

# Bioenergy and the Rise of Sugarcane-Based Ethanol in Brazil

*By*

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**Third International Conference on Linking Markets and Farmers:  
Exploring Leading Practices to Foster Economic Growth in Rural India**



New Delhi, India, March 12, 2007



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# Agribusiness Sector in Brazil, 2006

- **One of the most dynamic sectors in the economy:**
  - 40% of the GDP (Brazilian GDP ~ US\$ 700 bi);
  - 35% of all jobs;
  - 5 million farms.
- **Country's largest source of foreign currency:**
  - Net Trade Balance of US\$ 50 billion in 2006.
  - 30-40% of all Brazilian exports.

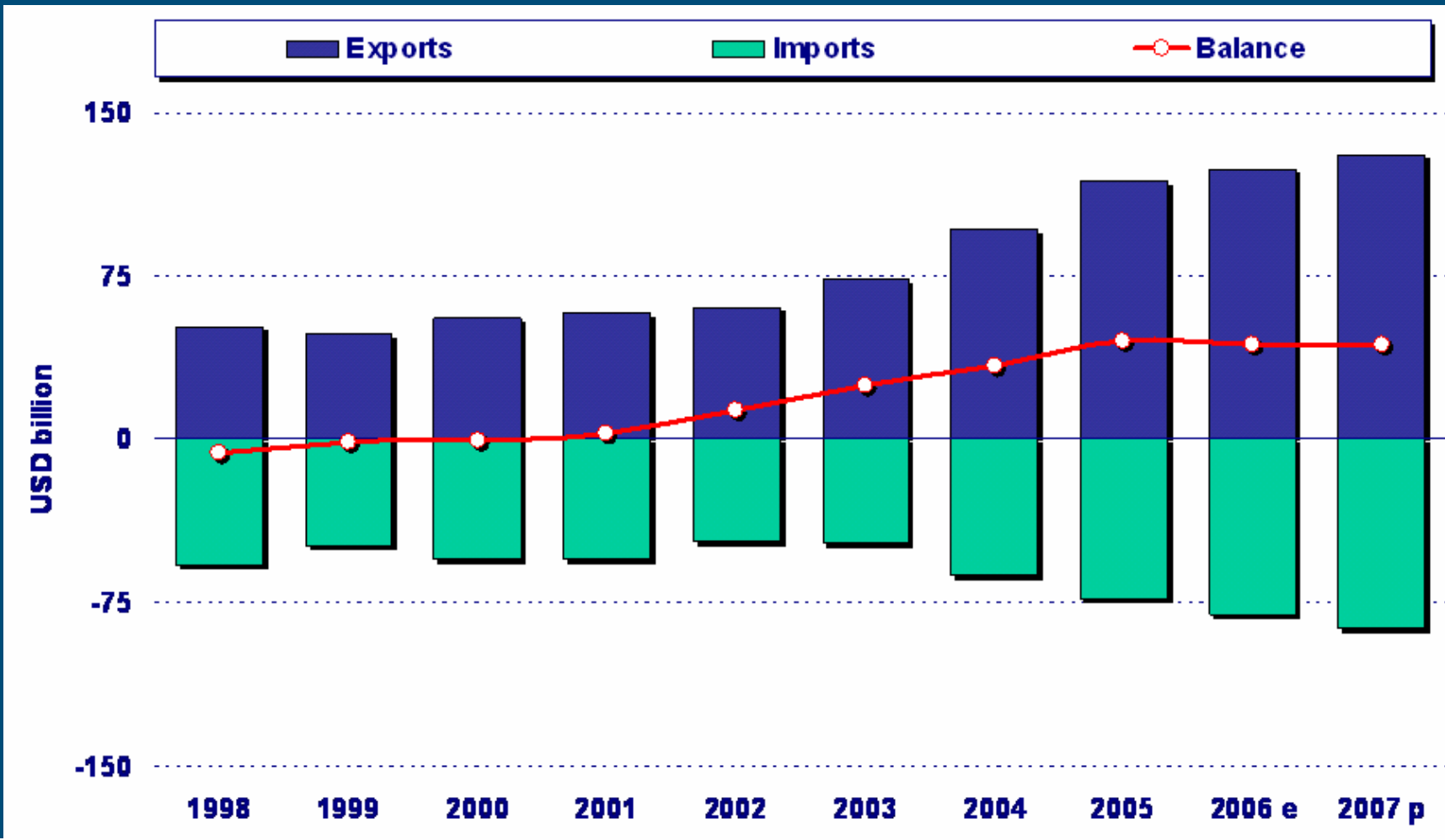


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# Brazilian Trade Balance, 1998-2007(f)



Source: MDIC-SECEX

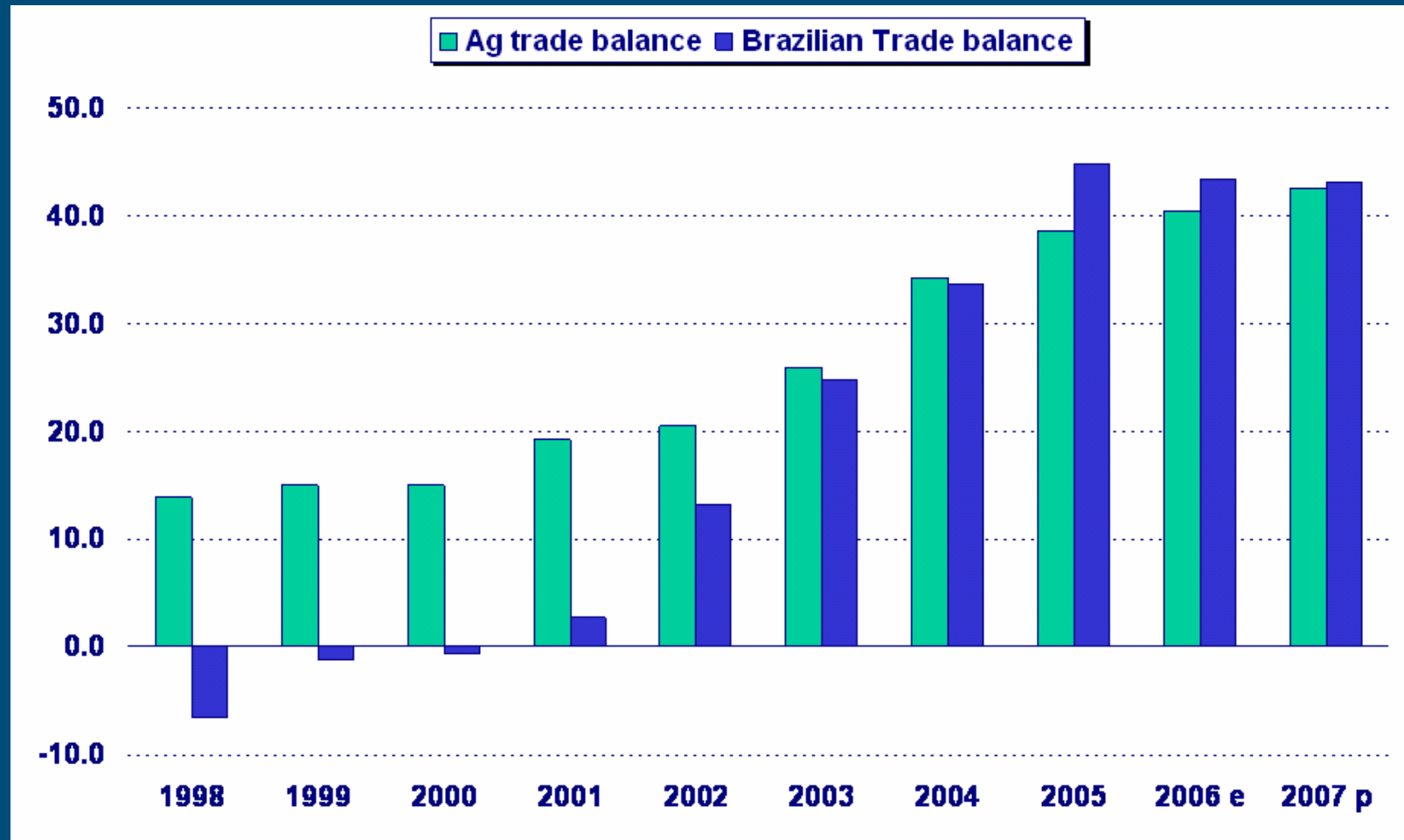


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# Brazilian Ag-Trade Balance, 1998-2007(f)



Source: MDIC-SECEX

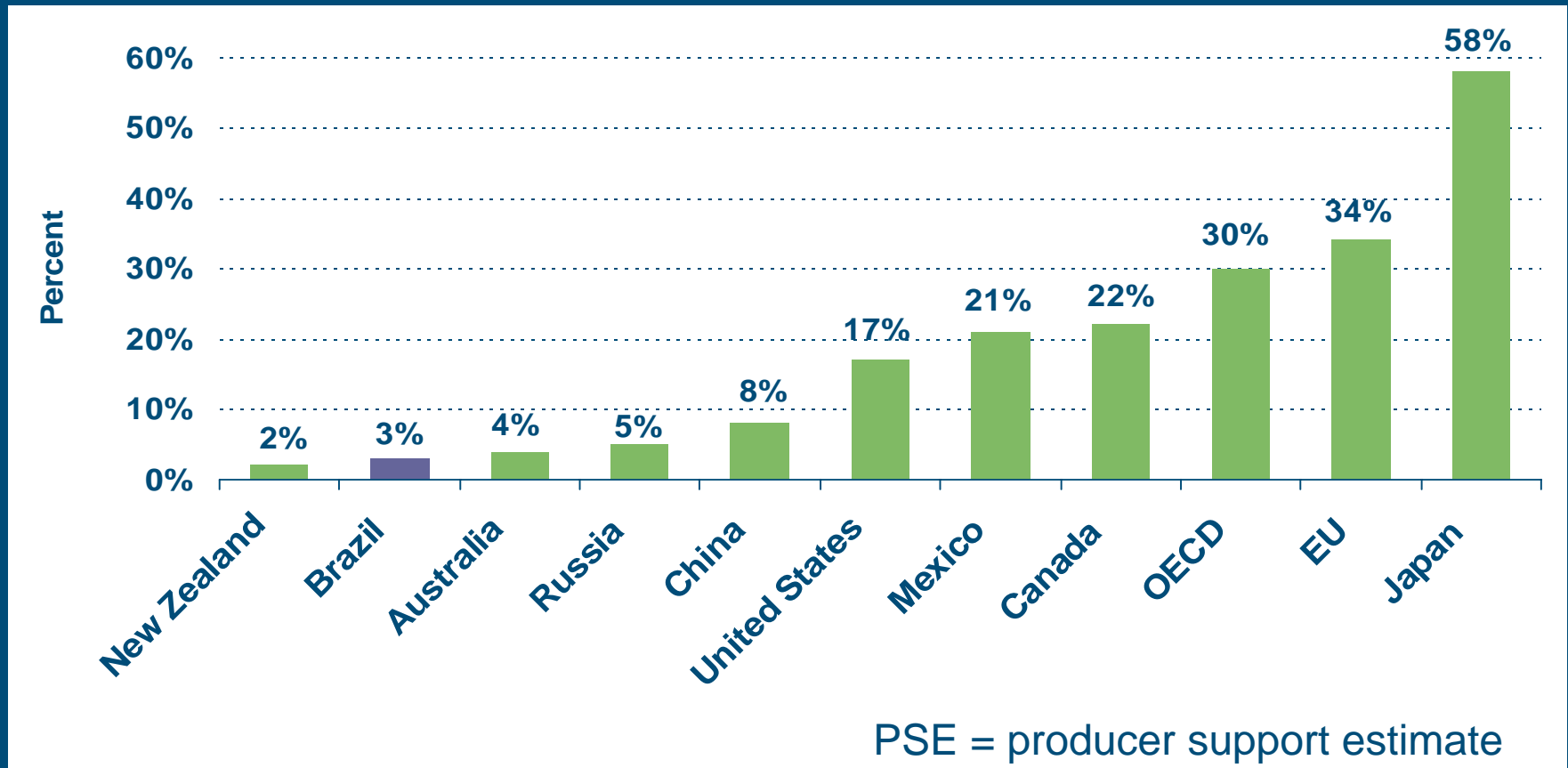


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# PSE by selected Countries, 2002-04



Source: WTO, APEC, COMTRADE, USITC and TARIC12 and ICONE

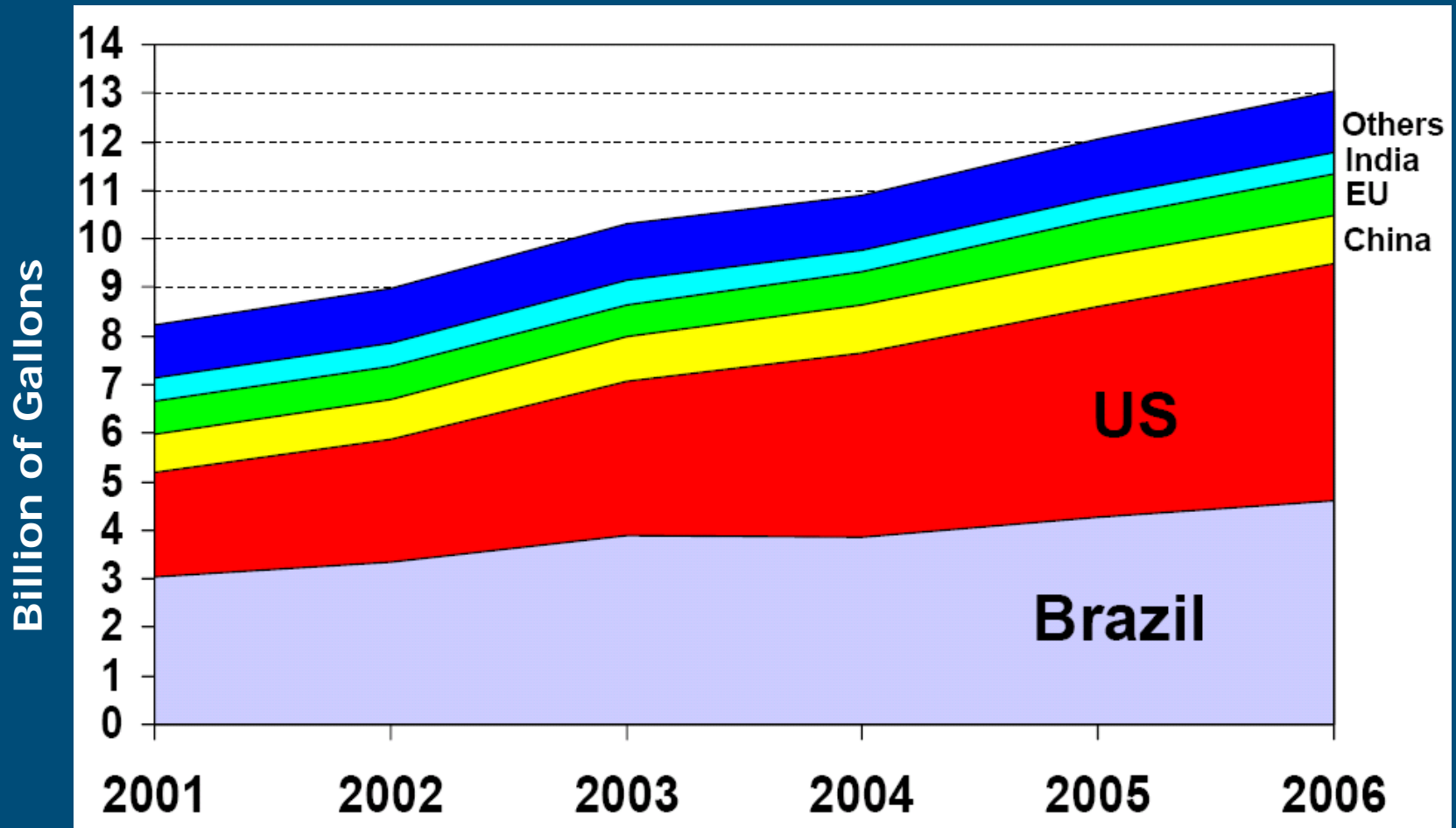


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# Ethanol: world production



Source: F. O. Licht

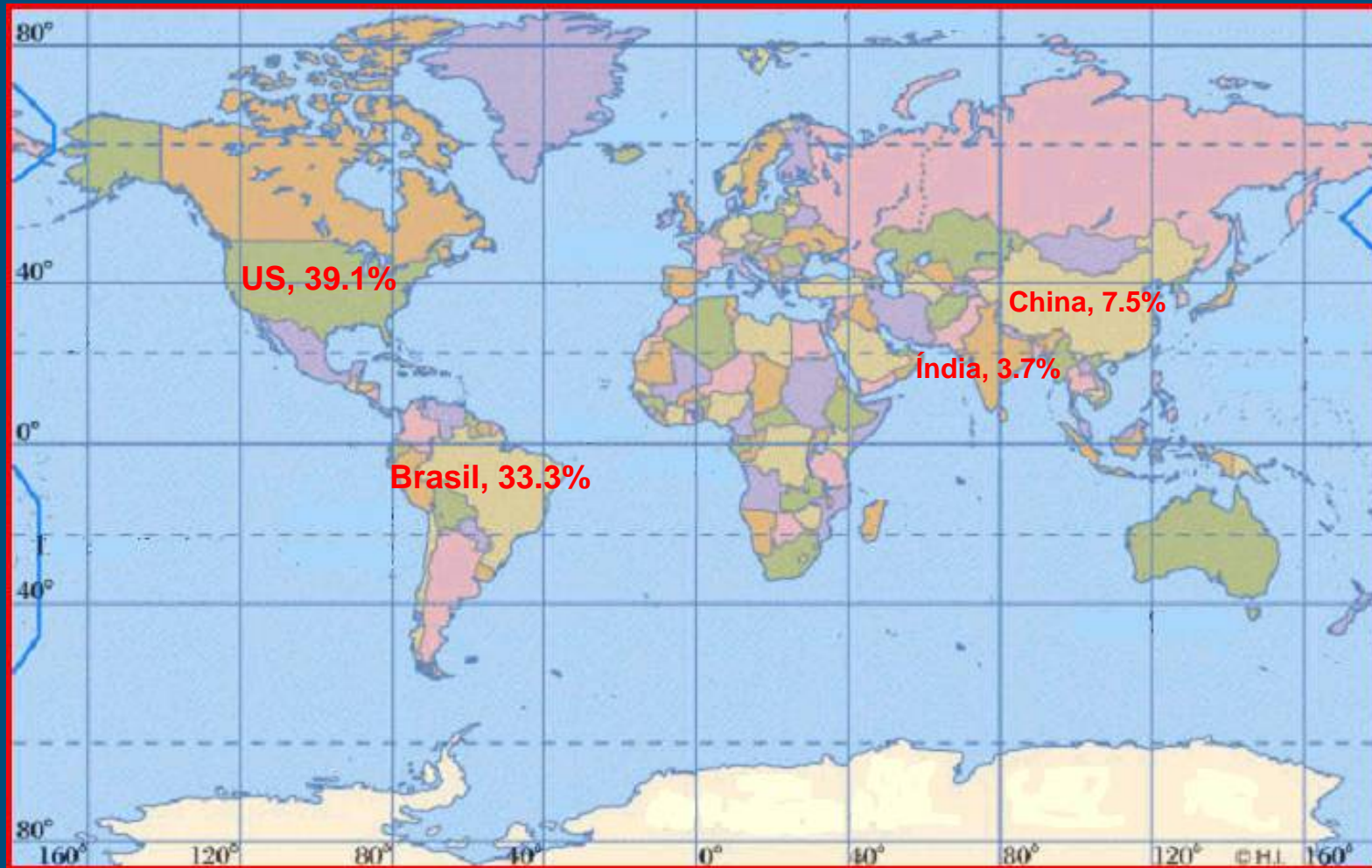


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# World Production of Ethanol, 2006



Source: RFA

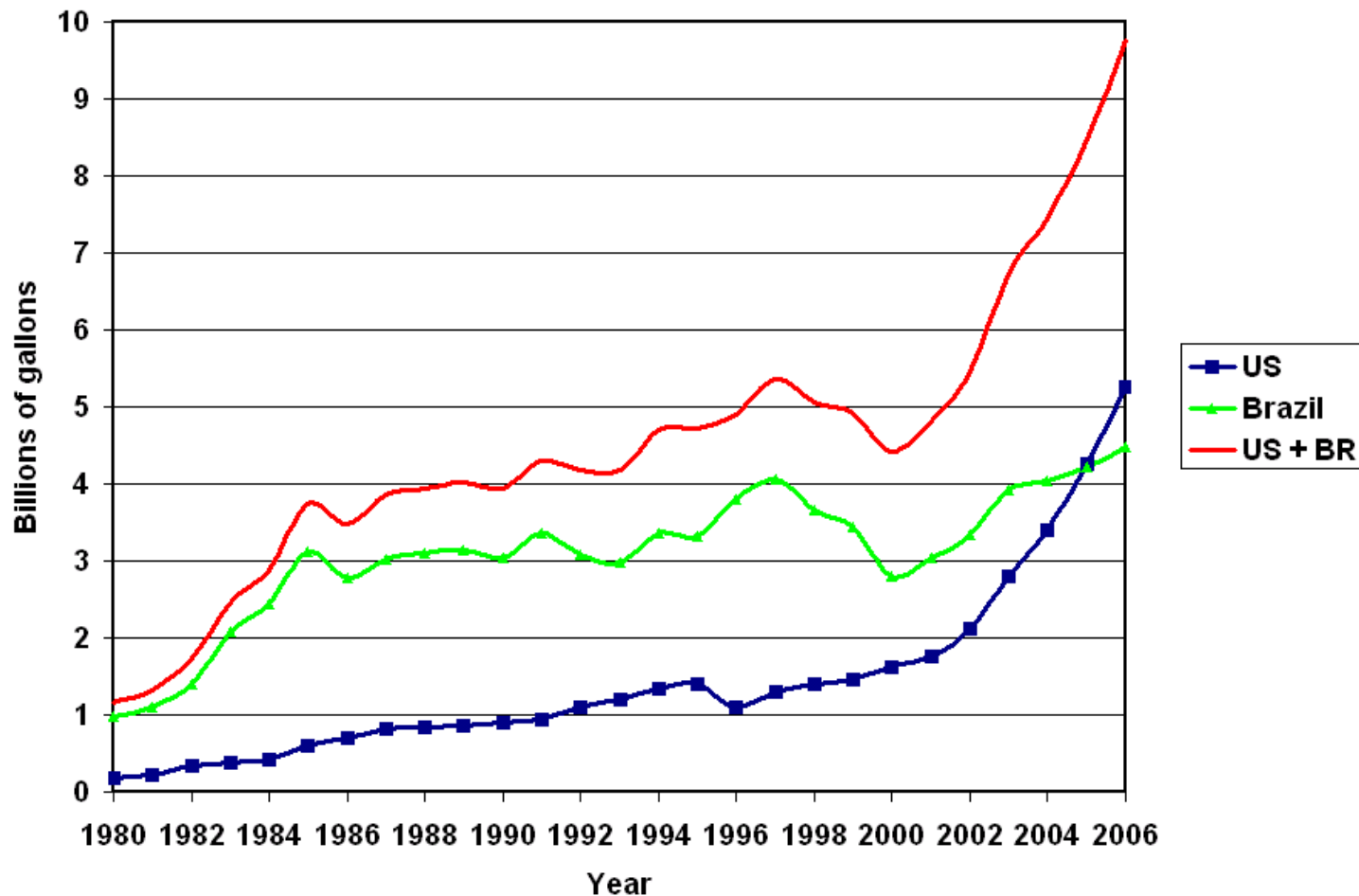


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# Ethanol Production: Brazil and US



Sources: RFA, MAPA and Unica



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# Ethanol Production: Brazil and US, 2006

	<b>US</b>	<b>BRAZIL</b>
Mills in operation	97	335
Feedstock	Corn	Sugar cane
Cultivated area (million acres)	16.5	6.2
ETHANOL production (million gallons)	5.3	4.5
<b>Ethanol productivity (gallons/acre)</b>	<b>321</b>	<b>727</b>
ETHANOL trade (million gallons)		
Imports	741	---
Exports	---	900
<b>Costs of production (US\$/gallon)</b>	<b>1.14</b>	<b>0.83</b>
<b>Import duty</b>	<b>39%</b>	<b>0%</b>

Source: RFA and Unica

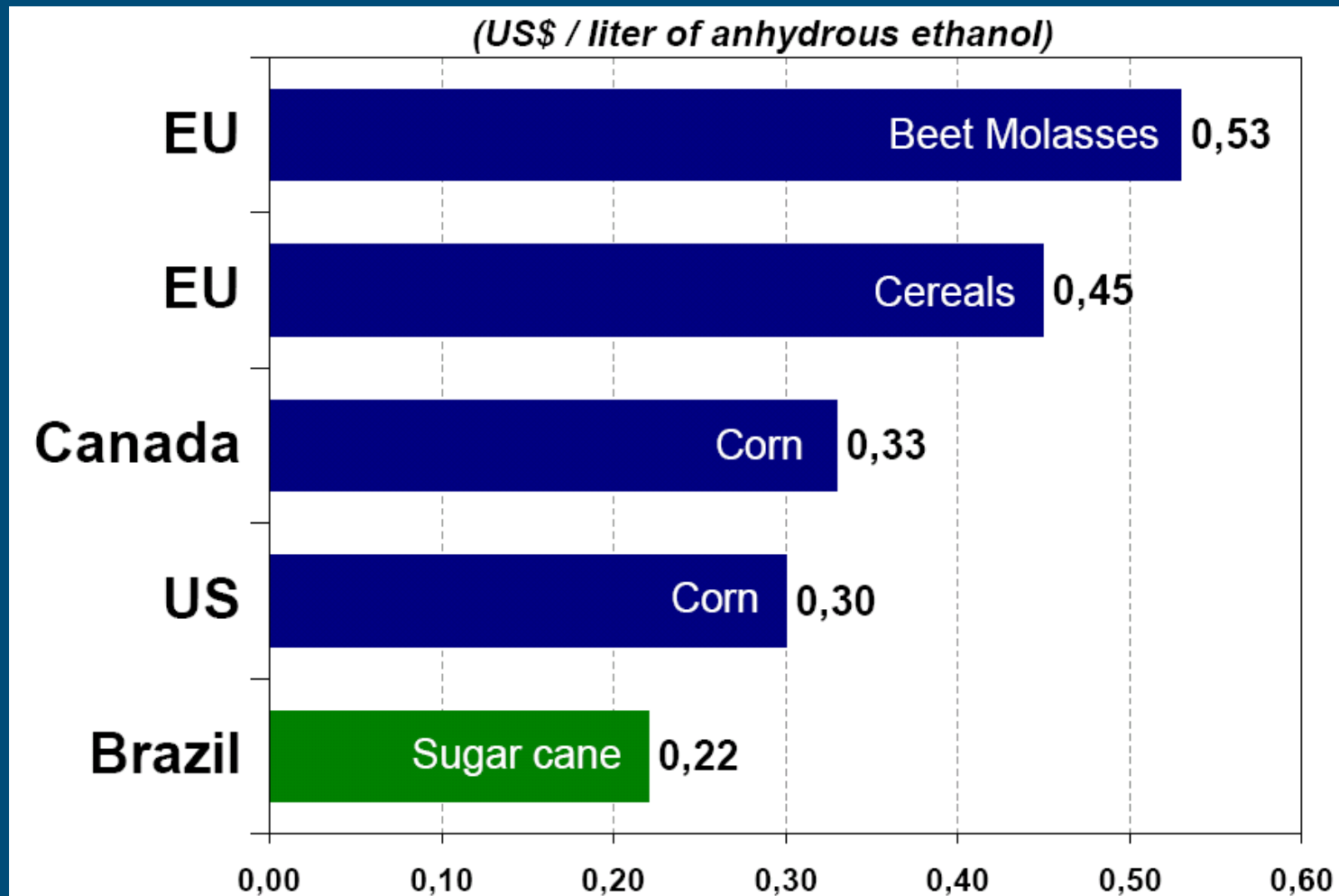


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# Ethanol: total cost of production

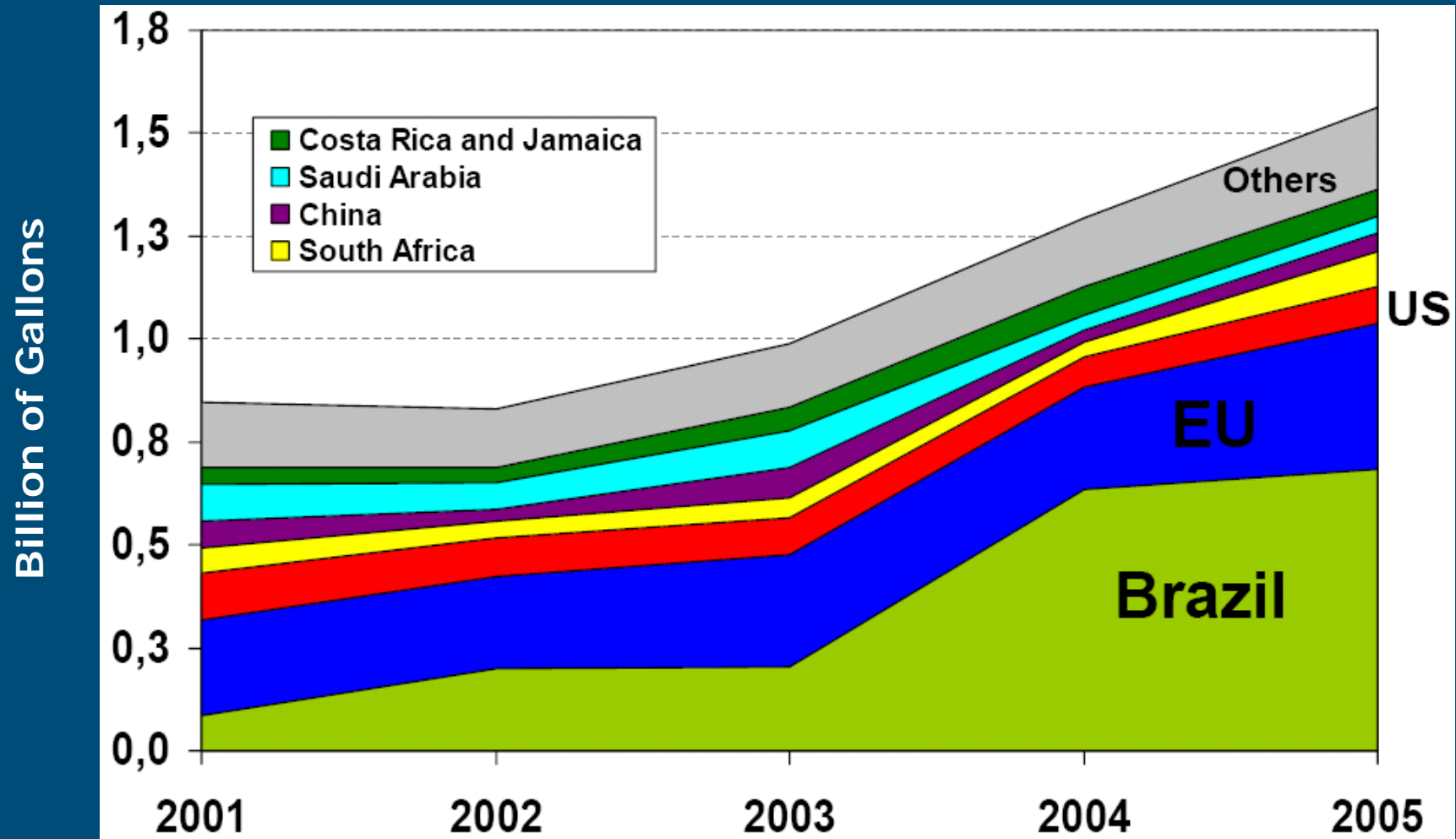


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# Ethanol: world exporters, 2001-05



Source: F. O. Licht

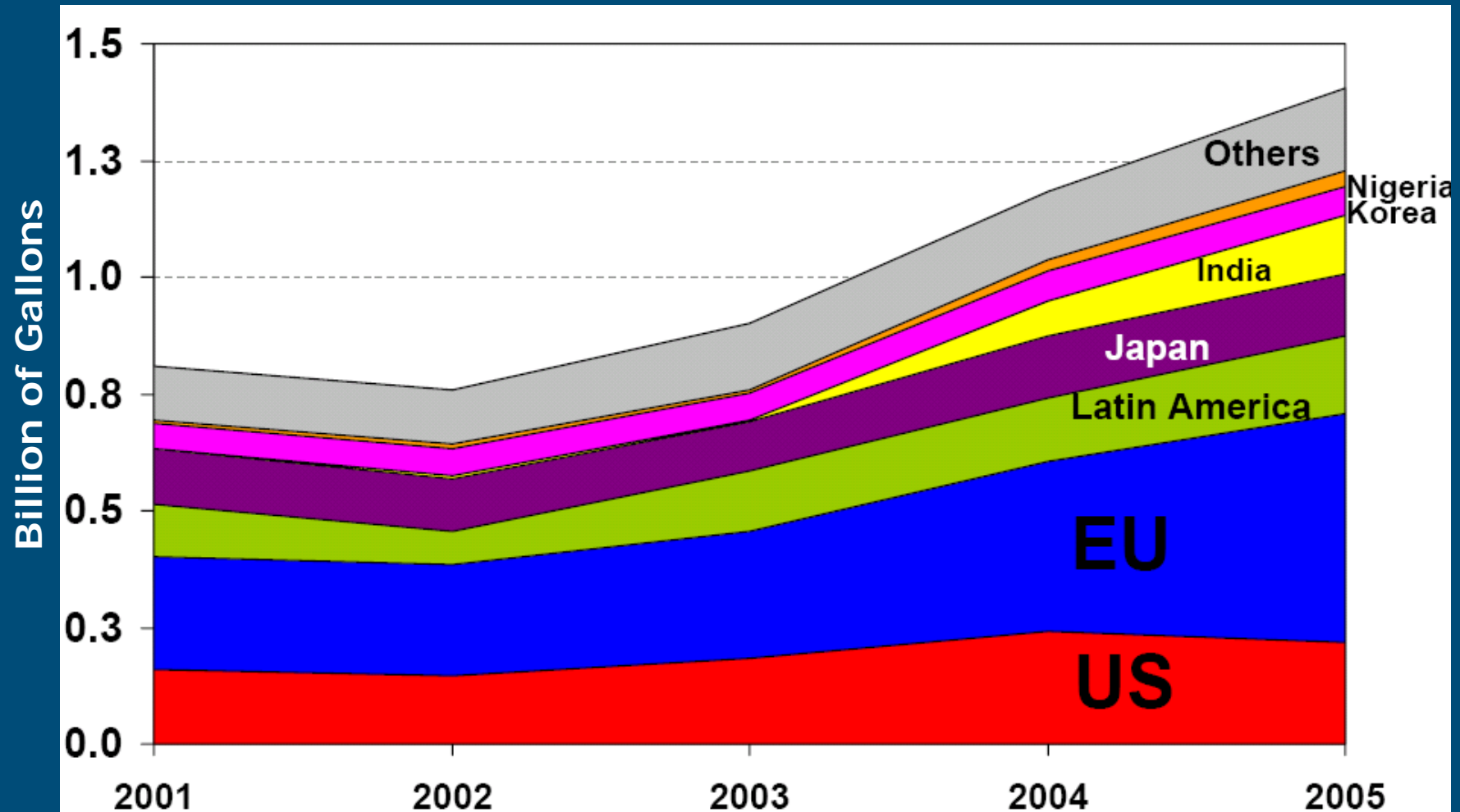


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# Ethanol: world importers, 2001-05



Source: F. O. Licht

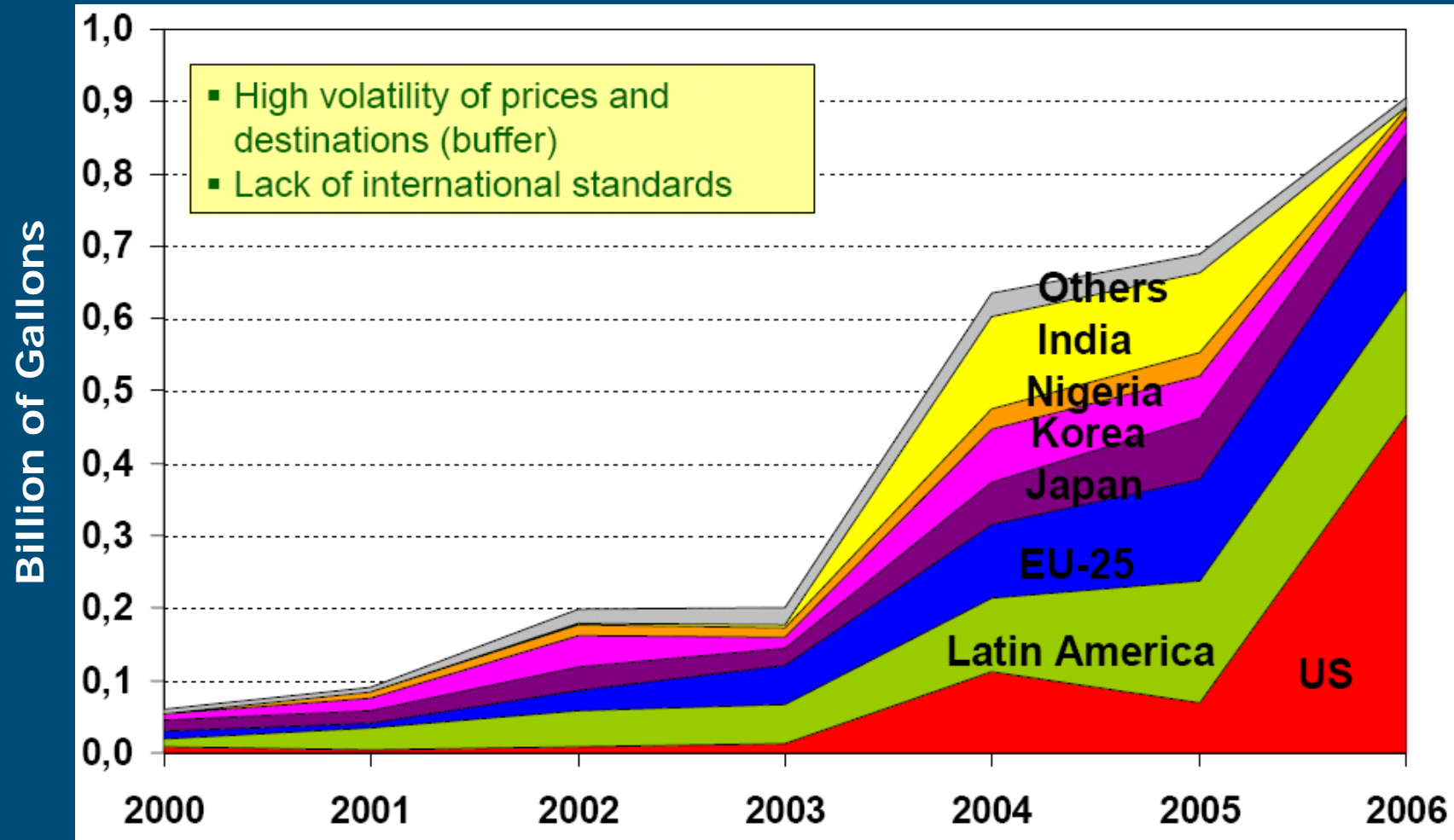


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# Ethanol: Brazilian exports 2000-06



Source: MDIC-SECEX



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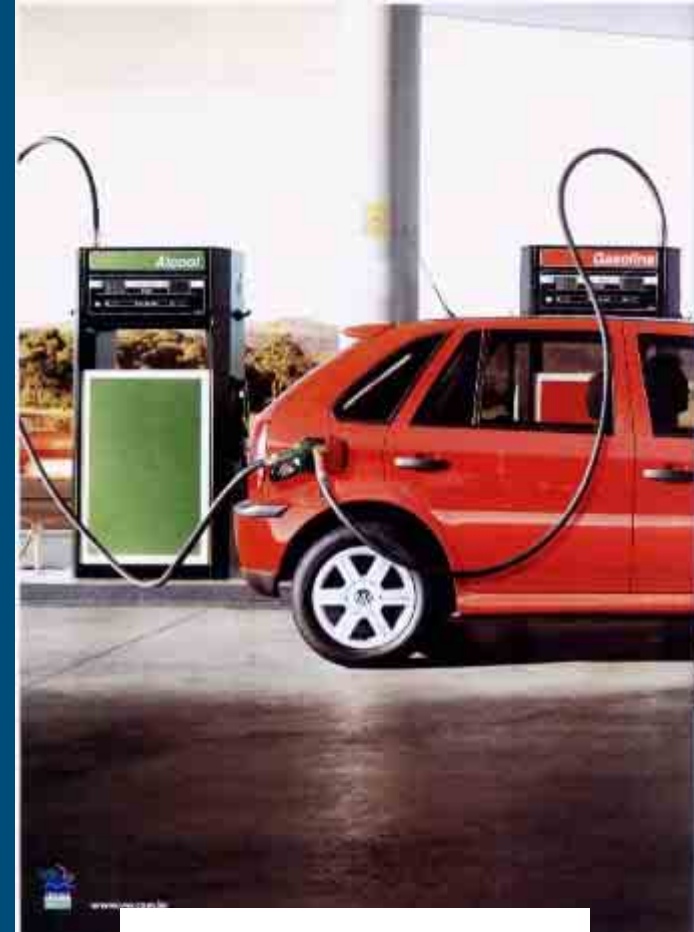
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# Ethanol Program in Brazil: past and present



1925



2006

Source: ANFAVEA

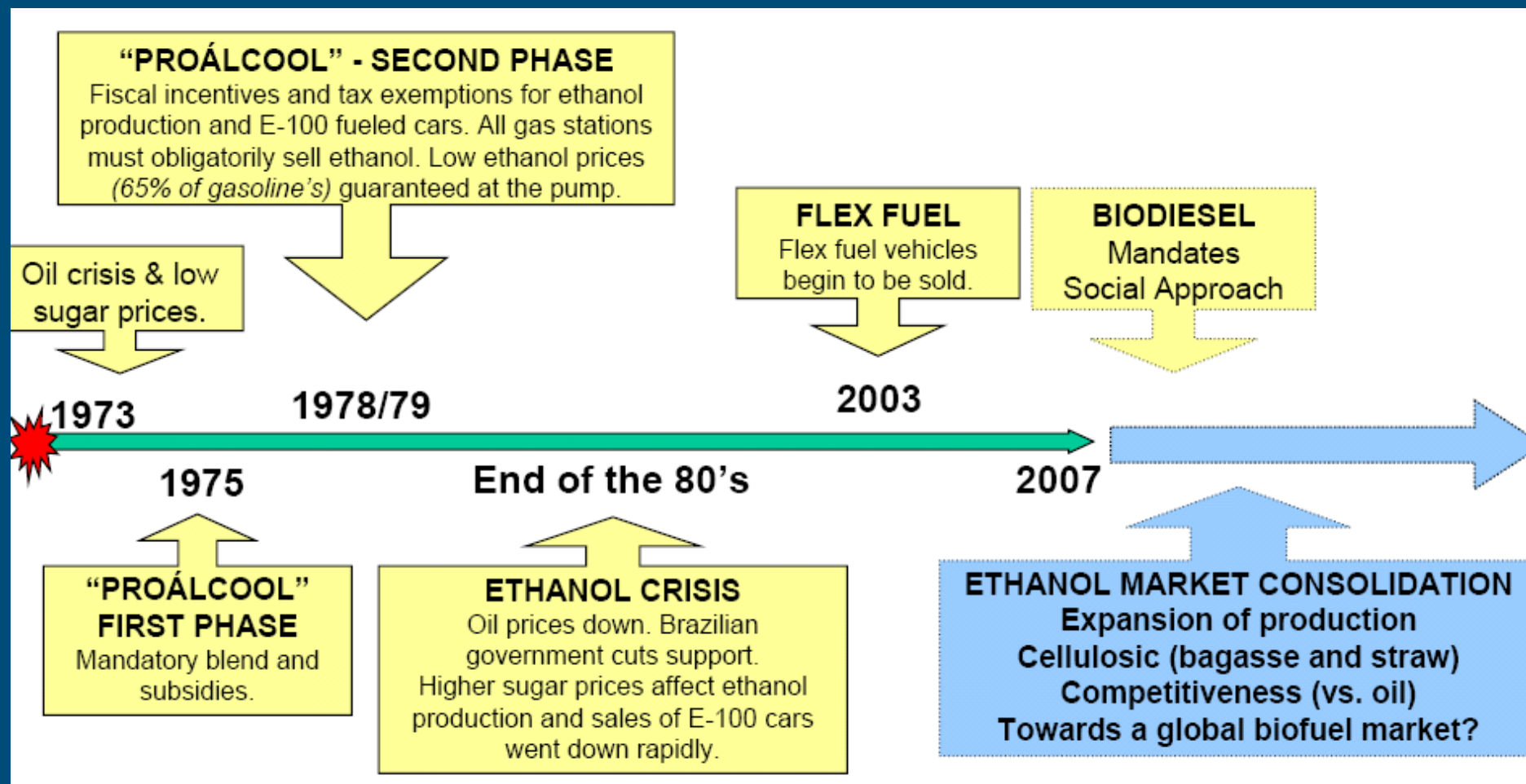


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# Ethanol Program in Brazil: the last 33 years of history



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# Brazil: technological changes in the sector

- In 1975, the yield of sugar cane was 65 tons/hectare with 3 cuts. Today, yield is around 90 tons/hectare with 6 cuts
- In the 70s, 1 ton of sugar cane made 65 liters of ethanol. Today, it makes around 90 liters / ton of sugar cane.
- In the 70s, 1 ton of sugar cane made 90 kgs of sugar. Today, we are able to make 120 kg of sugar



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# Flex Fuel Vehicles (FFV) in Brazil



Through some special electronic sensors, the on-board computer recognizes the fuel and properly adjust the engine combustion parameters, without any interference from the driver.

- Introduced in the Brazilian market on March 2003.
- These vehicles are designed to be fueled with gas, ethanol, or any blend of gas and ethanol (today from E23 to E100)
- Seven brands and 49 models.
- 33,000 gas stations all over the country with at least one dedicated E100 pump

Source: ANFAVEA

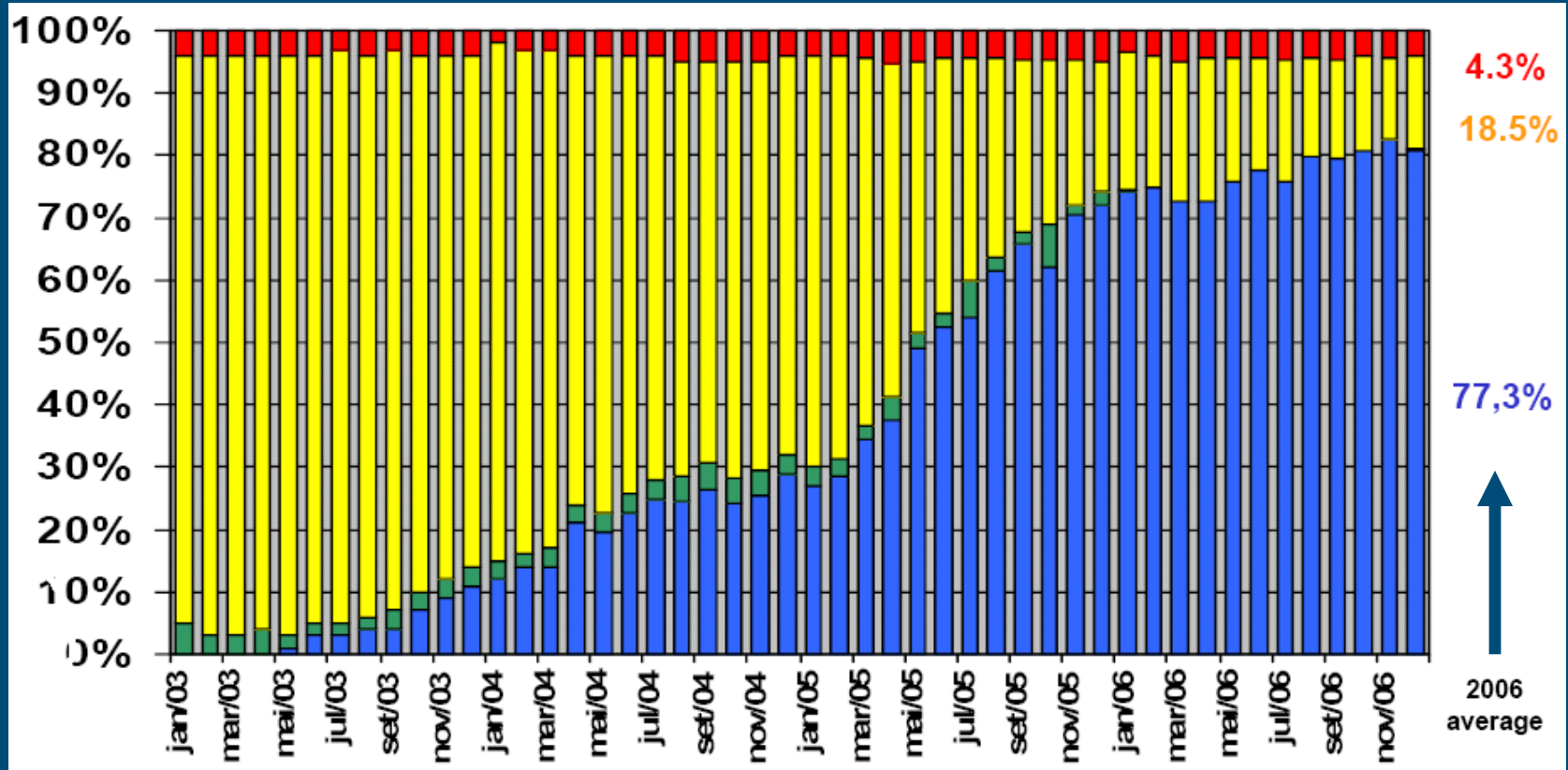


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# Brazilian Market Sales: light vehicles



Reasons for success:

- a) Consumer's guarantee for moves in fuel relative prices
- b) Operational cost reduction
- c) Best performance

■ Flex (Alcohol or Gasoline)
 ■ Gasoline
 ■ Alcohol (Pure)
 ■ Diesel

Source: Anfavea (2006), MAPA

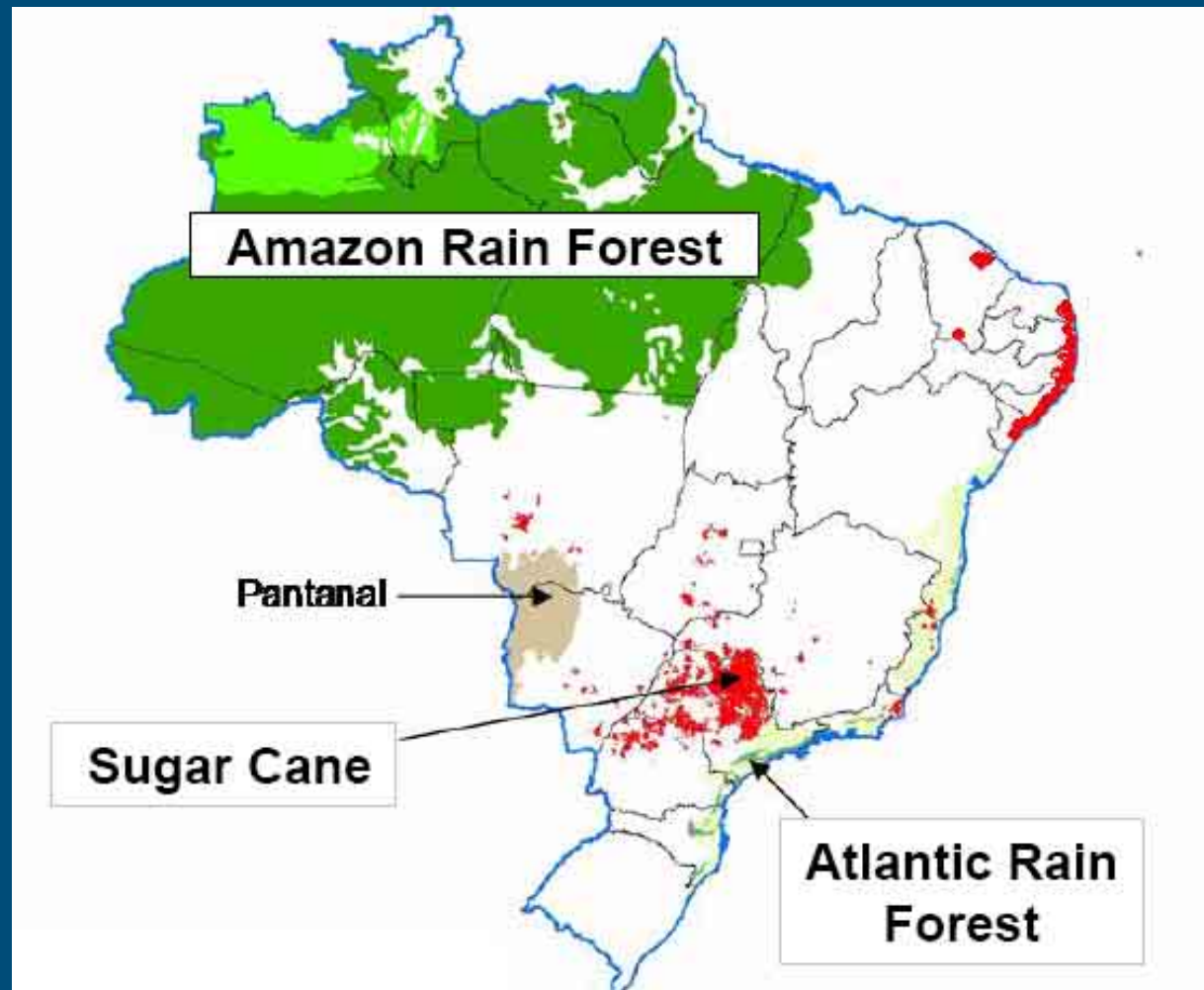


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# Brazilian Main Sugar Cane Production Regions



Sources: IBGE and CTC

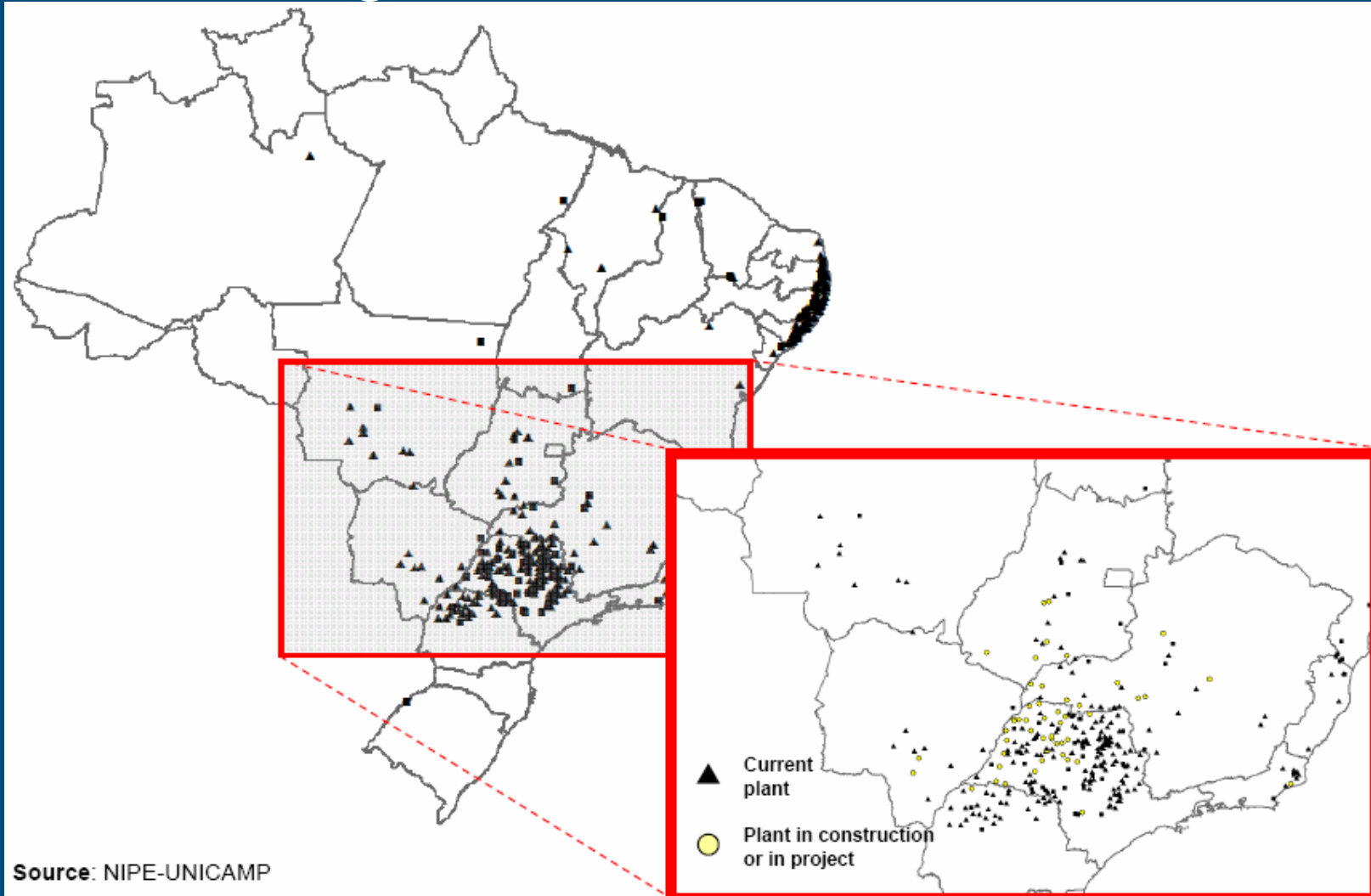


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# Brazilian Sugar Mills Location



Source: NIPE-UNICAMP



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# Sugar Cane Production in BR: today and potential

Million Acres (2005)	
<b>BRAZIL</b>	<b>2,100</b>
<b>Total Arable Land</b>	<b>790 (38%)</b>
<b>1. Cultivated Land: All crops</b>	<b>150</b>
Soybeans	57
Corn	28
<b>Sugar cane</b>	<b>14.3</b>
<b>Sugar cane for ethanol</b>	<b>7</b>
Oranges	2
<b>2. Pastures</b>	<b>440</b>
<b>3. Available land (ag, livestock)</b>	<b>200</b>



}
}
 billion gallons of ethanol require:
 }
}
 million acres of sugarcane

Source: MAPA, UNICA



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# Brazilian mills: today and in the next years

Investments for the next six years	
New Plants (77)	US\$ 12.2 billion
Existing plants (335)*	US\$ 2.4 billion
<b>TOTAL</b>	<b>US\$ 14.6 billion</b>



**81%** of the new plants are being built by traditional entrepreneurs of the sector

Source: MAPA, UNICA.

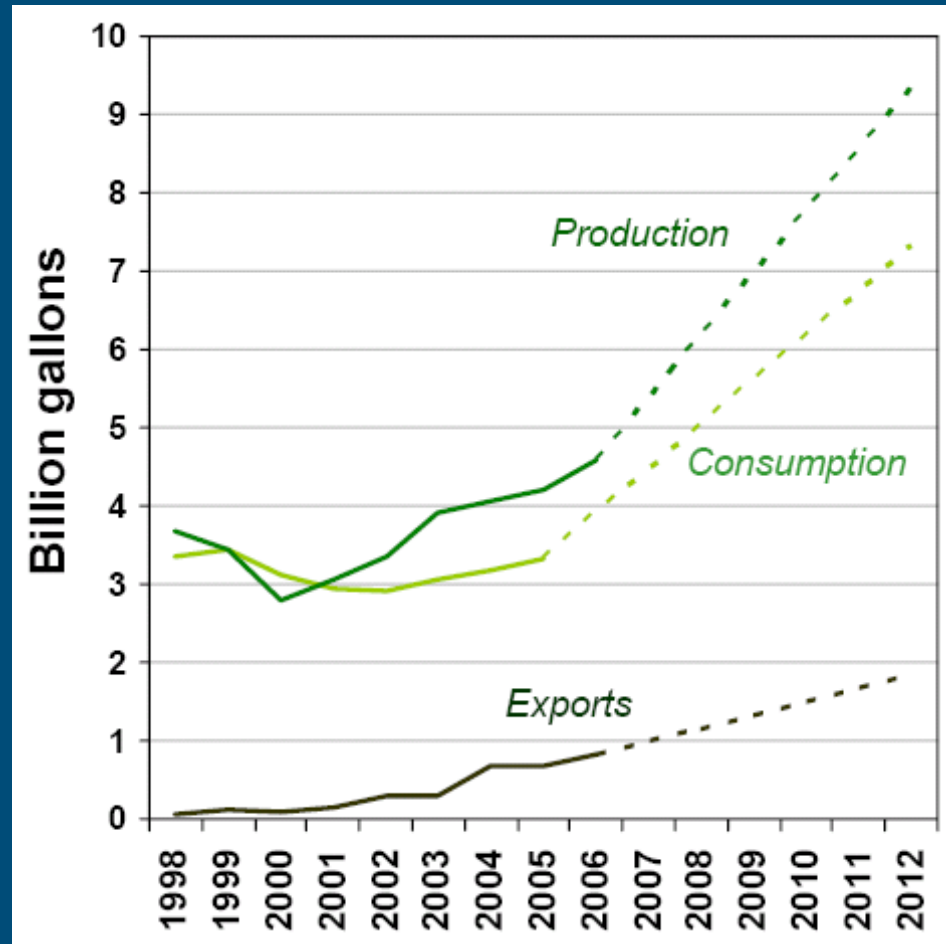


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# Brazilian Ethanol Projections



Source: MAPA, UNICA



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# Ethanol Values

## Values

- ✓ Renewable source of energy
- ✓ Octane booster
- ✓ Fuel extender
- ✓ Fuel substitute
- ✓ Low carbon fuel
- ✓ Low pollution fuel (reduce GHG emissions)
- ✓ Social development inducer in rural areas
- ✓ In line with Kyoto & Sustainable Development



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# Final Remarks

- Ethanol Program in Brazil: a pure and true story of **LINKING MARKETS AND FARMERS**



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