



Bio-ethanol: Climate Benefits with Responsible Production

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WWF-Brasil**

**Task 40 Workshop on Sustainable Biomass Production
for the World Market**





CONTENT

- WWF- Brasil and Agriculture
- The Brazilian energy context
- The biofuels market
- The impacts of expansion
- A Sustainability scenario
- Conclusions





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WWF- Brasil

- Brazilian NGO, contributing to an international network

WWF-Brasil Mission

Help the Brazilian society to conserve the nature, harmonizing human activity with biodiversity preservation and with rational use of natural resources, for the benefit of the citizens of today and the future generation.





WWF-Br Agriculture Programme

Help the society to conserve nature promoting an agriculture production which includes environmental and social safeguards and economical viability, from familiar and small holders to large producers.





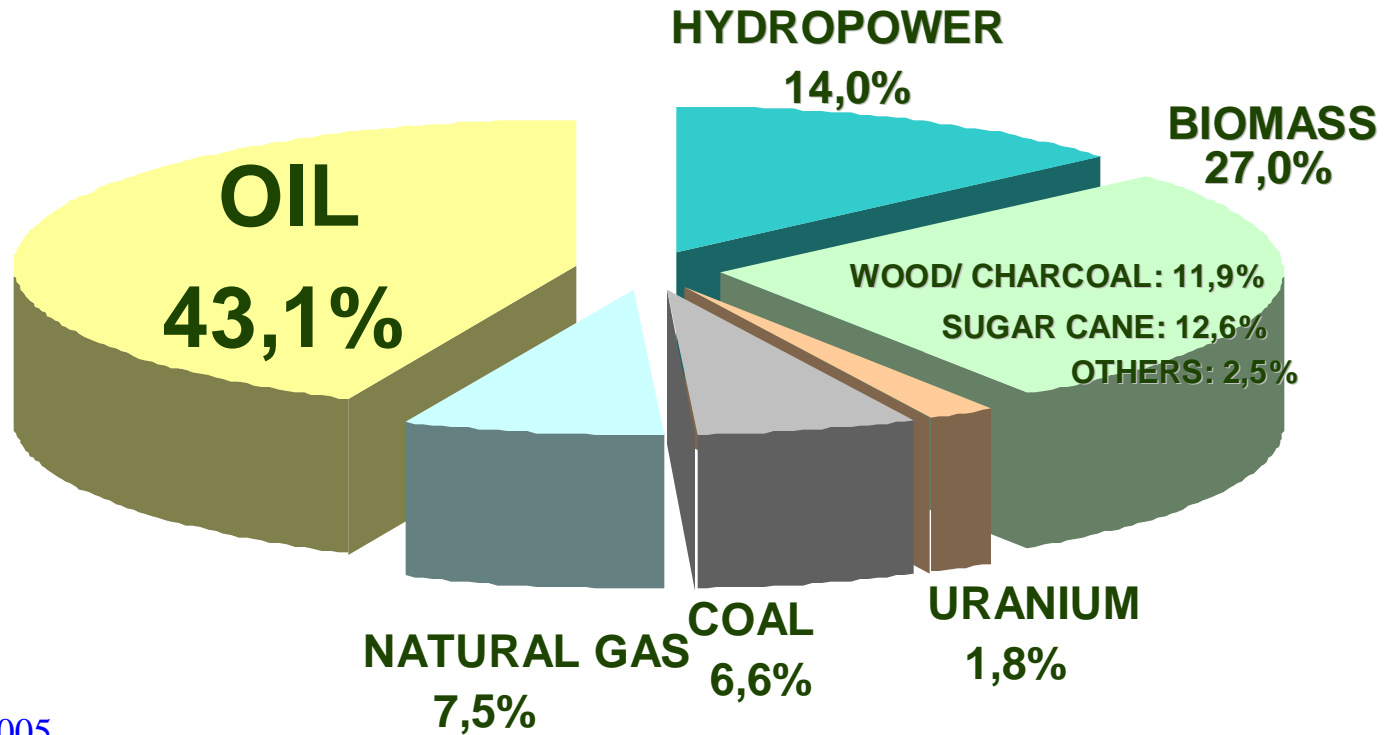
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ENERGY MIX (2003)



Source: MME, 2005





TRADE BALANCE OF FUELS (2003)

FUEL	PRODUCTION	IMPORTS	EXPORTS	IMPORTS	EXPORTS
	mil m3	mil m3	mil m3	% OF DEMAND	% OF SUPPLY
GASOLINE	18,537	-	2,497		13%
DIESEL	37,020	3,698	-	9%	
ETHANOL	14,660	-	1,200		8%
NATURAL GAS	15,792,031	5,946,859	-	27%	

IMPORT DEPENDENCY

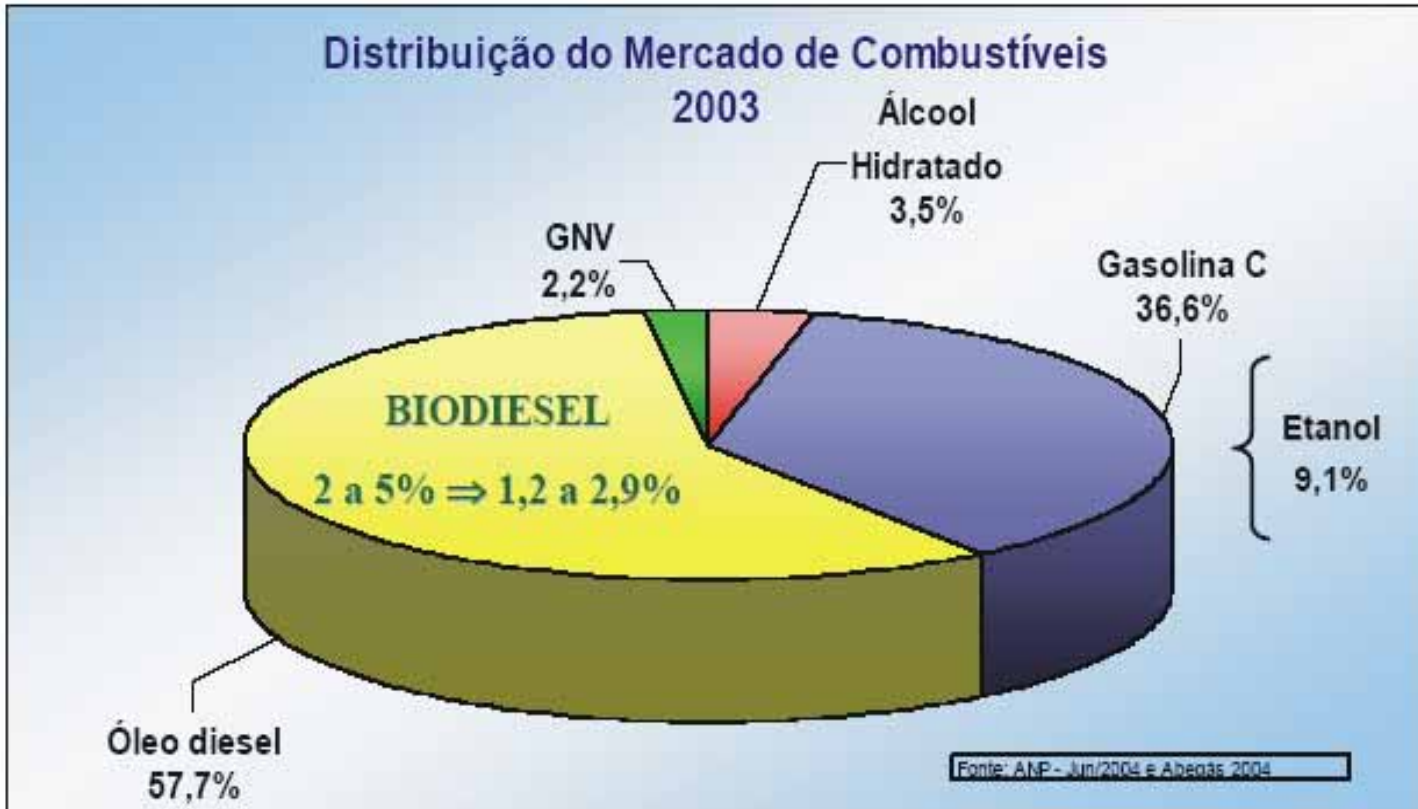
OVERSUPPLY

Source: MME, 2005





MARKET SHARE BY FUEL (2004)



Source: MME, 2005





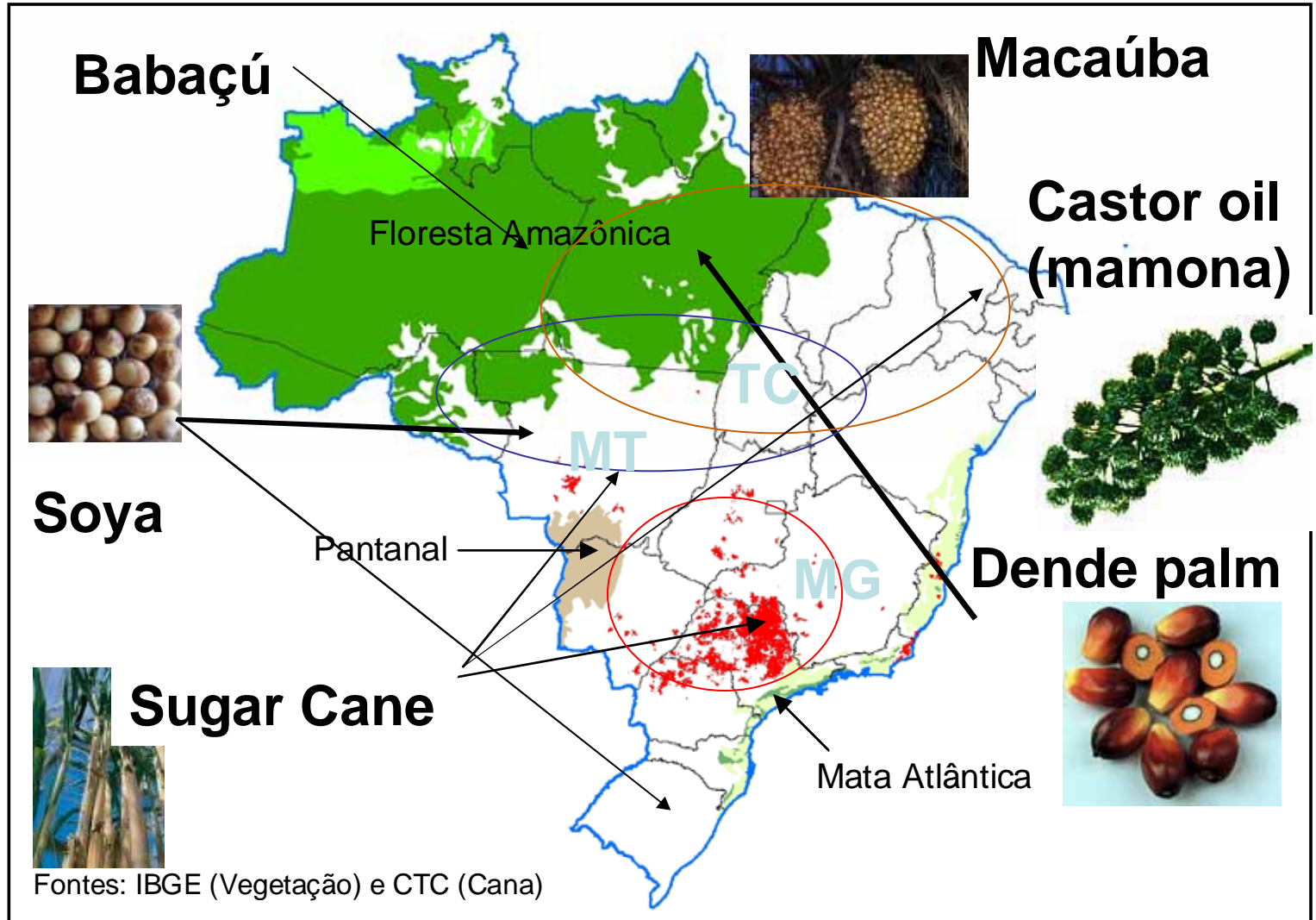
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CROPS FOR BIOFUELS





DRIVERS FOR BIOFUELS PRODUCTION

DOMESTIC

- Ethanol: gasoline price increase and introduction of hybrid engines (35% of new car sales)
- Biodiesel: launch of a biodiesel obligation: 2% by 2007 (800 M l/y), 5% by 2013 (2 B l/y), and goal of 20% by 2020 (12 B l/y).

FOREIGN

- Kyoto Protocol implementation
- Exports to Japan, South Korea and US
- Fall of subsidies in Europe and US





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POSITIVE IMPACTS OF BIOETHANOL

- Hard currency savings average 1.8 billion US dollar/year with the replacement of $\approx 200,000$ barrels of gasoline/day (last 20 years)
- Air quality improvements in large cities (reduction of major pollutants: CO, NO_x, VOC)
- Creation of 720,000 direct jobs and 200,000 indirect jobs in rural area
- CO₂ emission reduction in the transport sector ~ 9 Mtons/year

Source: La Rovere, 2005





CLIMATE BENEFITS

Net CO ₂ emissions reduction (1990-91)	Mtons C/Year
Ethanol Substitution for Gasoline* *Including blending 22% of ethanol with gasoline and 4.2 million pure ethanol-fired cars	- 7.41
Bagasse Substitution for Fuel Oil Burning as Heat Source in Other Industries	- 3.24
Fossil Fuel Utilization in Sugarcane Industry	+ 1.20
Net Contribution (uptake)	- 9.45

Source: Macedo, 2004





POSSIBLE NEGATIVE IMPACTS OF BIOETHANOL PRODUCTION

- Massive development of ecologically harmful monocultures based on large-scale land owners and land concentration (covering 80% of agriculture land)
- Transfer of subsidized public funds equal to \approx US\$ 10 billions to the sugar sector
- Local air pollution due to burning of cane plantations
- Mechanization in the agricultural sector can lead to job losses for hundreds of thousands of rural workers
- Pressure in the Amazon and Cerrado due to the complexity of deforestation





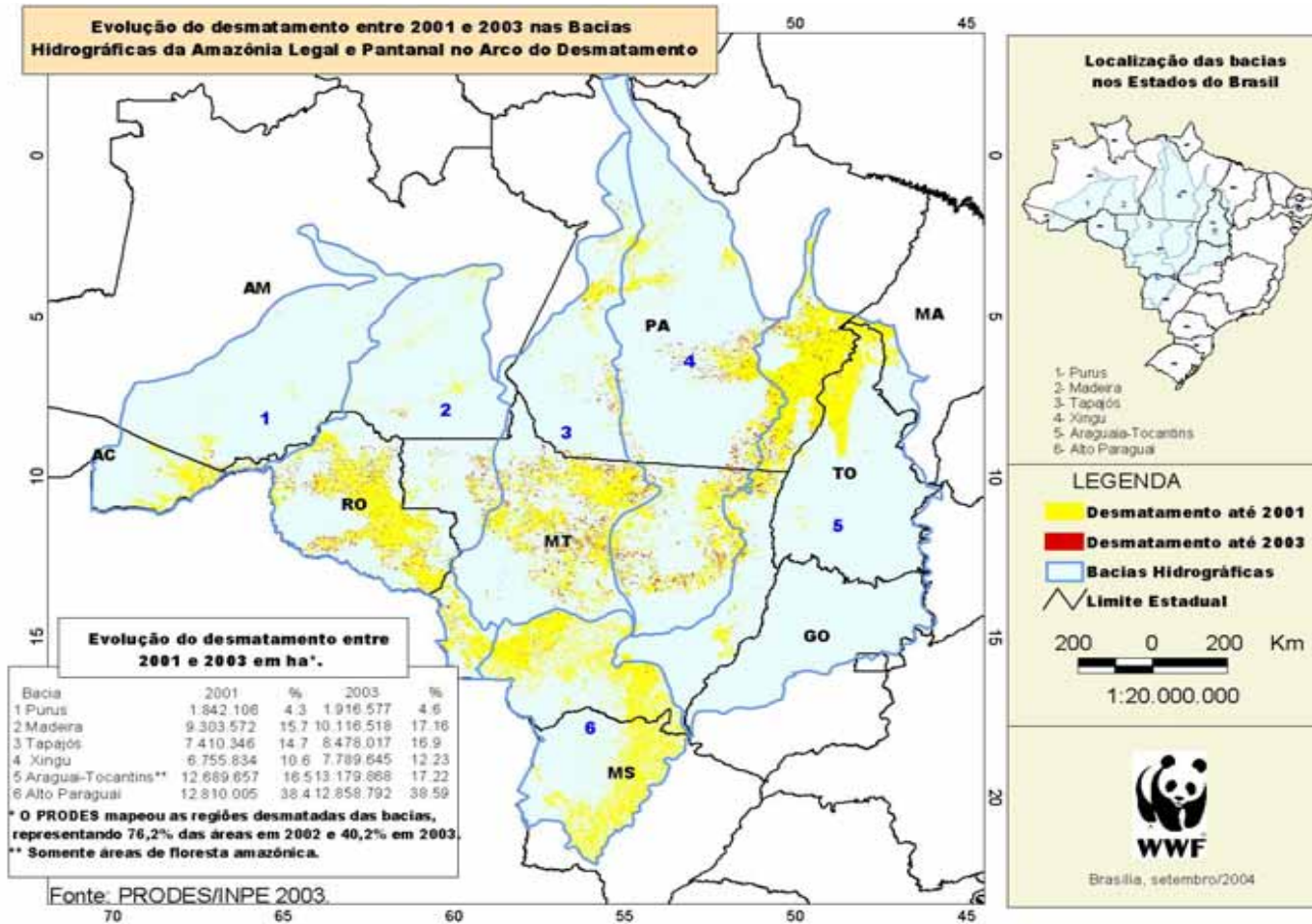
Main reasons for Deforestation in the Amazon and Cerrado

- **The reality in the Amazon and Cerrado is a chaos:**
 - Disrespect to local communities, murdering, forests with no value
- **Amazon Deforestation Arc is a result of the sommatory of diferent factors including:**
 - Cattle Ranching
 - Soy/Cotton/Sugar Cane Production
 - Illegal Properties
 - Predatory Timber
 - Lack of incentive for sustainable activities
 - Burocracy
 - Governement Agencies Corruption
 - Lack of interest in the public goods





Deforestation 2001 and 2003





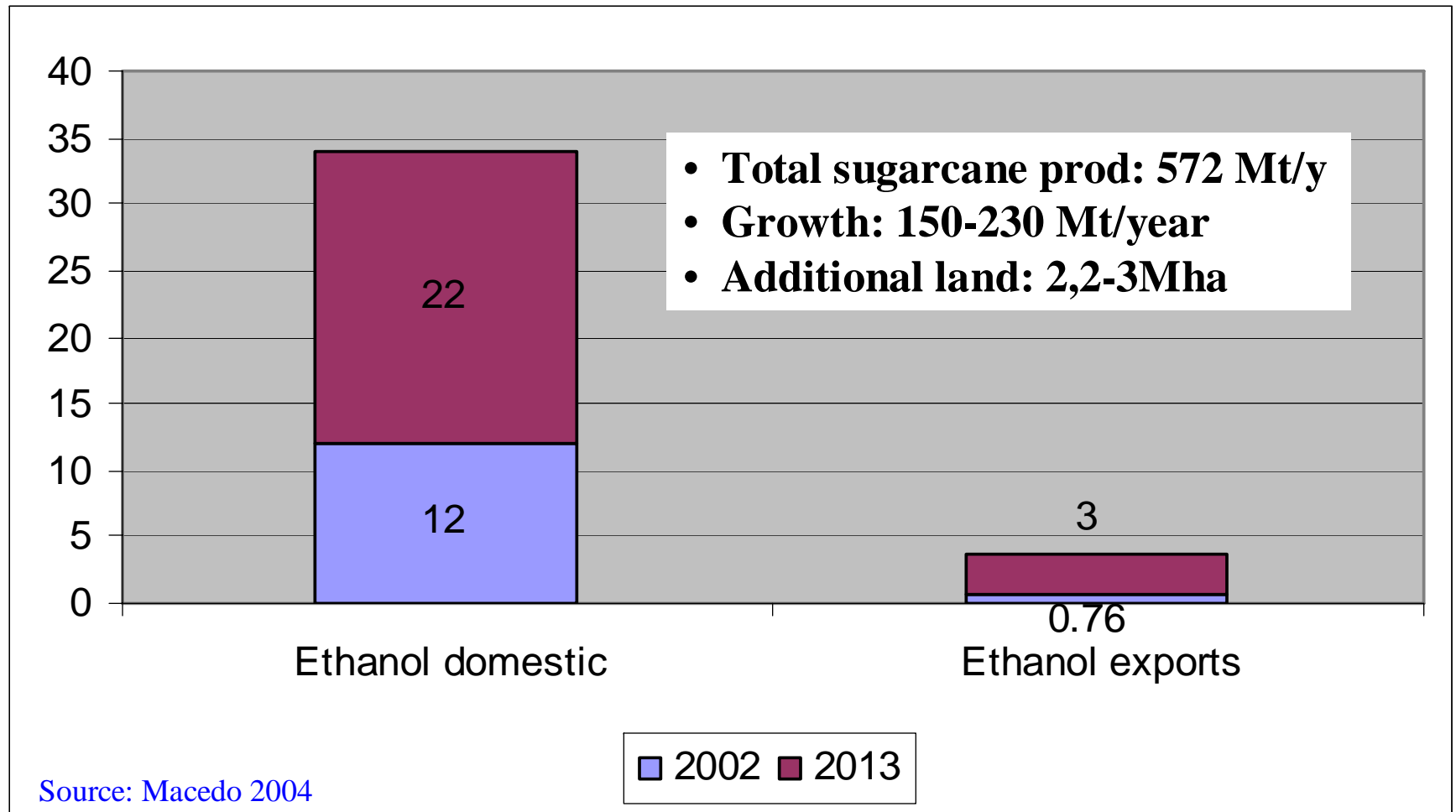
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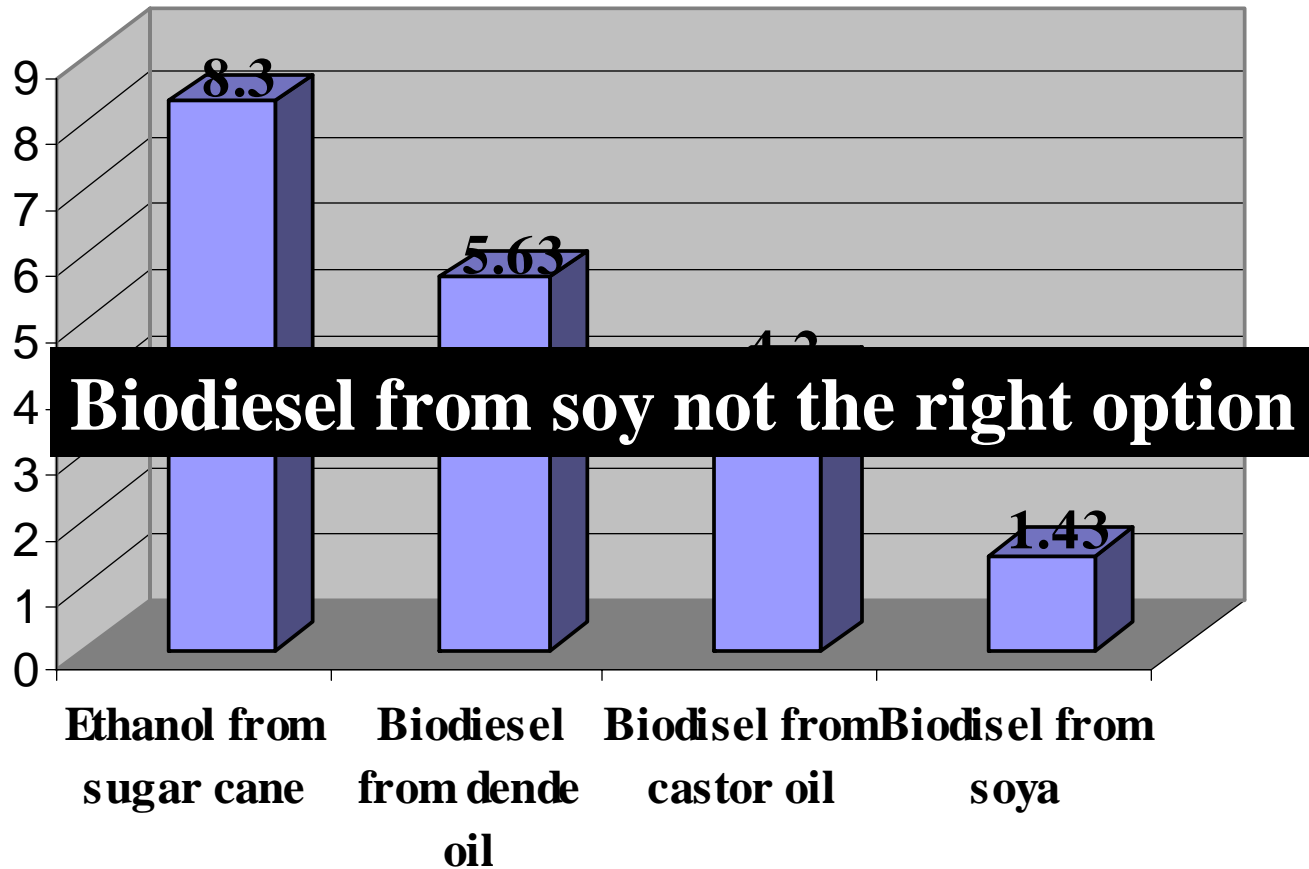


FUTURE ETHANOL PRODUCTION





ENERGY BALANCES OF BIOFUELS



Source: Macedo, 2004





POTENTIAL FOR EXPORTS

- Short and medium potential from Brazil is mainly in bioethanol, little in biodiesel where national production will hardly meet demand
- Sugar conversion in hybrid plants (sugar or bioethanol) requires centralized production
- For biodiesel a more decentralized production and conversion is possible due to broader range of products, but centralized soy production is to play a major role





POTENTIAL IMPACTS OF EXPANSION

- Without environmental planning and strong regulations, exports will maximize the impacts of ‘cash crops’ agriculture:
 - Expansion of large-scale agriculture into ecologically sensitive areas in the Cerrado and the Amazon
 - Demand for new infrastructure (need strategy, planning)
 - Contamination of surface water due to growth in sediments and agrochemical inputs use
 - Further land-ownership concentration and marginalization of small farmers
 - Sugar Cane Expansion in the Cerrado could lead to more pressure in the Amazon



Principais rodovias, portos, agroindústrias de soja, e desmatamento (2001) nos estados da Amazônia Legal e Pantanal

Localização das bacias hidrográficas nos Estados do Brasil

Soy-based biodiesel can drive more deforestation

What should we do differently with sugar cane?

Rodovias por estado (km) e % do total
AC 1.473 (6,9%)
AM 1.730 (9,4%)
GO 1.136 (6,2%)
MS 1.308 (9,9%)
MT 4.415 (24,2%)
PA 4.781 (26,2%)
RO 1.784 (9,3%)
TO 1.645 (9,8%)

Portos por estado
AM - 1 MA - 1
MT - 1 MS - 1
PA - 2 RO - 1

Agroindústrias de soja por estado
AM - 1 GO - 8
MT - 2 MS - 5

1. Purus
2. Madeira
3. Tapajós
4. Xingu
5. Araguaia-Tocantins
6. Alto Paraguai

LEGENDA

- Portos
- Agroindústrias de soja
- Rodovias
- Rios
- Desmatamento
- Limites Estaduais

200 0 200 400 km
1:20.000.000



Brasilia, setembro/2004





POSITIVE IMPACTS OF EXPANSION WITH SAFEGUARDS

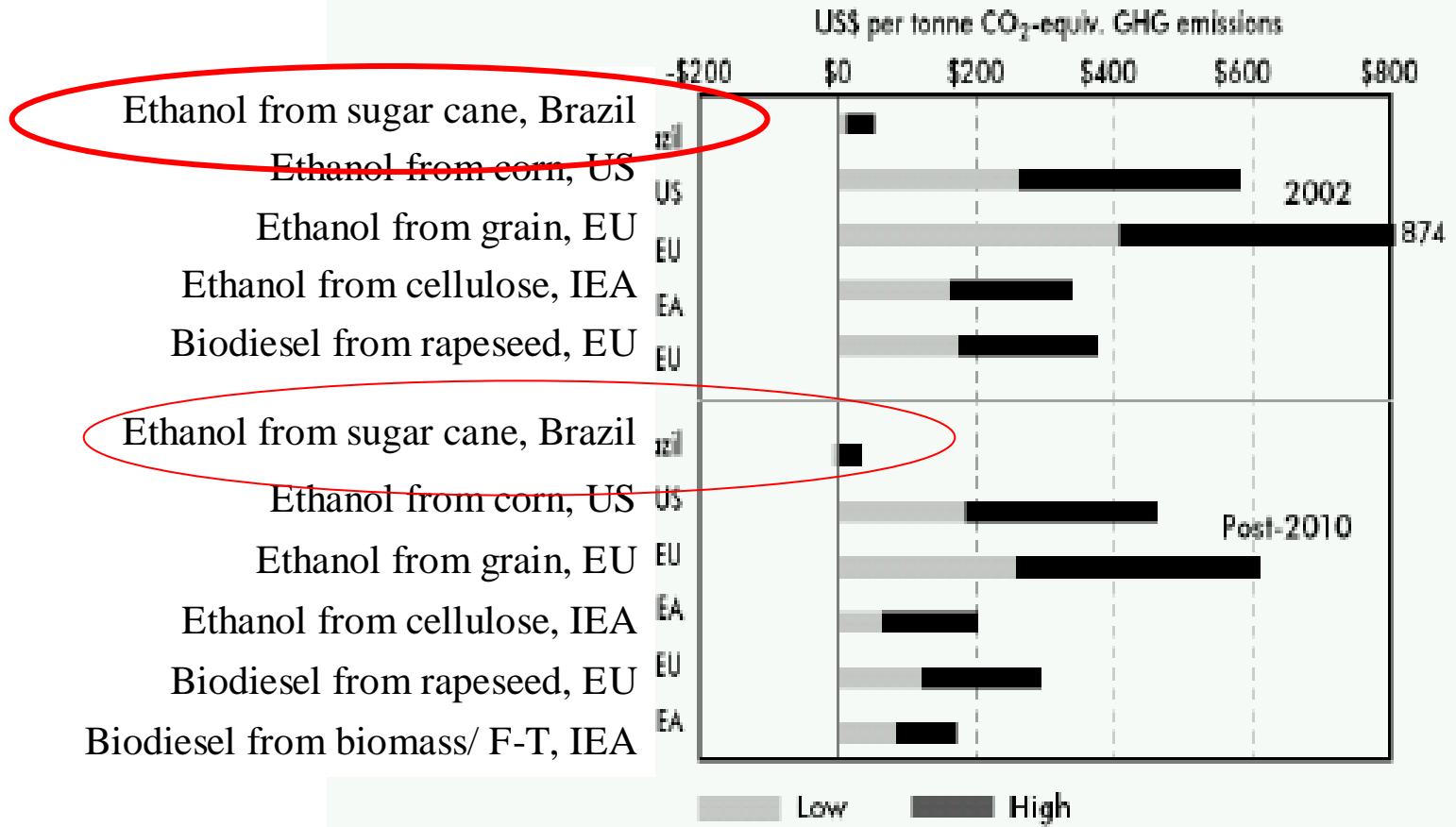
- Additional hard currency savings from gasoline substitute and replacement of diesel imports ~1.2 billion USD/y, replacing 2 M m³/y
- Further air quality improvements in large cities
- Further CO₂ emissions reductions due to bioethanol, while for soy-based biodiesel poor GHGs benefit

Source: La Rovere, 2005





BIOFUELS COSTS (TONNE/GHG REDUCTION)

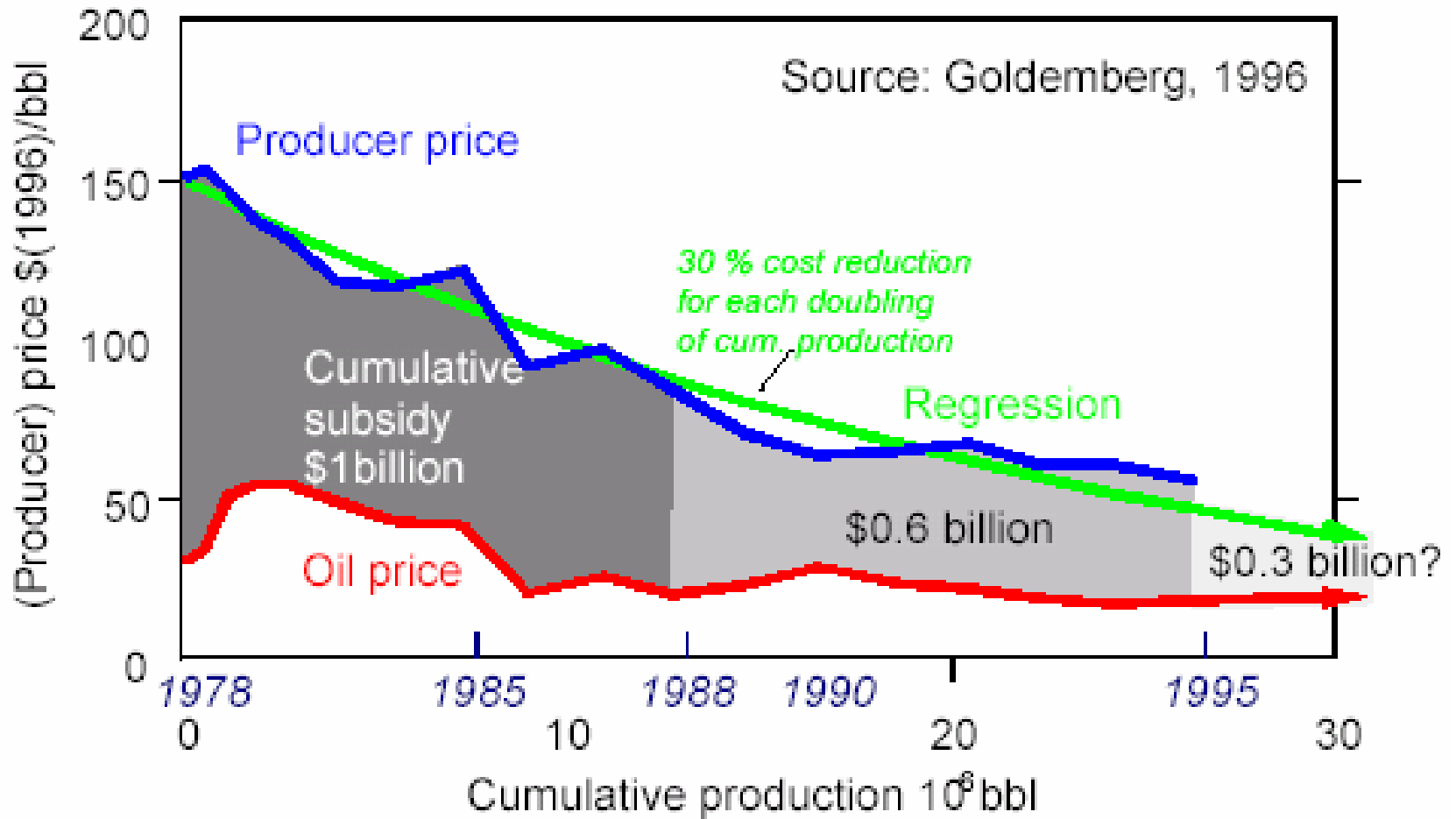


Source: IEA 2005





LEARNING CURVE FOR BIOETHANOL





Brazilian Environmental Law

- Forests reserves
 - 80% in the Amazon
 - 35% in the Cerrado and transition areas
 - 20 % in the south/southeast (Atlantic Forest, etc.)
- Riparian Areas

Very hard to guarantee/implement





Good Environmental Practices

- Zero Tillage
- Organic production
- Biodiversity corridors
- Pest management
- Degraded land use
- Etc.





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WWF-Br Agriculture Programme Proposals

- Close work with the productive sector
 - Good practices
 - Information/ education
- Zoning
 - Public Policies
- Sustainability Certification
 - Imaflores (need of strong work with the productive sector)
 - Farmers/producers certification
- Working Groups with committed stakeholders
 - “Better Sugar, Better Business”
 - Financial sector





WHY SUSTAINABILITY CERTIFICATION?

- To create a standardised tool to assess the climate benefits and environmental sustainability of a given biofuel
- To make sure that we don't address one problem while creating another
- To incentivise and reward improved production practices, including social performance
- To drive the development efficient technologies, such as lignocellulosic ethanol or Fisher-Tropsch biodiesel





CONCLUSIONS

- Over the next 10 years, Brazil will double its ethanol and significantly develop biodiesel production to meet domestic and export demand
- Without environmental and social safeguards, biofuels expansion will increase environmental and social impacts (in the Cerrado and the Amazon)
- Exports will play a role and could offer an opportunity for sustainability improvements
- GHGs and sustainability certification should be a key component of a national climate and development policy

