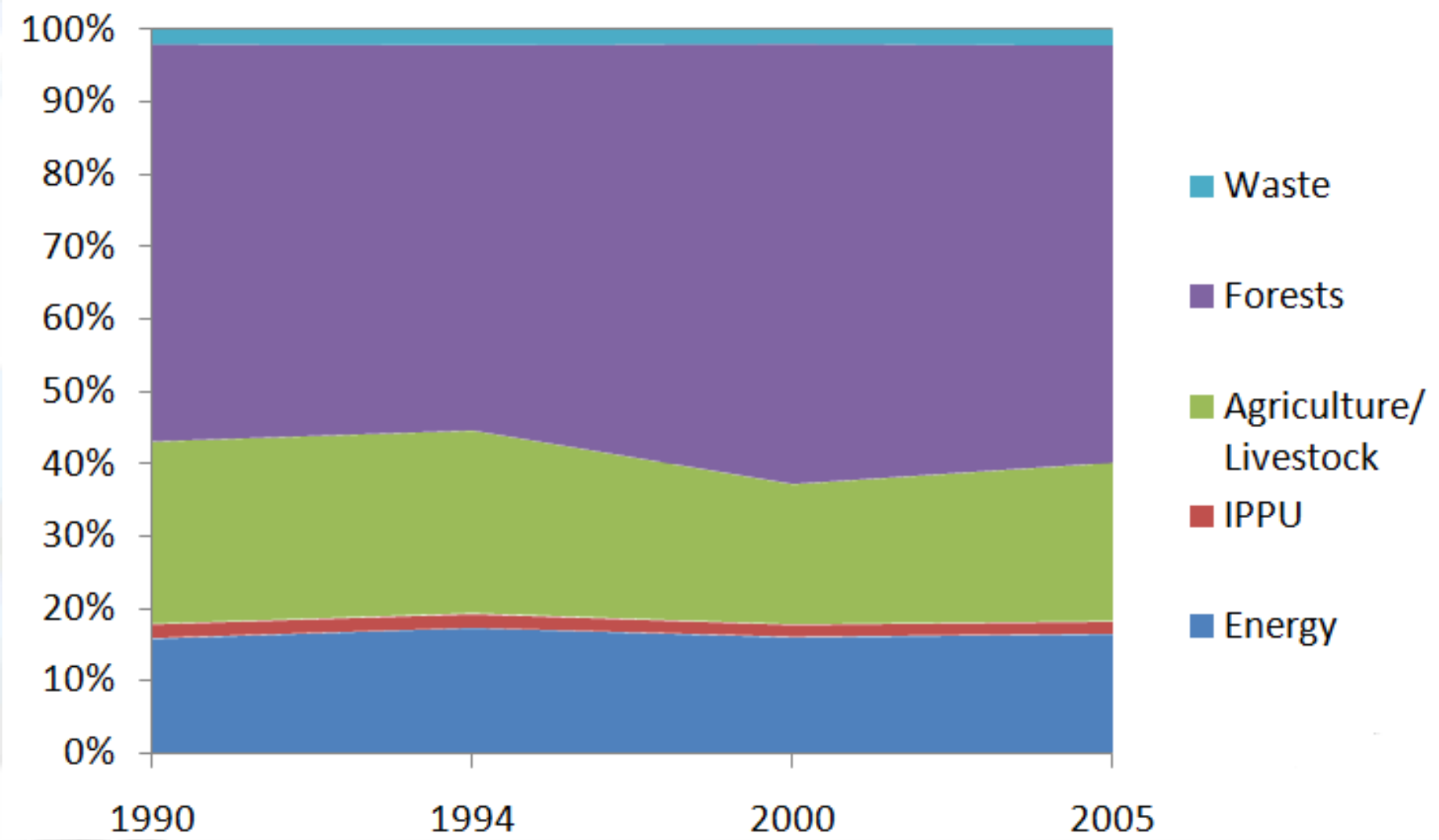
Preliminary data



Total Emissions



Total Emissions (%)



3 - Brazil's GHG Emissions and Mitigation Actions in 2020

GHG Emissions / Mitigation Actions Million tons CO_2eq/y	2005 Data	2020 BAU	2020 Mitigation Scenario	Reduction in 2020 M t CO_2eq	Reduction / BAU Total in 2020 - %
Land Use Change	1268	1084	415	669	24.7%
Agriculture/Husbandry	487	627	461 – 494	133 – 166	4.9 – 6.1%
Energy	362	901	694 – 735	166 – 207	6.1 – 7.7%
Others	86	92	82 – 84	8 – 10	0.3 – 0.4%
TOTAL	**2203**	**2703**	**1652 – 1728**	**975 – 1052**	**36.1 – 38.9%**

Brazil's GHG Emissions and Mitigation Actions in 2020

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Land Use Change	**1268**	**1084**	**415**	**669**	**24.7%**
REDD (Amazon)				564	20.9%
REDD (Savannah)				104	3.9%
Agriculture / Husbandry	**487**	**627**	**461 - 494**	**133 - 166**	**4.9 – 6.1%**
Pastures Recovery				83 – 104	3.1 – 3.8%
Agroforestry schemes				18 – 22	0.7 – 0.8%
Low / Zero tillage				16 – 20	0.6 – 0.7%
Biological nitrogen fixation				16 – 20	0.6 – 0.7%

Brazil's GHG Emissions and Mitigation Actions in 2020

GHG Emissions / Mitigation Actions Million tons CO_2eq / y	2005 Inventory Data	2020 BAU	2020 Mitigation Scenario	Reduction in 2020 M t CO_2eq	Reduction/ BAUTotal in 2020 - %
Energy	**362**	**901**	**694 - 735**	**166 - 207**	**6.1 – 7.7%**
Energy Efficiency				12 – 15	0.4 – 0.6%
Biofuels Increase				48 – 60	1.8 – 2.2%
Hydropower Increase				79 – 99	2.9 – 3.7%
Renewable power (SHPs, Biomass, Wind)				26 - 33	1.0 – 1.2%
Others	**86**	92	82 - 84	8 - 10	0.3 – 0.4%
Industrial Processes	37				
Waste	49				
Renewable Charcoal				8 - 10	0.3 -0.4%

NPCC - Energy

- Hidro power increase :
  - Until 2016 more 34.460 MW
    - -27 Mton of CO_2 per year

- Renewable Energy Incentives Program
  - Wind: 1420 MW
  - Small hidro: 1200 MW
  - Biomass: 700 MW
  - -3 Mton of CO_2 per year

- Renewable Energy public sale: 2400 MW from biomass and residues

NPCC - Energy

- Nuclear energy:
  - From 2000MW today to 3000MW in 2013;
  - More 4000 – 8000MW until 2030
- Solar Energy – 606 MW - grew 67% last year
  - 13 new projects for distant communities
- Waste – from 1200 to 8400MW until 2030

NPCC – Industry

- Increase charcoal use in iron and steel industry
- Energy efficiency increase

Next Steps: Monitoring and Reporting

- Total emissions in 2020:
  - from 22.6% growth in BAU to 22-26% decrease compared to 2005
  - from 62% to 21-27% increase compared with 1990

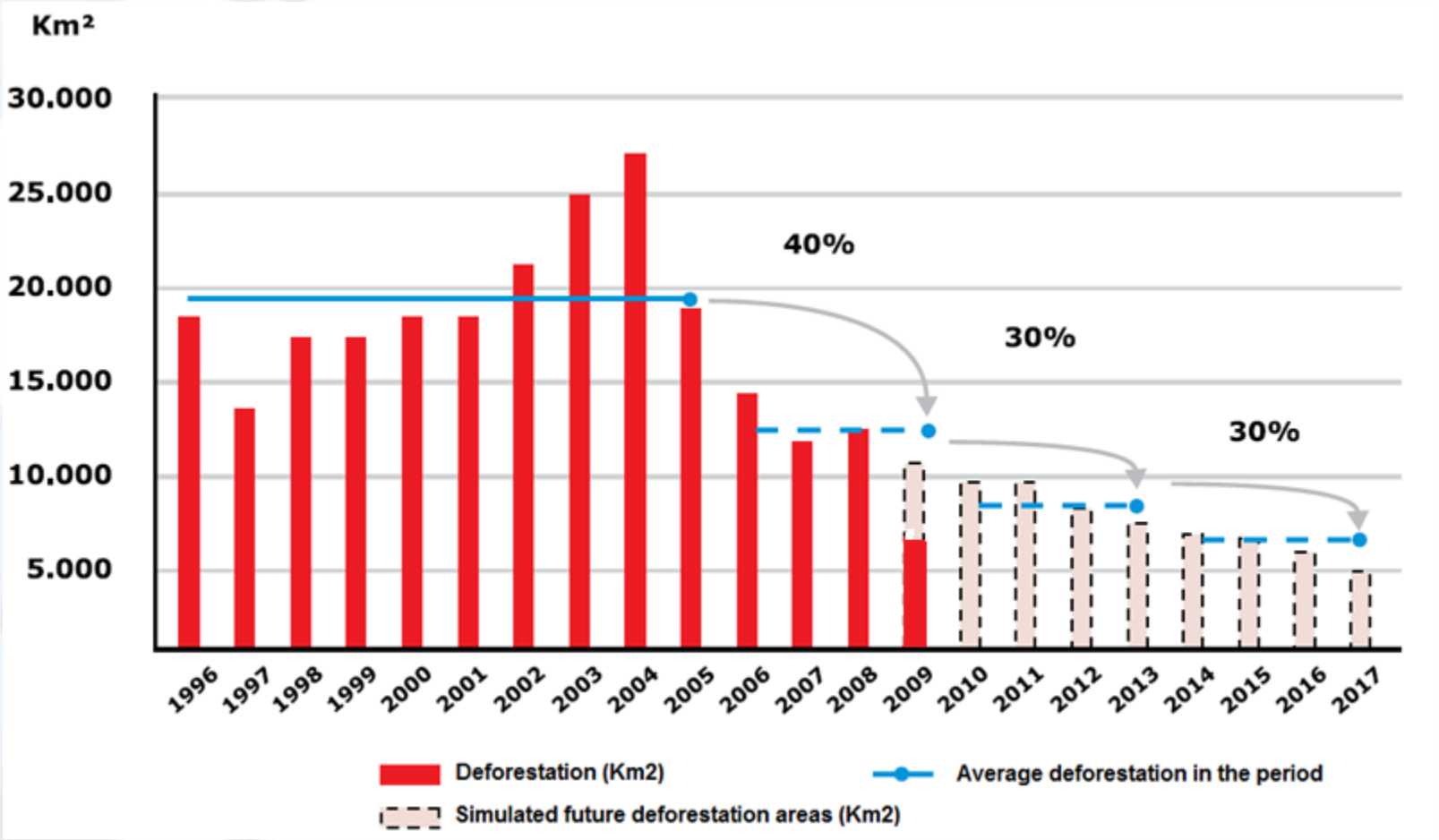
Regional Government Initiatives

- State of São Paulo
  - 20% reduction in 2020 over 2005
- City of Rio de Janeiro
  - 8% reduction in 2012 over 2005
  - 16% reduction in 2016 over 2005
  - 20% reduction in 2020 over 2005

4 – Amazon Deforestation Reduction

- Forest protection: mostly domestic efforts
  - Amazon deforestation in BAU 2020 = 1996-2005 average = 1.95 M ha /year
  - Amazon deforestation in 2008 = 1.2 M ha
  - Amazon deforestation in 2009 = 0.7 M ha
  - Mitigation scenario 2020 = 0.4 M ha / y

Amazon Deforestation Reduction

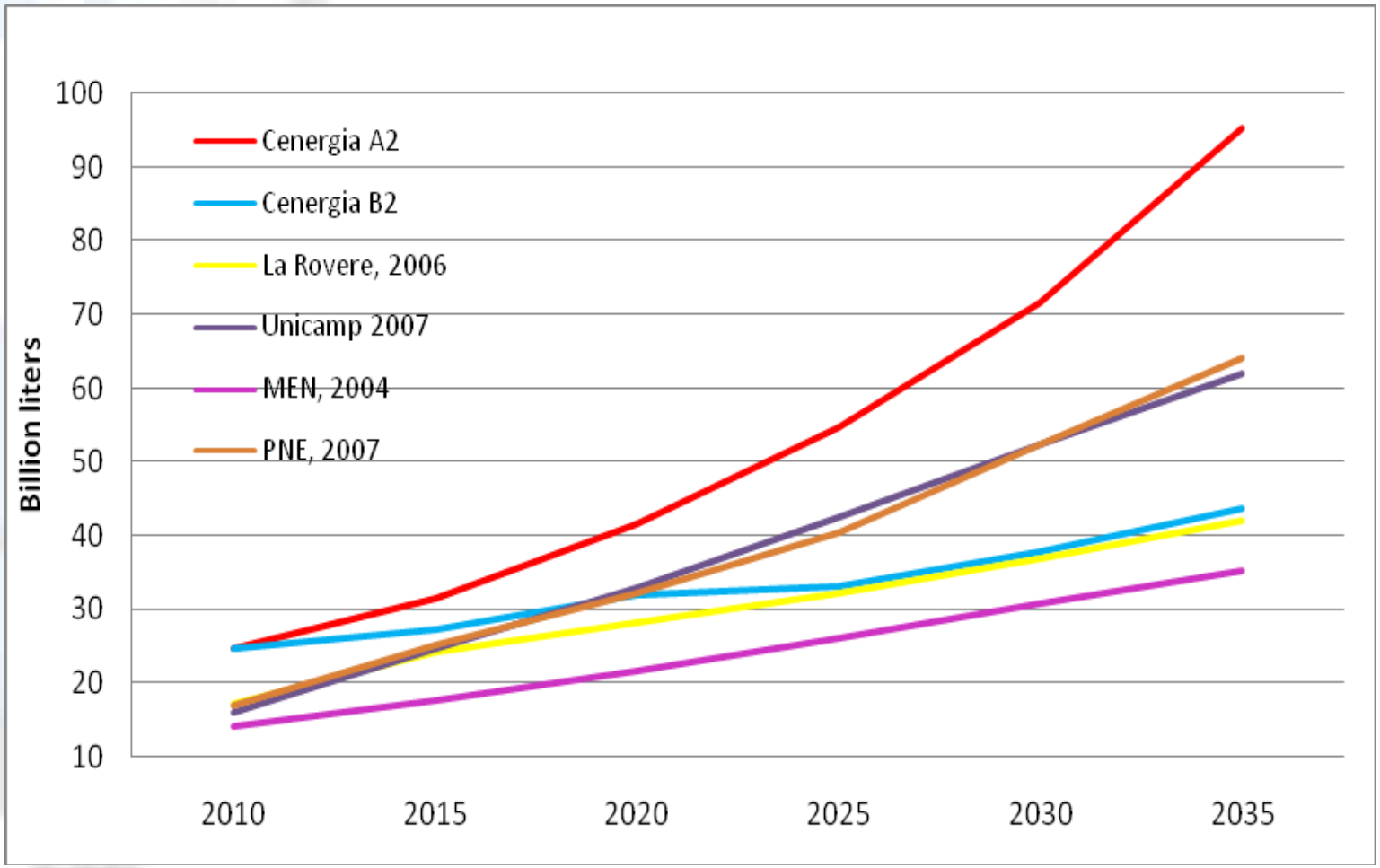


Historical deforestation rates of the Amazon Forest and future deforestation reduction goals.

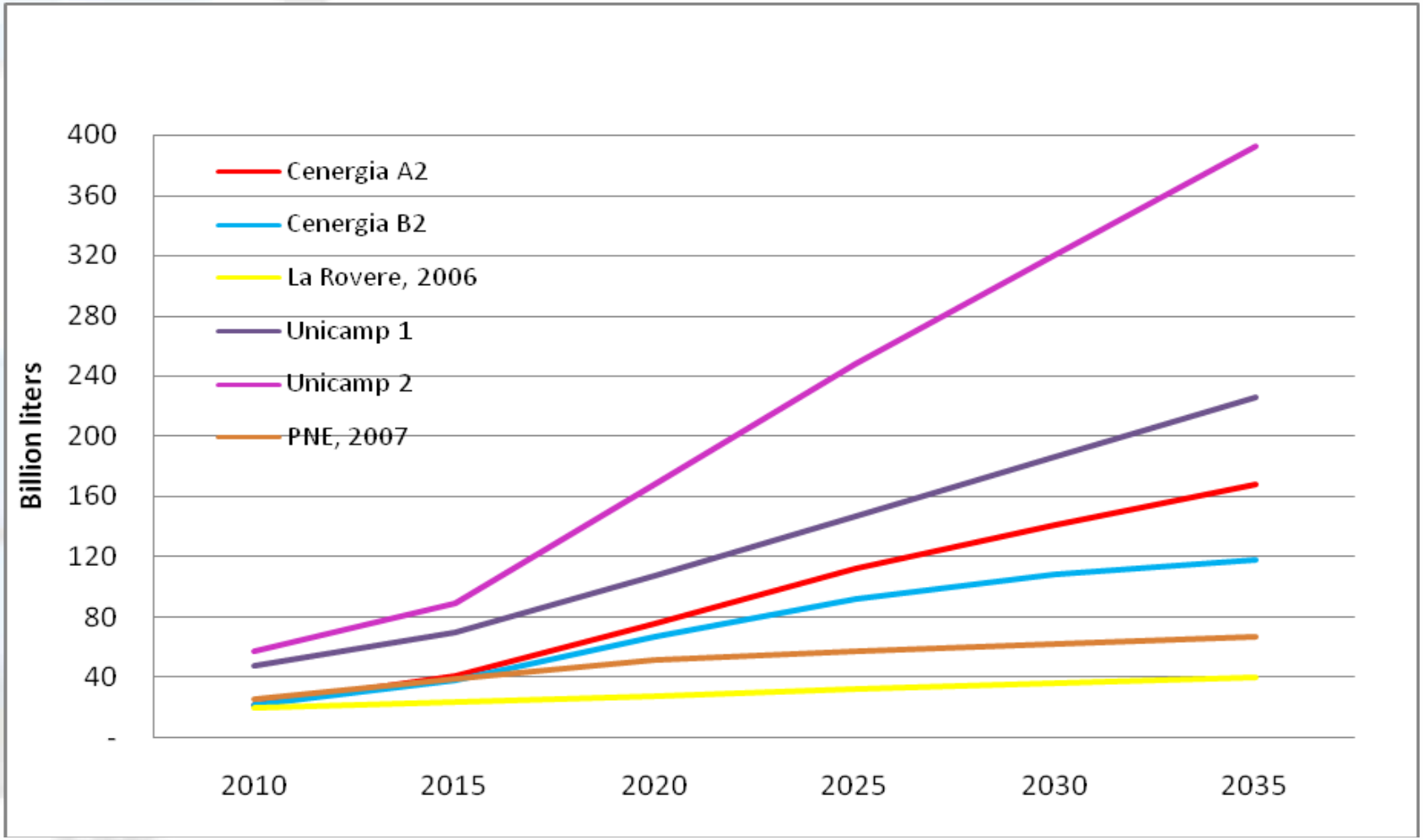
5 - Biofuels

- Etanol
  - Etanol production and consumption in Brazil is growing very fast.
  - 2008 production: 27 billion liters (+20%)
  - 2035 estimated production:
    - From 120 to 170 billion liters = 1/3 of world E10

Projected Ethanol Consumption



Projected Ethanol Production



Forests X Biofuels

- To increase from 27 to 170 billion liters production it would be necessary more 16 million ha (less than 7% of the pastureland area).

Land use in Brazil

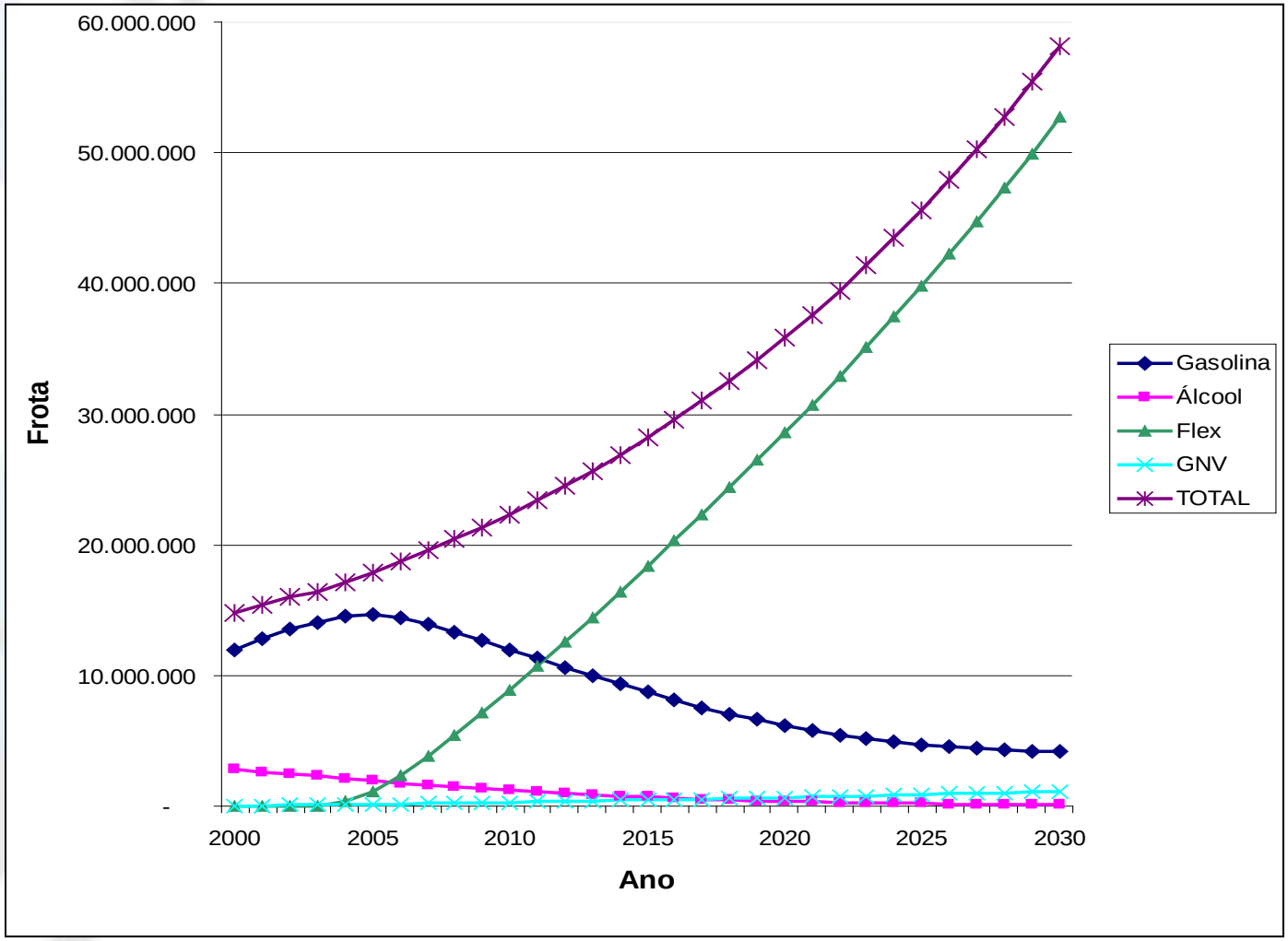
Area (million ha)	Distribution in relation to	
	Agriculture areas (%)	Agriculture and pasture lands (%)
Soy (21)	35	7
Corn (12)	20	4
Sugarcane (5.4)	9	2
Other cultures (17)	36	6
Total agriculture (60)	100	20
Pastureland (237)	–	80
Agriculture+pastureland (297)	–	100

Source: CTC (2007).

Forests X Biofuels

- It will be very important to:
  - Delimitate expansion areas. Follow the Sugar cane zoning (2009)
  - Inhance number of bovines per ha.
  - Increase monitoring

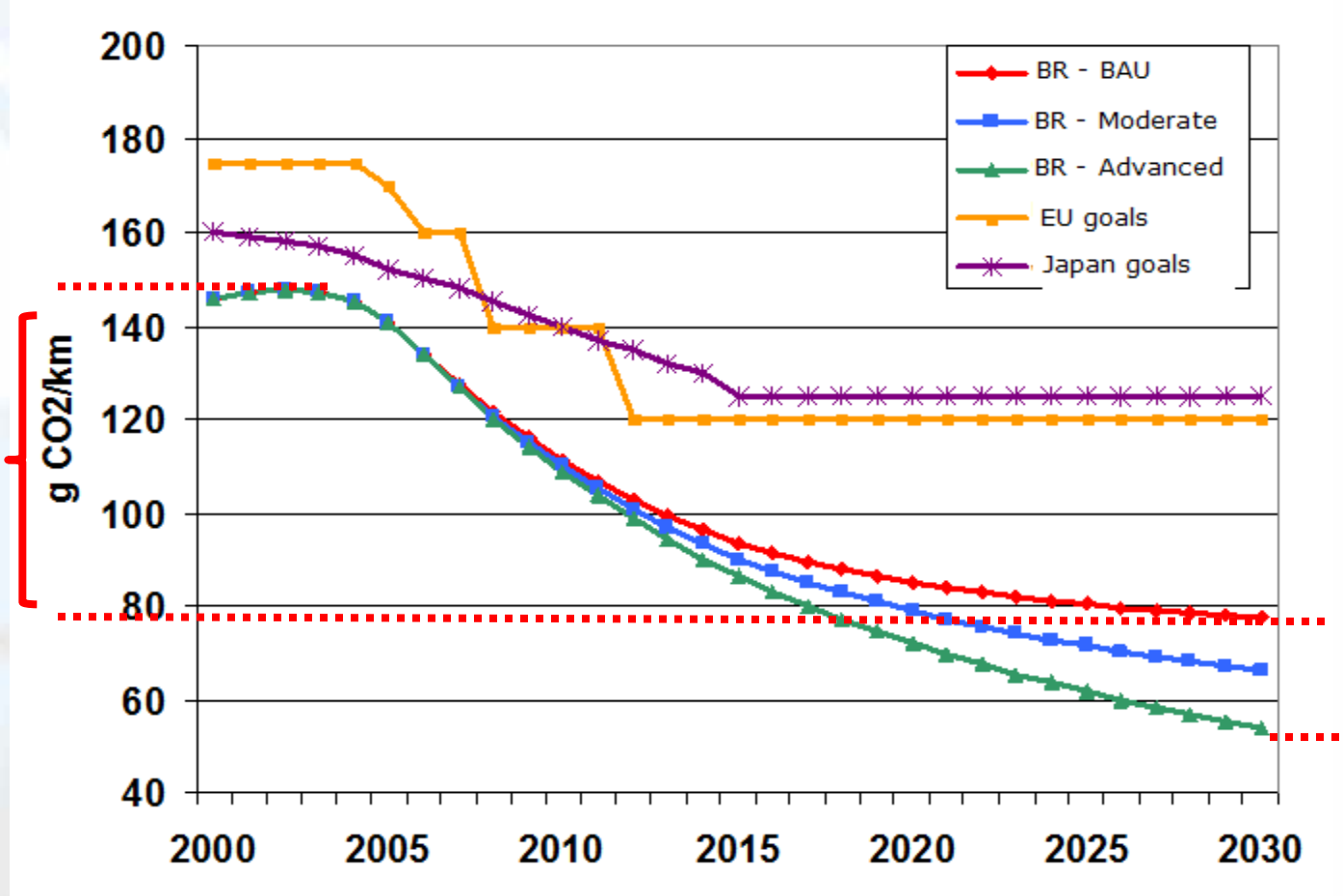
Light Transport Scenarios - Fleet



Source: Wills and La Rovere, Energy Policy, 2009.

Light Transport Scenarios

Emission Factor x Efficiency Program



-50% due to flex cars

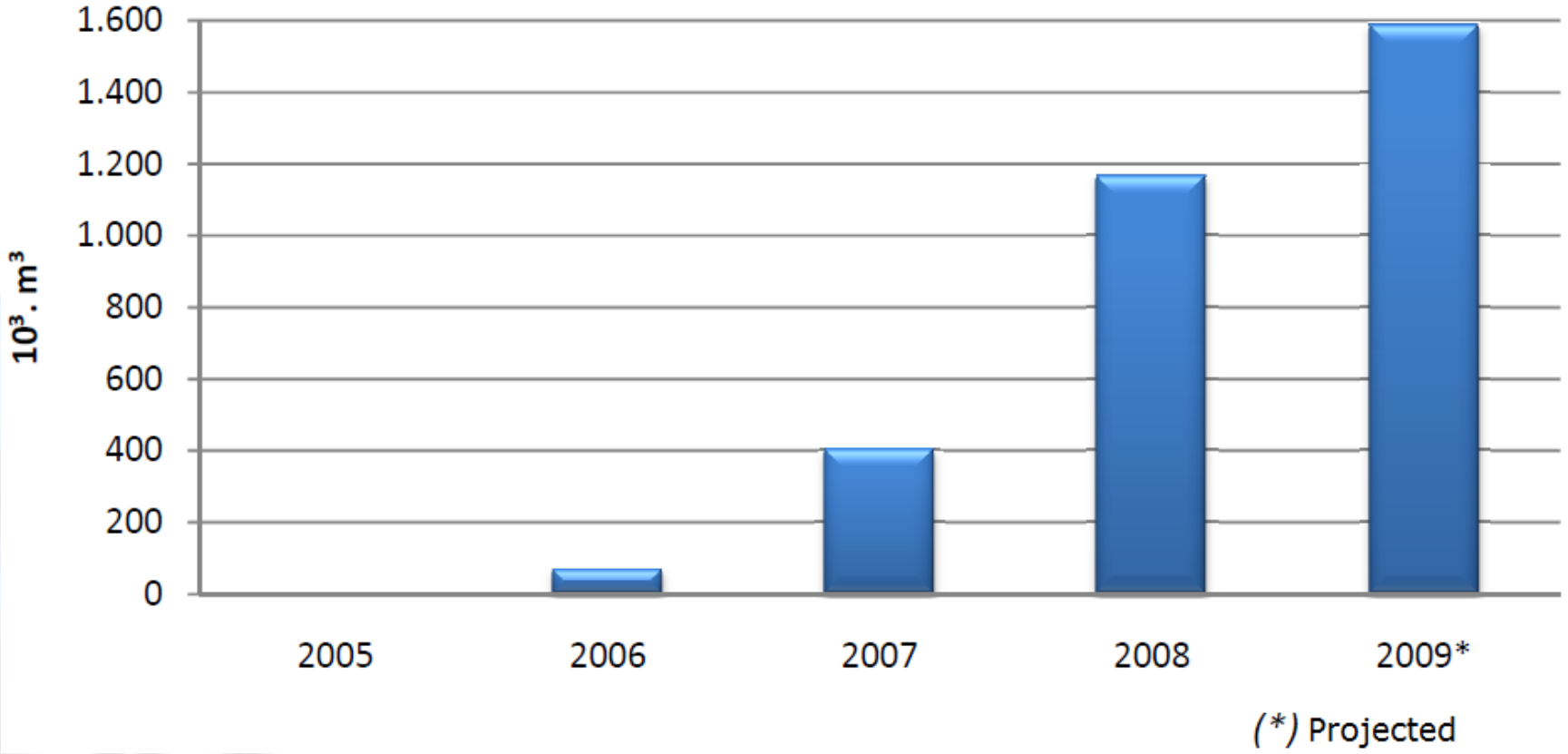
-30% due to EE

Source: Wills and La Rovere, Energy Policy, 2009.

Biodiesel

- Biodiesel consumption and production is also growing fast in brazil:
  - From 2005 to 2008 – 2% mix
  - From 2008 to 2009 – 3% mix
  - 2009 Consumption: 1.6 billion liters (+37%)
  - 2010: 5% mix anticipated from 2013

Biodiesel Consumption



Source: ANP, 2009

Conclusions

- Comparing to developed countries, Brazil´s CO_2 emission per capita is low, and even in the BAU scenario it is projected to continue low.
  - 73% of Hidro in the PWR sector
  - 18% of ethanol in the transport sector
  - We can use more sugar cane bagasse in PWR sector
- Biggest emissions from deforestation – But is decreasing (-75% in the last 5 years)
- Country is looking for energy efficiency
  - Refrigerators, air conditioners, and recently cars
- Etanol production can grow a lot, in a sustainable way.

Work in progress:

- National Scenarios (2050) for PNUMA;
- State of Rio de Janeiro Inventory and Scenarios (2030), for the State government
- City of Rio de Janeiro Inventory and Scenarios (2030), for the City government

THANK YOU!

wwills@lima.coppe.ufrj.br