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Residential and Transportation scenario for Low Carbon Society study Brazil Case

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Key information

	2000	2006
Population, total	173.9 million	188.7 million
Population growth (annual %)	1.5	1.2
GNI per capita, Atlas method (current US$)	3,870.0	4,730.0
GDP (current US$)	644.5 billion	1.1 trillion
GDP growth (annual %)	4.3	3.7
Inflation, GDP deflator (annual %)	6.2	4.3
Agriculture, value added (% of GDP)	5.6	5.1
Industry, value added (% of GDP)	27.7	30.9
Services, etc., value added (% of GDP)	66.7	64.0

Source: World Development Indicators database, April 2007

Key issues with data and contextual information

Reliability of Economic Data

- hyperinflation from late 70's to 1994
- uncertainties on input/output coefficients, price elasticities, interest rates
- skewed income distribution
- informal economy

Specificities of National Circumstances

- energy resources endowment: relevance of hydropower (250,000 MW, only 20% tapped) and of biomass (wood, charcoal, ethanol from sugarcane, vegetal oils)
- relevance of emissions from land-use change : deforestation is the most important source in the short term

GHG Emissions

1st National Communication: Inventory of

Brazilian GHG Emissions in 1990-1994

- CO2 emissions from LULUCF = three times higher than emissions from the energy system
- GHG emissions from cattle raising activities: nearly equal to CO2 emissions from fossil fuels

Medium and long-term prospects:

- CO2 emissions from energy will be dominant

Relevance of Biomass in Brazil

- Share in total energy supply = 30% (2004);
- Main biomass energy resources: wood, charcoal, sugarcane bagasse, rice husks, ethanol from sugarcane, vegetal oils, biodiesel;
- Agricultural land availability:
  - Land used by agriculture sector: 50 million ha;
  - Land used by sugar cane crops: 5 million ha;
  - Estimated land for ethanol production: 2.5 million ha;
  - Total Brazilian agricultural land: 140 million ha (exclusive of land suitable for forest plantations);
  - Land still available for agriculture: 90 million ha.

Socio economic Vision

- Lifestyle and Mindset
  - Community development
  - Move to diversity of activity, doing work to serve community
  - Sustainable consumption, local markets, trade of goods and services.
  - Full access to fixed dwellings, clustered housing and services, larger floor space
- Economy and Industry
  - Moderate growth. Commodity-driven economy, agricultural sector strengthened, internal markets
- Population and Household
  - Moderate increase - (moderate variant on UN Population prospect)
  - Fewer large households
- Land use and Infrastructure
  - Decentralized agricultural production, local town-development
  - Reliance on IT and telecoms, local production of energy and diversity of sources
  - Establishing at least on viable alternative to individual transport systems, use of freight for transporting goods
  - Local town development, protection of ecosystems

Overall assumptions

- Focus on ESS model utilization - rather than ‘polishing up’ data
- Simple and basic settings
  - Little knowledge of model
  - Poor data on residential and transport (house hold appliances passenger-km)
- Main drivers considered for mitigation
  - Efficiency
  - Biomass and Solar energy
  - Transportation modal shift from individual to mass

General parameter settings used

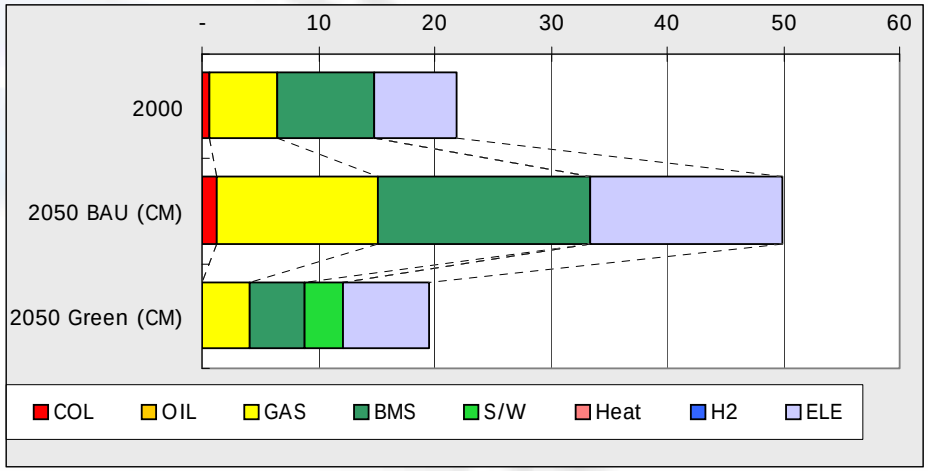
- Population Growth total of 48% – medium variant of UN population prospect

- Capita per household – 2,6

Key Residential parameters used

- 118% increase in **number of households** – demographic drive -> choice to present BAU scenario
- 10 to 20% **hold rate** increase in main services
- 10 to 25% **service loss** decrease in main services
- Average 2x **performance increase** in energy efficiency
- Shift to biomass and solar

Key Residential Results

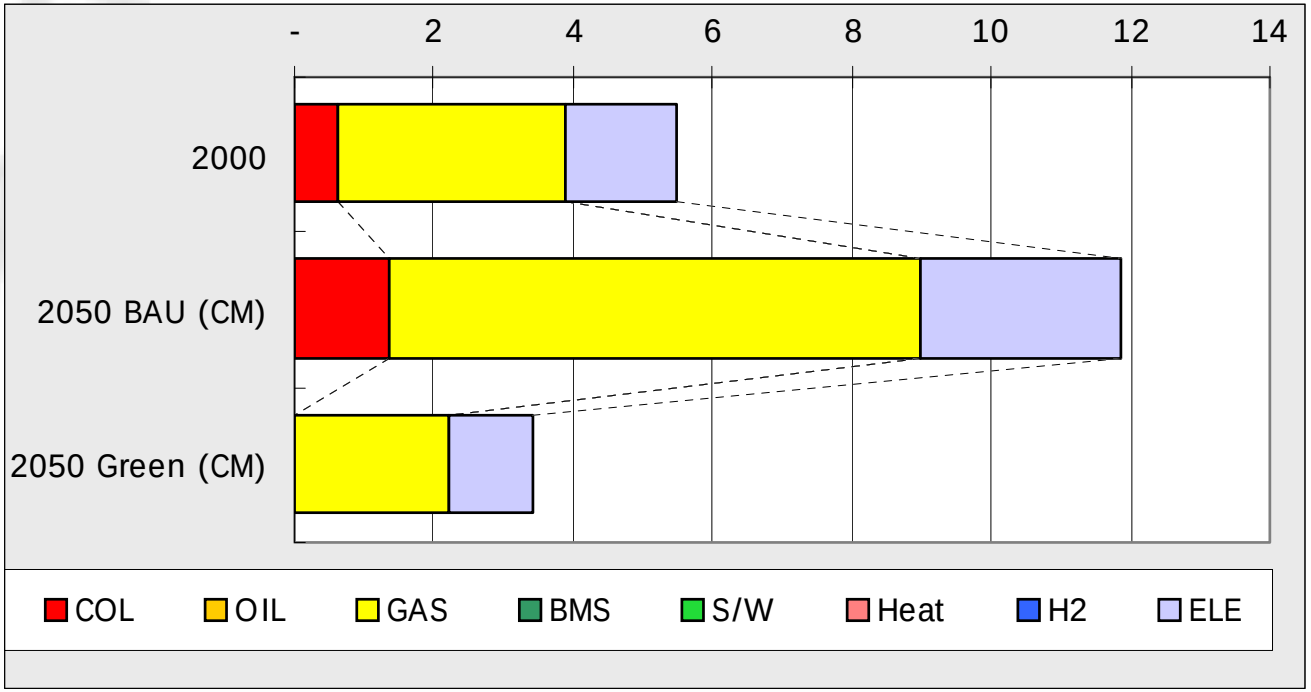


Total Energy consumption reduction

- 61% from BAU
- 11% from base year

Total CO2 emission reduction

- 71% from BAU
- 38% from base year



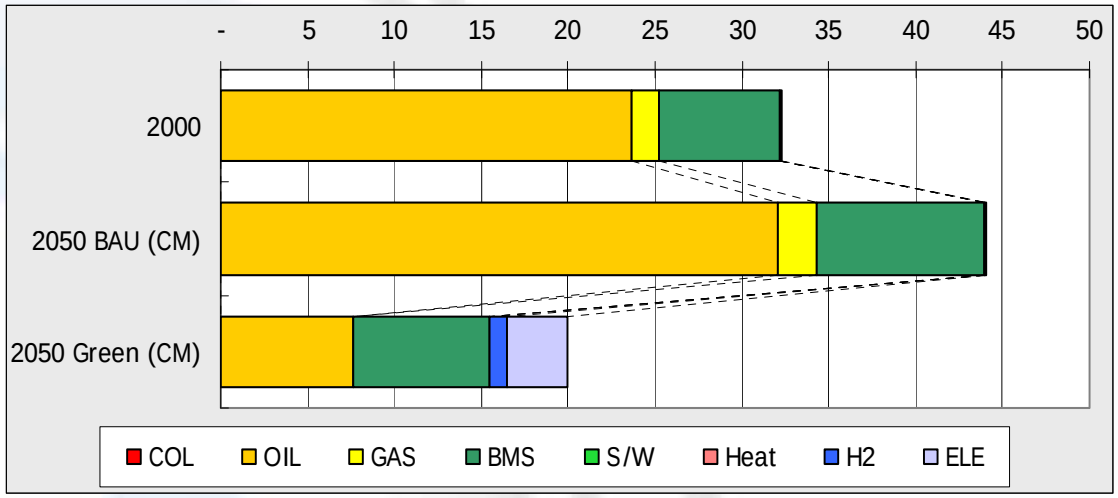
Key Passenger Transportation parameters used

- 8% **trip generation** reduction
- 37% increase in **number of trips** – demographic drive -> choice to present BAU scenario
- Modal shift from individual to mass transportation

	Share %				
Scenario	Car	Bus	Railway	Maritime	Aviation
BAU	40,4%	38,6%	0,9%	0,1%	1,2%
Green	20,0%	41,0%	10,0%	5,0%	5,0%

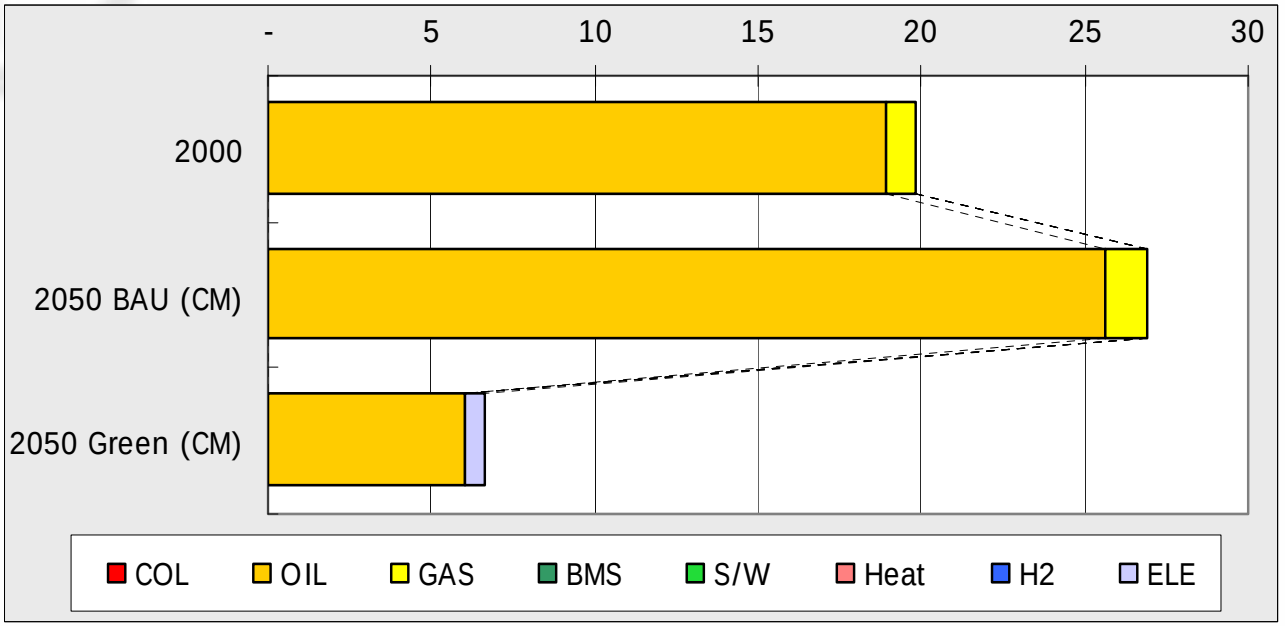
- Average 2x **performance increase** in energy efficiency
- Shift to biomass, electric and little H2

Key Passenger Transportation Results



Total Energy consumption reduction

- 55% from BAU
- 38% from base year



Total CO2 emission reduction

- 75% from BAU
- 67% from base year

Feedback and Suggestions for ESS
focus on the Usability side

- Great potential on interactivity – scenario discussion
- Create templates for ESS
  - Usage of Japan ESS sheet can induce errors until all data is fully reviewed.
  - Template more suitable for developing countries
- Built in data validation
- Data entry prioritization (which sector? power, industry, etc…)
  - Enable early checks to be performed
  - Intermediate results can be obtained before model is final
- Additional support for cases where each data is poor or unavailable
  - Ok with purchased data, focus on estimation techniques
  - ExSS?