

Biofuels in Brazil: Challenges and Opportunities

March 2nd, 2009

BACKGROUND

- Brazil has accumulated important expertise in the biofuels area, particularly regarding the use of ethanol as automotive fuel. The Brazilian experience with the use of ethanol fuel as a gasoline additive dates back to the 1920s. However, it was only in 1931 that fuel produced from sugar cane began to be officially blended with gasoline, which at that time was imported. The National Petroleum Council (CNP) was created in 1938 and played the role of a regulatory agency for fuels determining the directives for the market and regulating the use of the ethanol as a fuel. Despite these early initiatives, however, it was only in 1975, with the launching of the National Ethanol Program (ProAlcool), that the Brazilian government created the necessary conditions for the sugar and ethanol industry to become, three decades later, one of the most modern in the world, having achieved significant results from both environmental and economic perspectives.
- Over the last 30 years, the use of ethanol as a substitute for gasoline has contributed to the reduction of domestic oil consumption in nearly one billion barrels of oil equivalent, which represents 8 years of present gasoline consumption in the domestic market or 22 months of Brazil's current oil production. The main goals of ProAlcool were to introduce into the market a mixture of gasoline and anhydrous ethanol and to provide incentives for the development of vehicles that were fueled exclusively with hydrated ethanol. In chronological terms, one can describe four separate stages in the large-scale production and use of ethanol fuel in Brazil.
- In the first, from 1975 to 1979, following on the first oil crisis in 1973 and, with the drop in sugar prices in the international market, the Brazilian government decided to offer incentives to increase the production of ethanol for use as a gasoline additive. Thus, in addition to preventing the sugar and ethanol industry from having idle capacity, the aim was to reduce Brazil's dependence on fossil fuels.
- The second stage (1979 to 1989) is viewed as the peak of the ProAlcool program. During that period, a series of tax and financial public incentives were created, benefiting everyone from ethanol producers to final consumers. It began with the second oil crisis, in 1979, when the price of this international commodity once again rose sharply in the global market. However, due to the drop in oil prices and, among other factors, an increase in the price of sugar in the international market over the next ten years, the late 1980s were characterized by episodes of scarcity of hydrated ethanol in Brazilian gas stations, which seriously undermined consumer confidence and had serious repercussions on sales of cars fueled with ethanol in Brazil.

- The third stage, from 1989 to 2000, was characterized by the dismantling of the set of government economic incentives for the program as part of a broader deregulation that affected Brazil's entire fuel supply system. The new economic order brought by the Constitution of 1988 explicated limits for State intervention in economic matters. In this context, in 1990, the Sugar and Ethanol Institute (IAA) and the National Petroleum Council (CNP), which had regulated the Brazilian sugar and ethanol industry for over six decades, were extinct. Thus, as a result of lower oil prices in international markets, the government gradually eliminated subsidies and price controls. The first price to be liberated was sugar. Then, in 1996, as oil price recovered, the anhydrous ethanol price was liberated and finally, in 1999, the prices of sugarcane and hydrated ethanol were free. The planning and implementation of the industry's production, distribution and sales decisions, once oriented by the Government, became activities of the private sector. With the growing obsolescence of the ethanol-based vehicles fleet, the use of hydrated ethanol as fuel declined year after year. On the other hand, however, the mixture of anhydrous ethanol with gasoline was again written into law by the government, which, in 1993, established the requirement that 22 percent anhydrous ethanol must be added to all gasoline distributed at retail gas stations in Brazil. In practice, this governmental requirement generated a firm and predictable anhydrous ethanol market that is still in effect today, with the Inter-Ministerial Board for Sugar and Ethanol (CIMA) establishing the required percentage, which can range, after law revisions in 2001 and 2003, from 20 to 25 percent.
- The fourth stage began in 2000 with the revitalization of ethanol fuel, and was marked by the liberalization of prices for the products in the whole chain of commercialization in 2002. Ethanol exports increased further due to high oil prices in world markets and the introduction of flex-fuel vehicles in 2003 (powered by any mixture of hydrated ethanol and gasoline). During this stage, the dynamics of the sugar and ethanol industry began to depend much more on market mechanisms, particularly in the international market, than on government incentives. The industry made investments, expanded its production, underwent technological modernizations, and today sugarcane ethanol is efficiently produced in Brazil at prices that are internationally competitive.

CURRENT OUTLOOK AND FUTURE CHALLENGES

- See Powerpoint Presentation: DE at JH v7.ppt.
- On the same subject also recommend UNICA's President attached presentation: "An Overview of the Brazilian Sugarcane Industry".

Biofuels in Brazil: Outlook and Challenges

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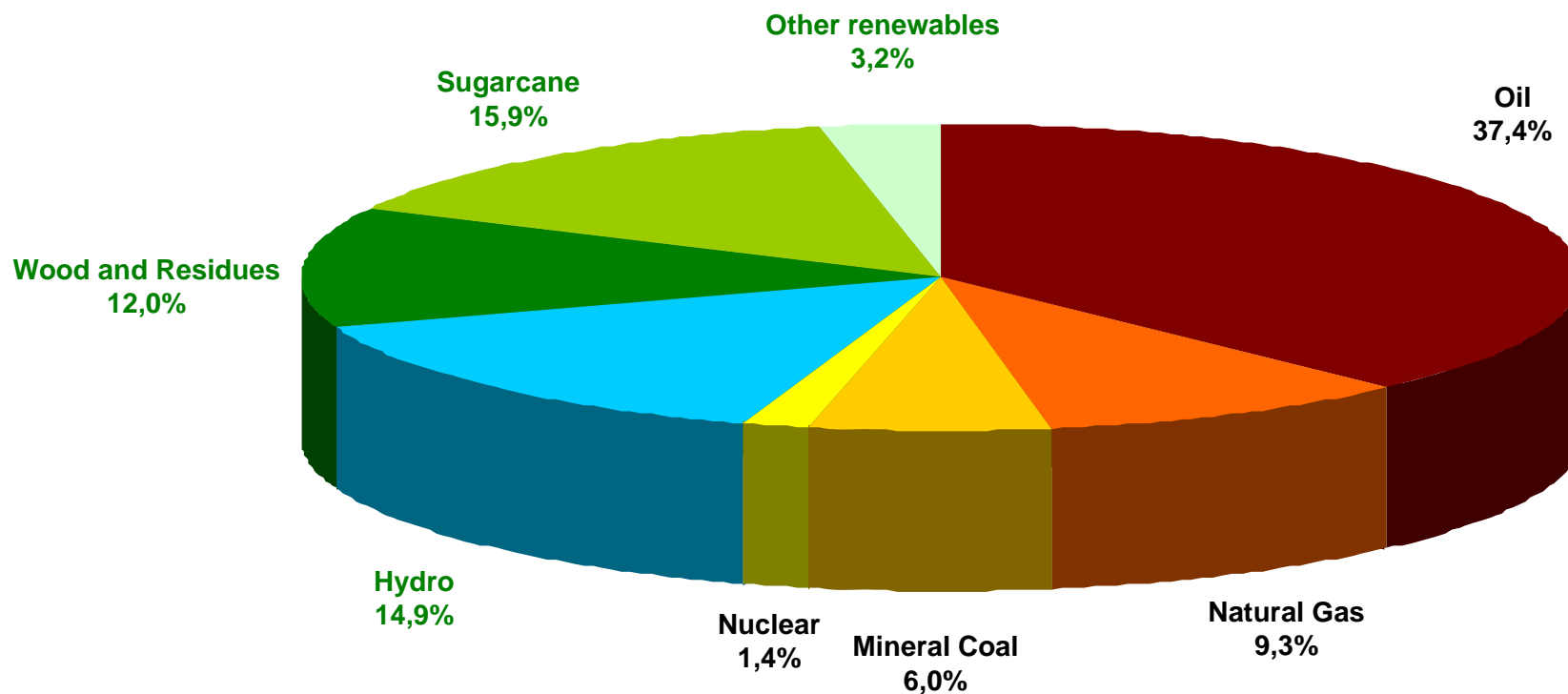
Department of Energy

Ministry of External Relations

Brazil's Energy Profile

Brazil's Energy Mix

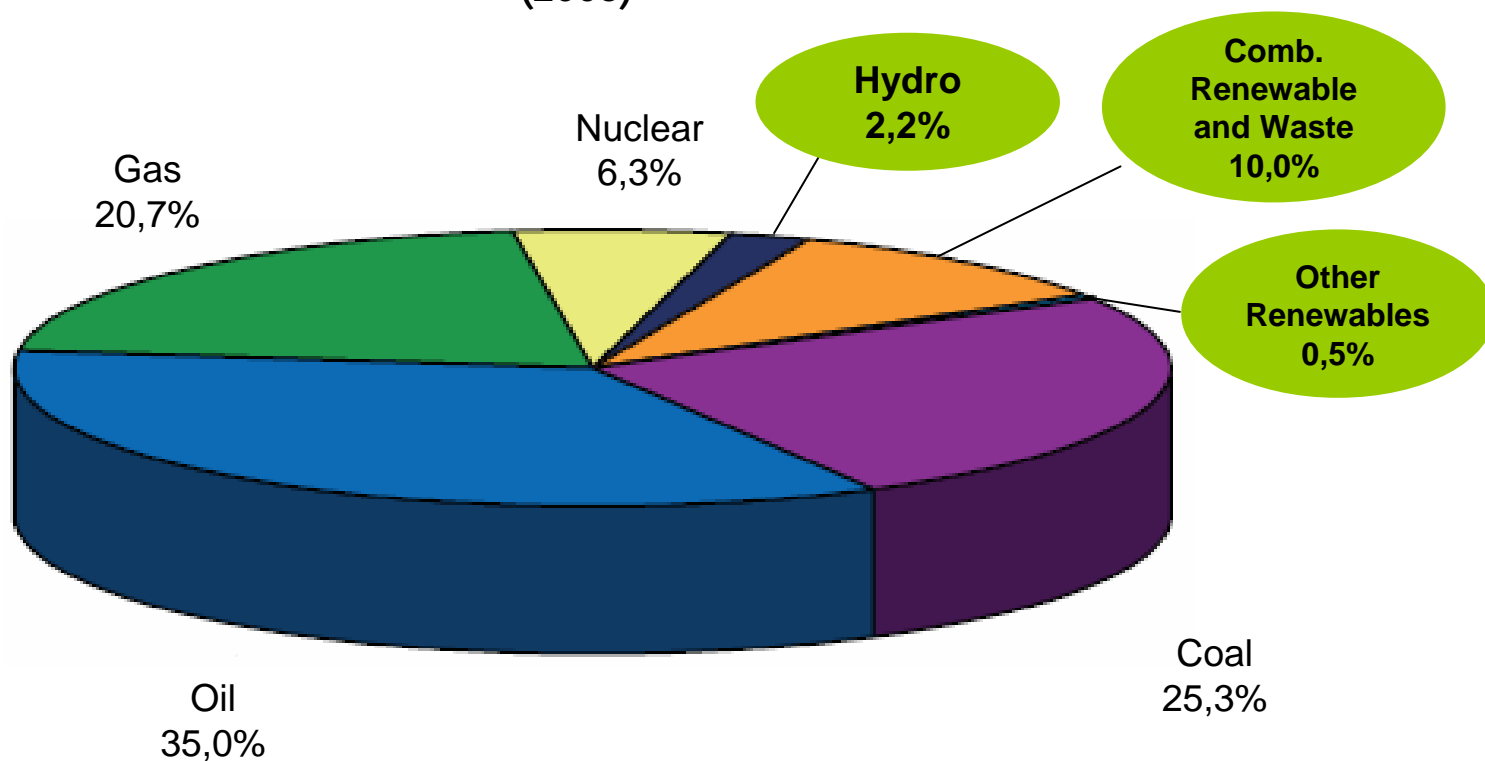
Share of Total Primary Energy Supply (2007)



Renewable sources: 46%

Global Energy Mix

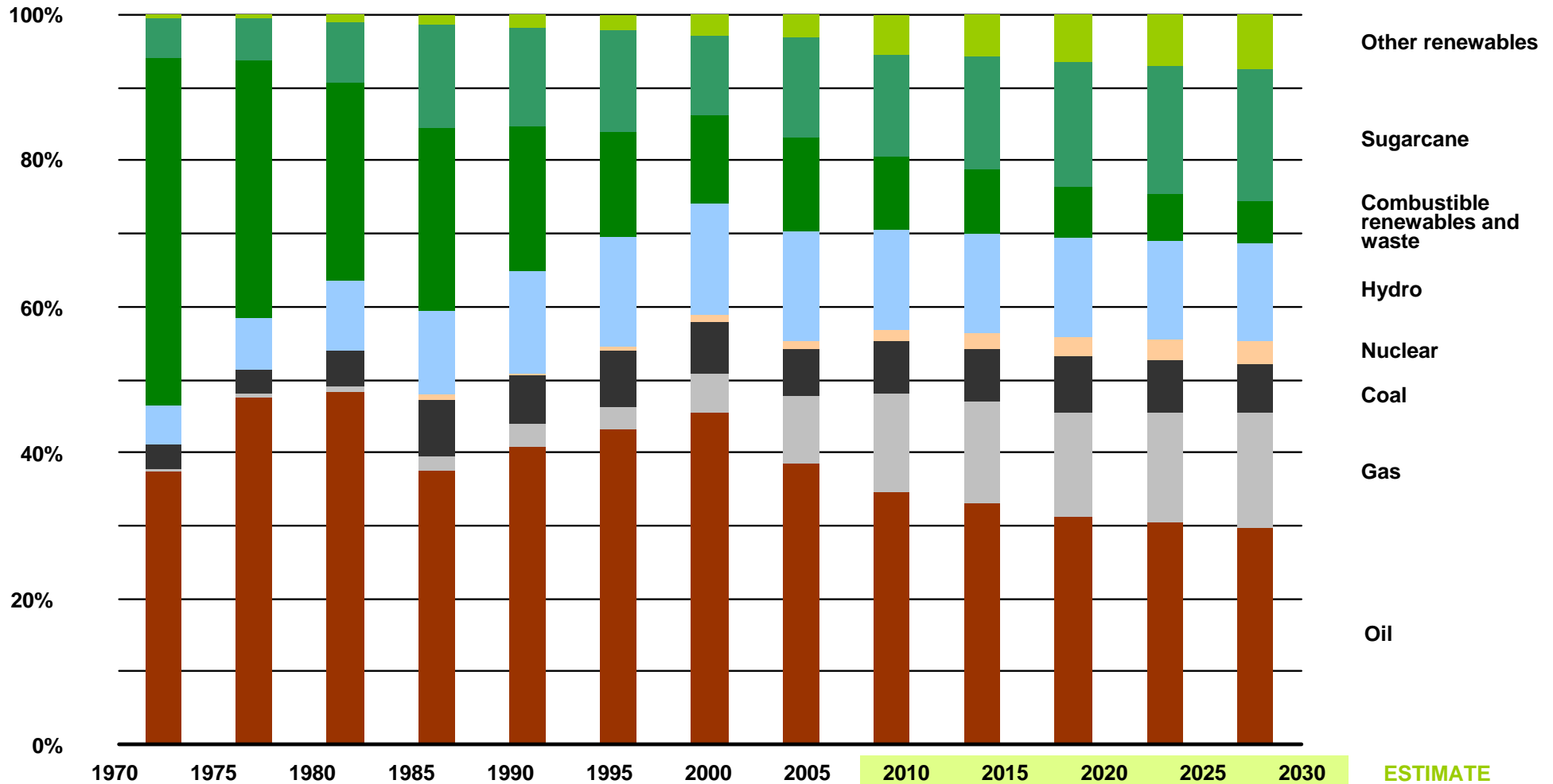
Share of Total Primary Energy Supply (2005)



Renewable Sources: < 13%

The Brazilian energy mix will be even more diversified in the future

Brazilian Energy Mix Trends

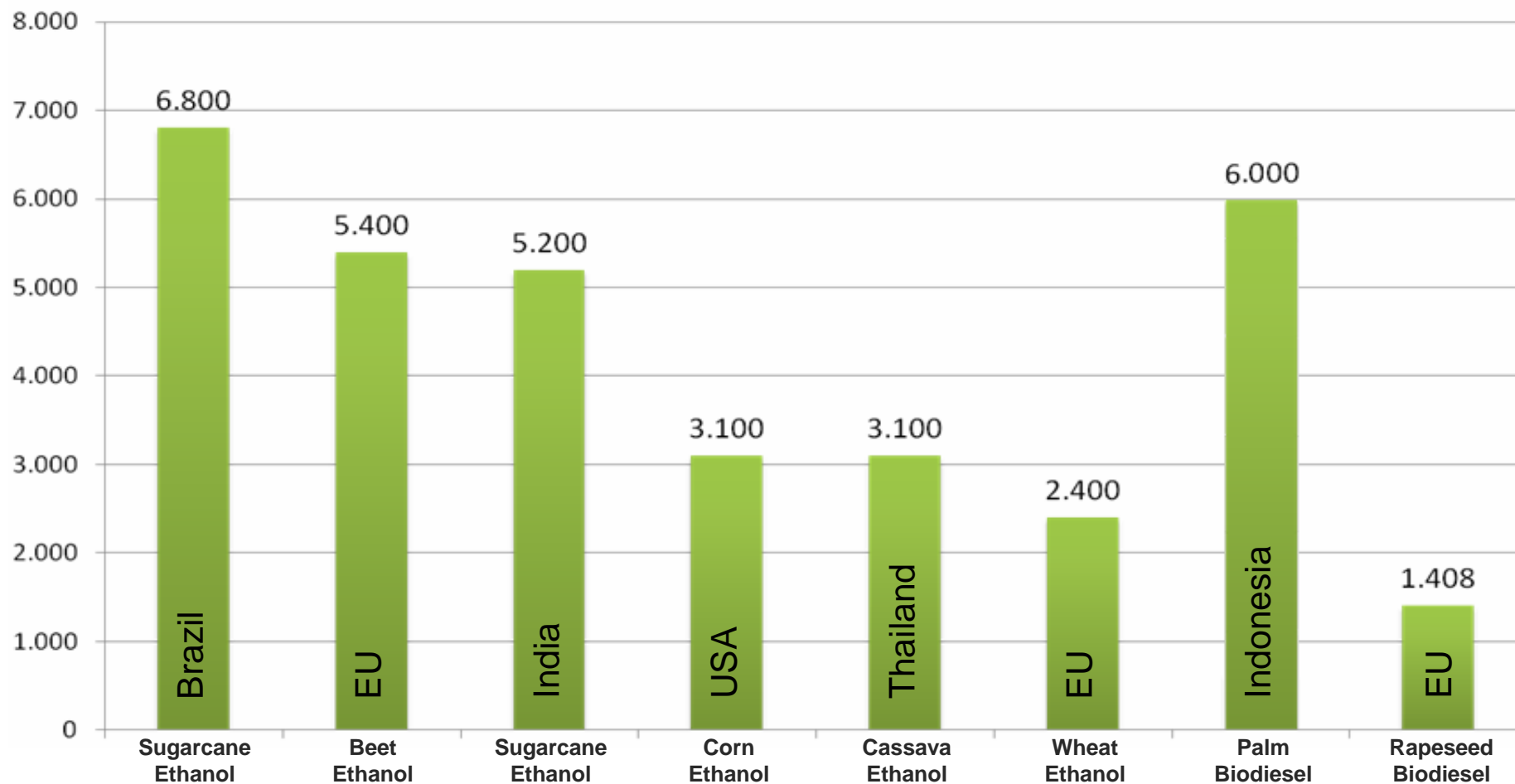


Source: Brazilian Energy Plan 2030, EPE.

Biofuels in Brazil

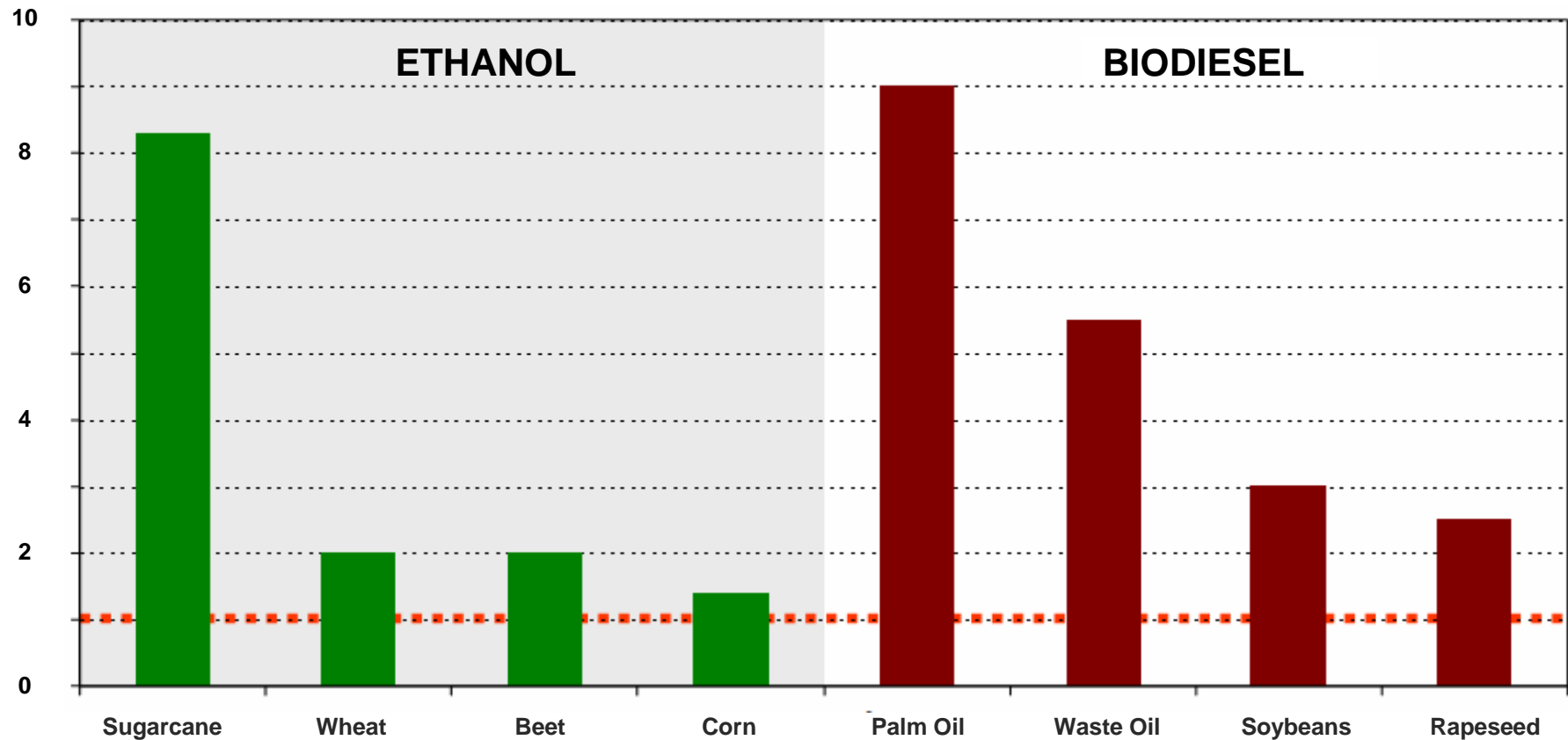
Brazilian ethanol stands high productivity...

Ethanol and Biodiesel Productivity (liters per ha)



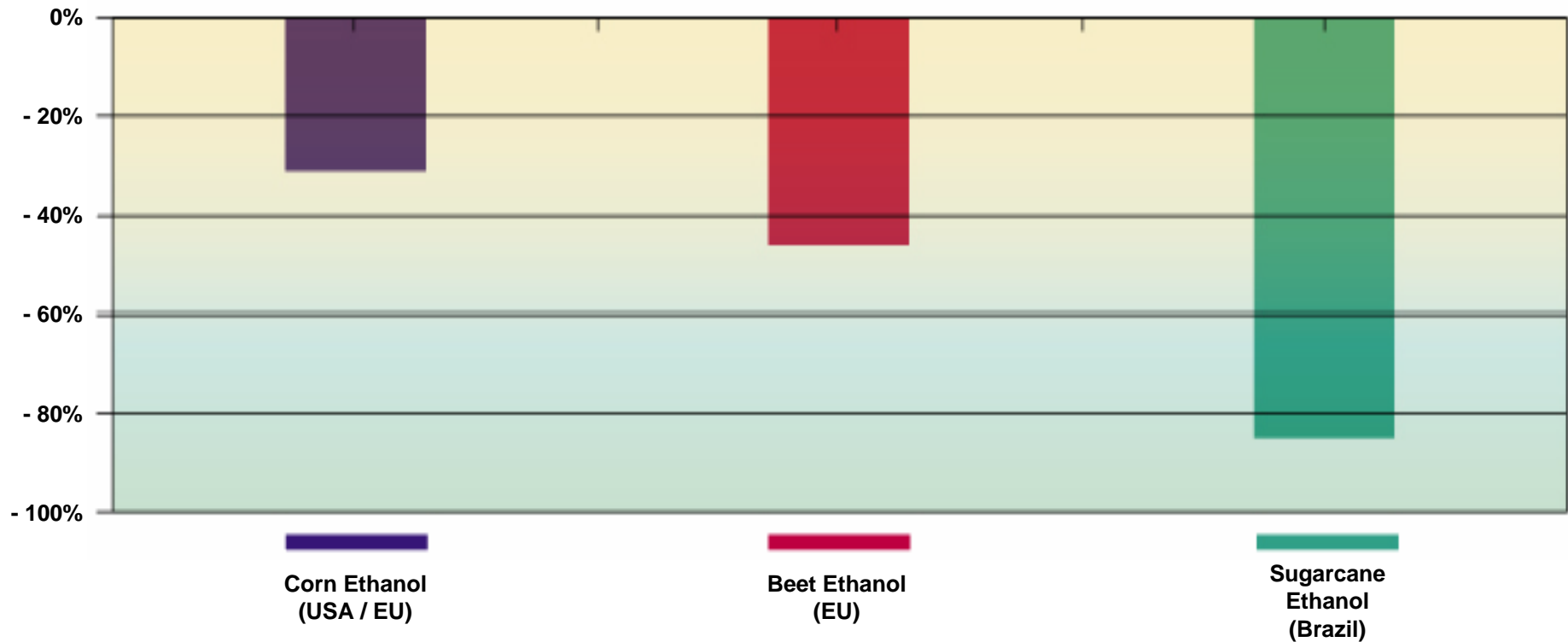
... besides boasting high energy efficiency

Energy Balance of Different Raw Materials (energy content / fossil energy consumed)



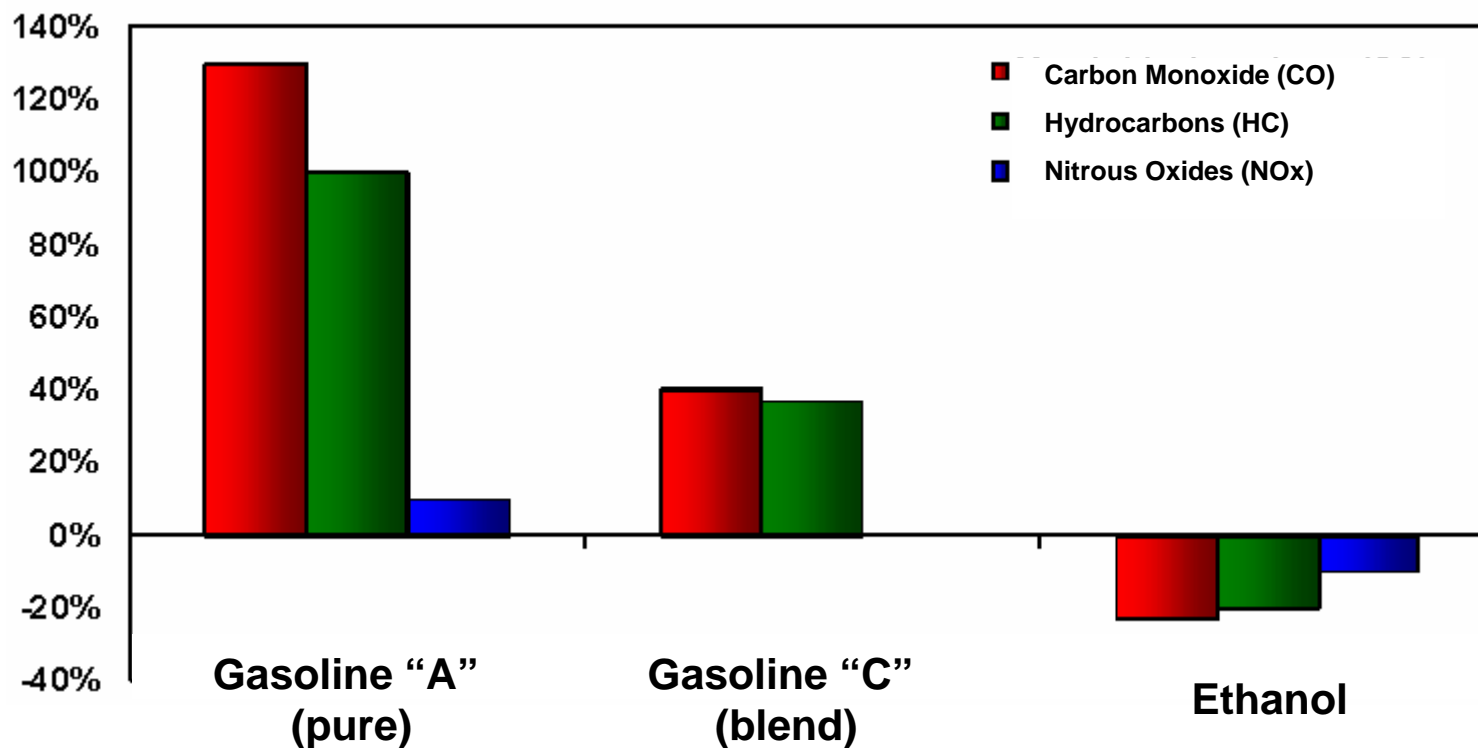
... and mitigating climate change effects

Average GHG Lyfe-Cycle Emissions
(avoided emissions through gasoline displacement)



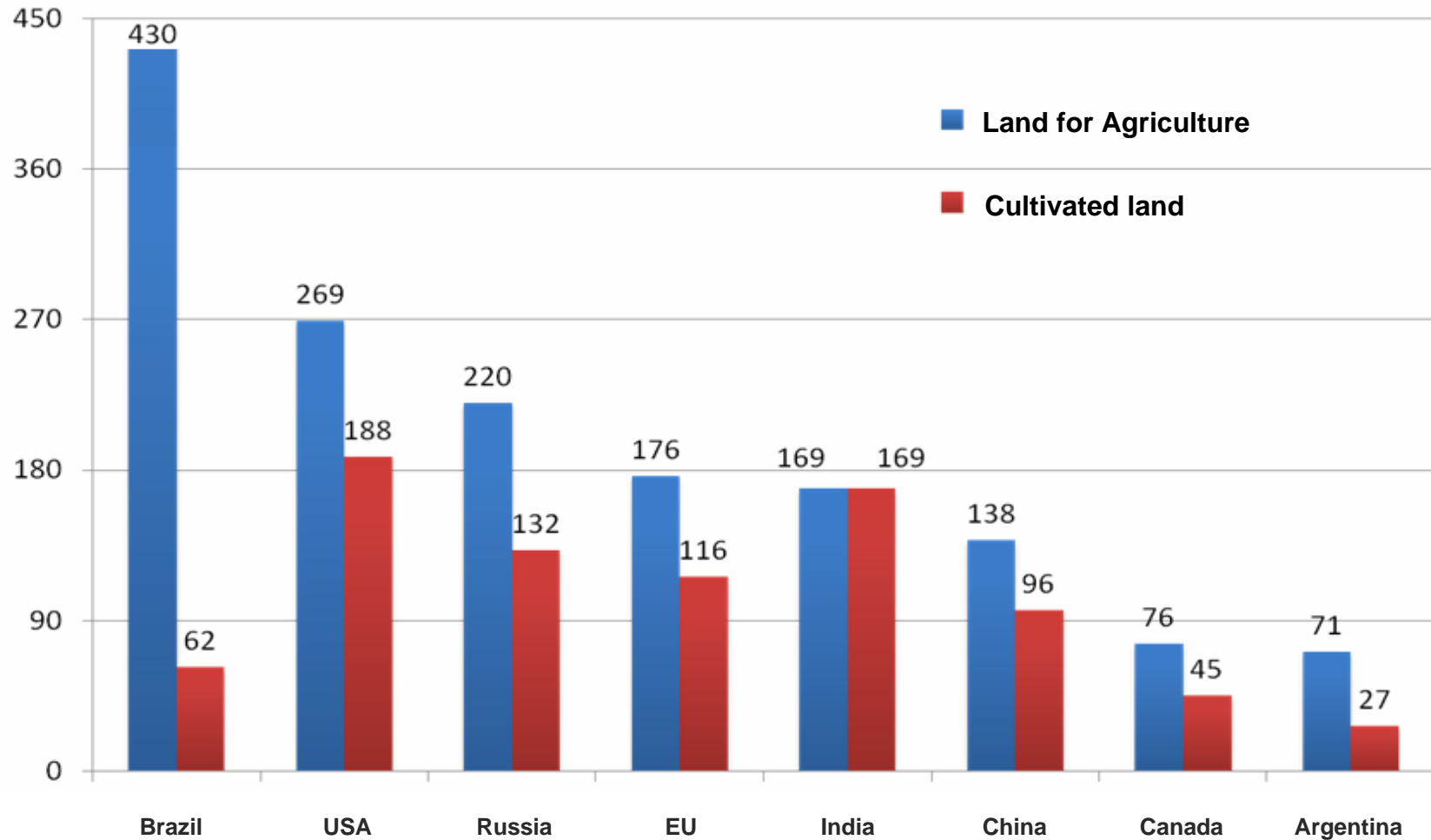
... reducing urban centers air pollution

Reduction / Increase x Transport Fuel
(considering that 100% of the auto fleet runs on one of the options listed)

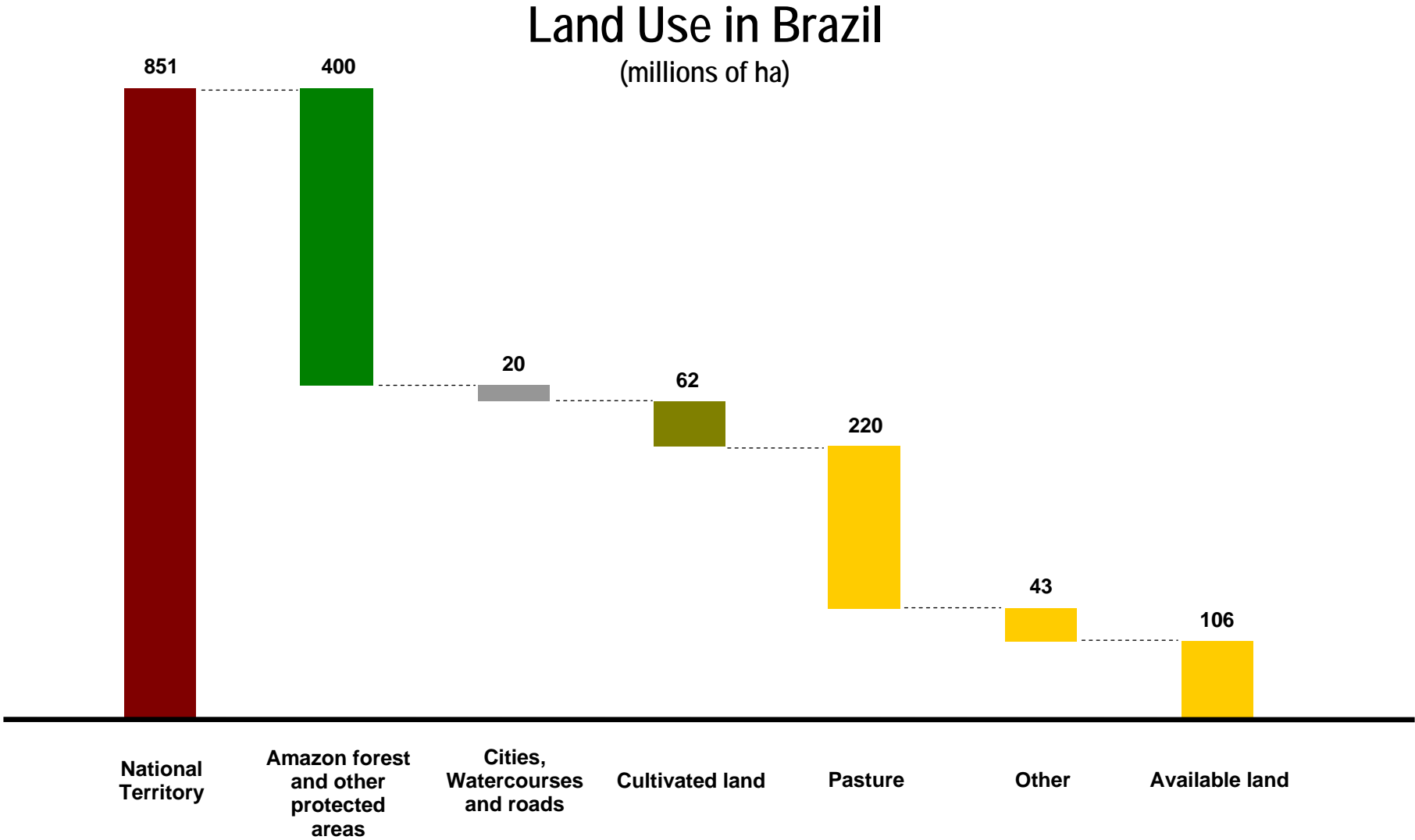


Food x Fuel: a fake dilemma

Availability of Land for Agriculture (millions of ha)



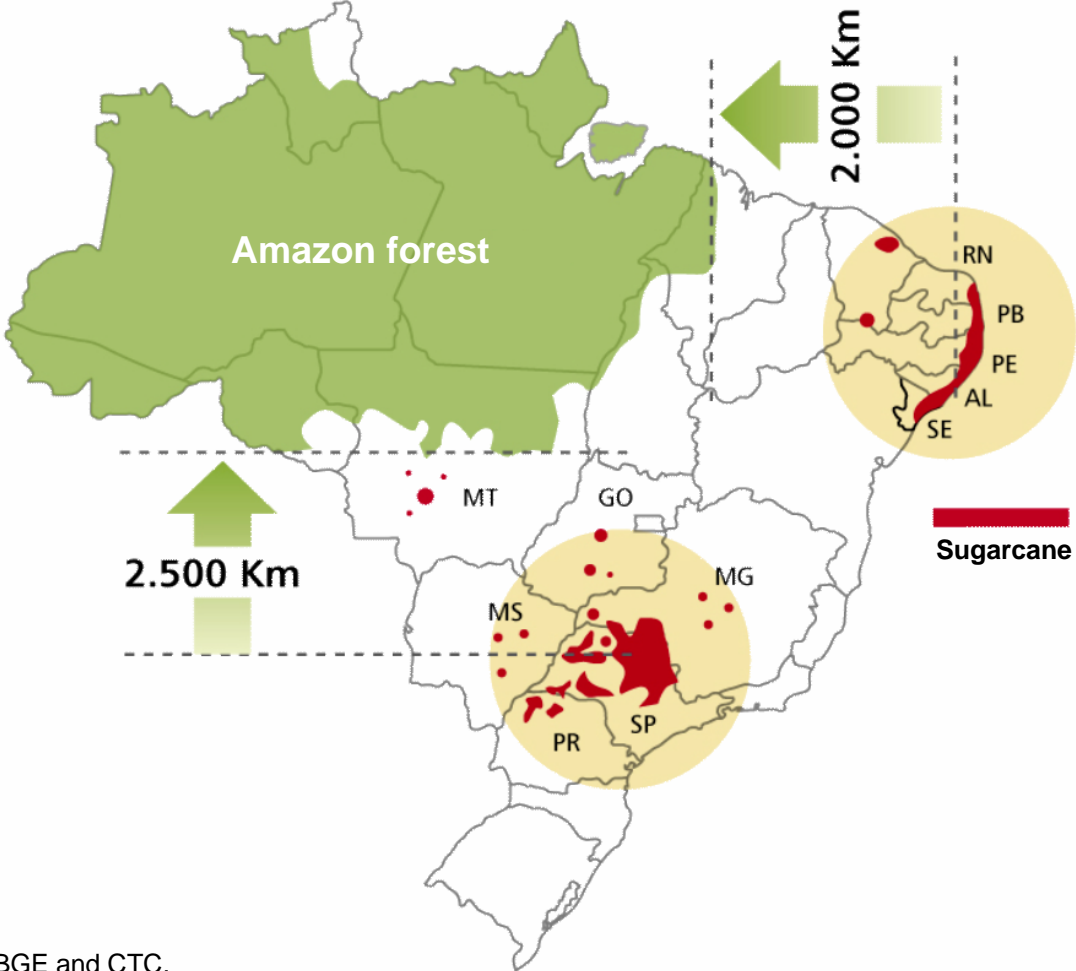
Brazil's potential for agriculture expansion



Source: FGV / GV Agro, MAPA, IBGE and CONAB.

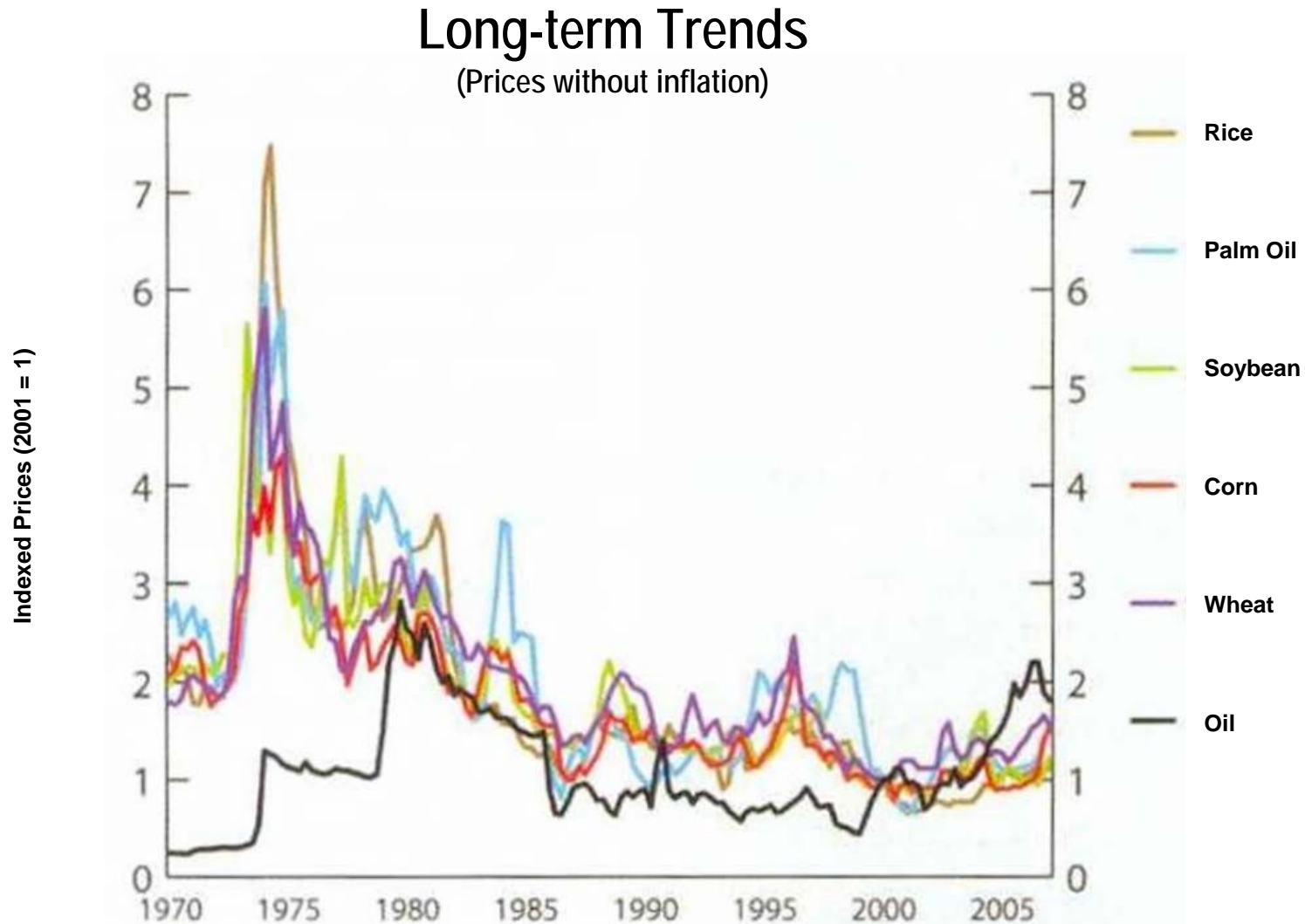
Ethanol poses no threat to the Amazon

Sugarcane producing regions



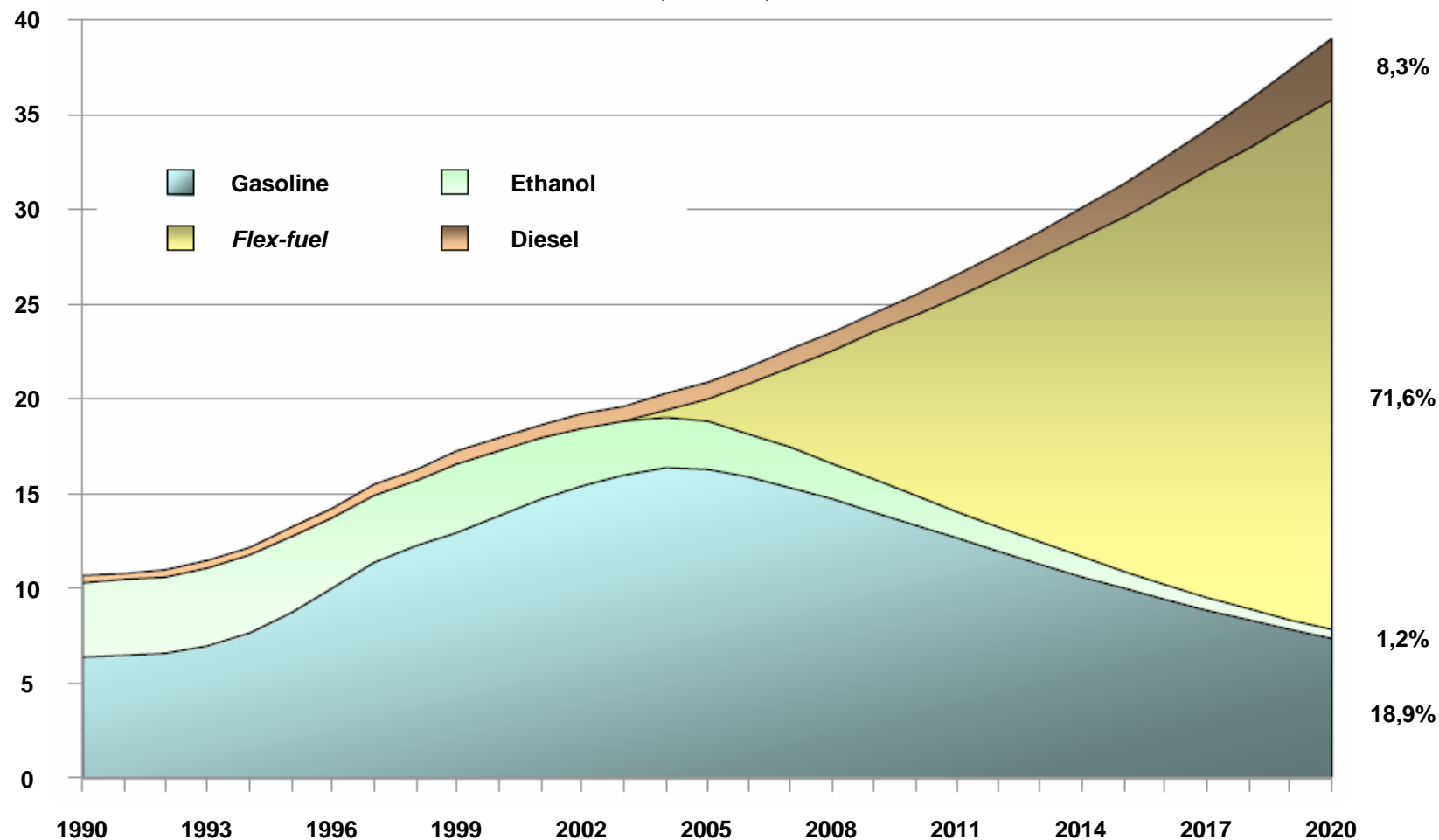
Source: MAPA, NIPE-Unicamp, IBGE and CTC.

Oil and commodities' price correlation



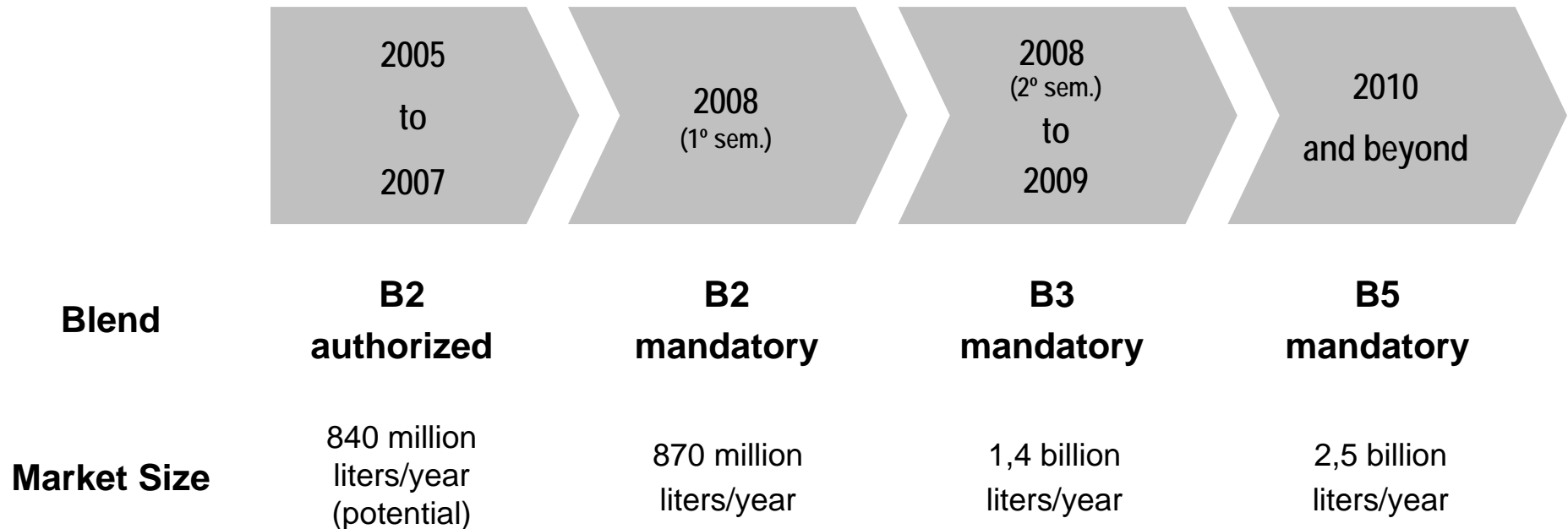
Flex-fuel technology boosts domestic ethanol demand

Number of light motor vehicles (millions)



Biodiesel: a market that experiences steady growth

Biodiesel Blending Goals



Challenges and Opportunities for Biofuels
