

2nd International Conference on Biofuels Standards Standards and Measurements for Biofuels: Facilitating Global Trade



The regulation of biofuels quality in Brazil and the developments regarding global fuel specifications

Rosângela M. Araujo
Superintendent of Biofuels and Quality Product
March, 2009



anp
National Agency of
Petroleum, Natural Gas and Biofuels

ANP

Biofuels

Ethanol

Biodiesel

Tripartite
White Paper

Mercosur

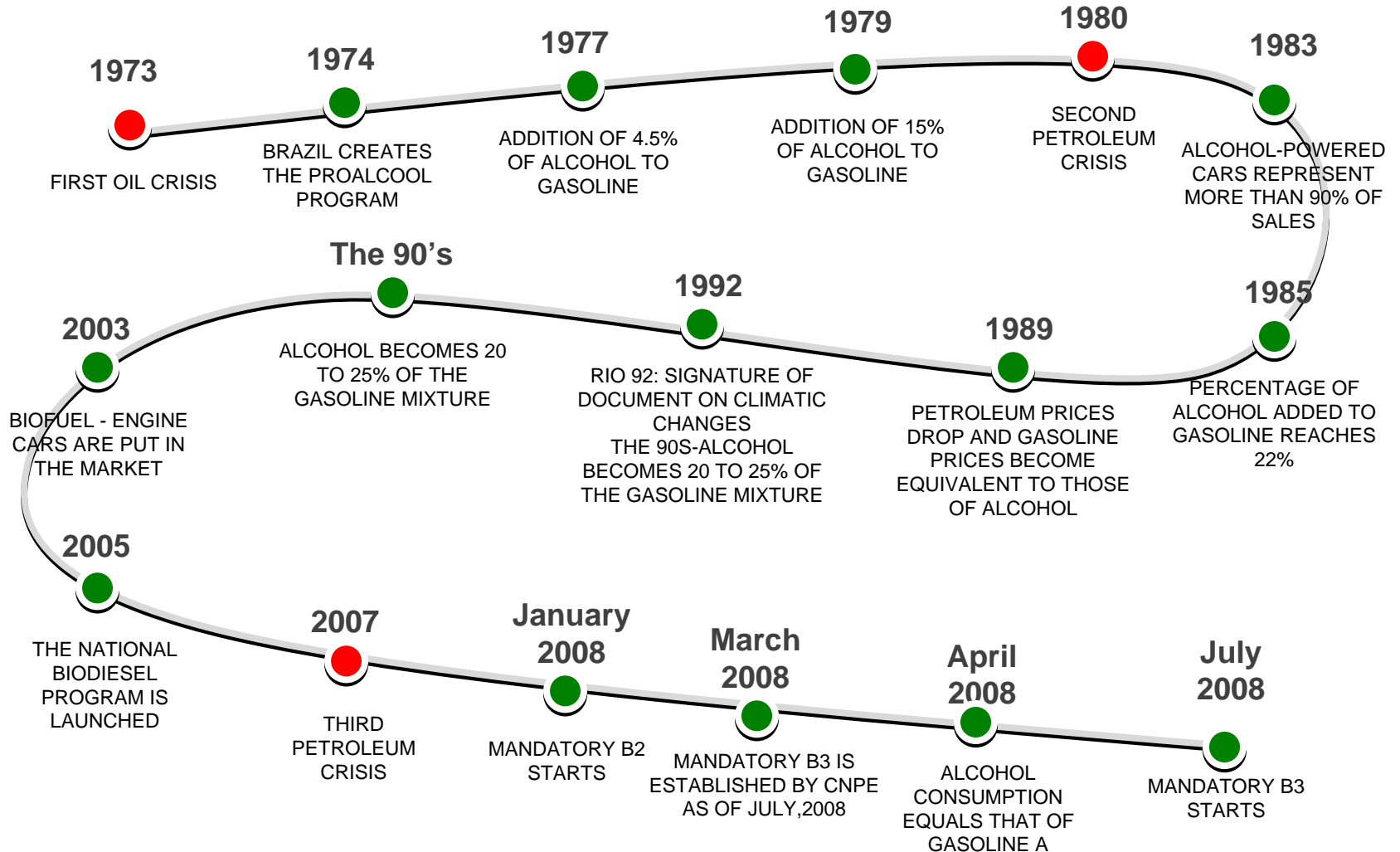
THE NATIONAL AGENCY OF PETROLEUM, NATURAL GAS AND BIOFUELS



- ✓ Federal institution, linked to the Ministry of Mines and Energy.
- ✓ Decision process through deliberative sessions by Direction, preceded by public hearings in cases involving acts that affect rights and duties of economic agents.
 - ✓ Same institutional environment for regulating oil, natural gas and biofuels.
- ✓ Role of ANP: guarantee of petroleum products and biofuels supply, establishment of product specifications and enforcement actions all over the country.

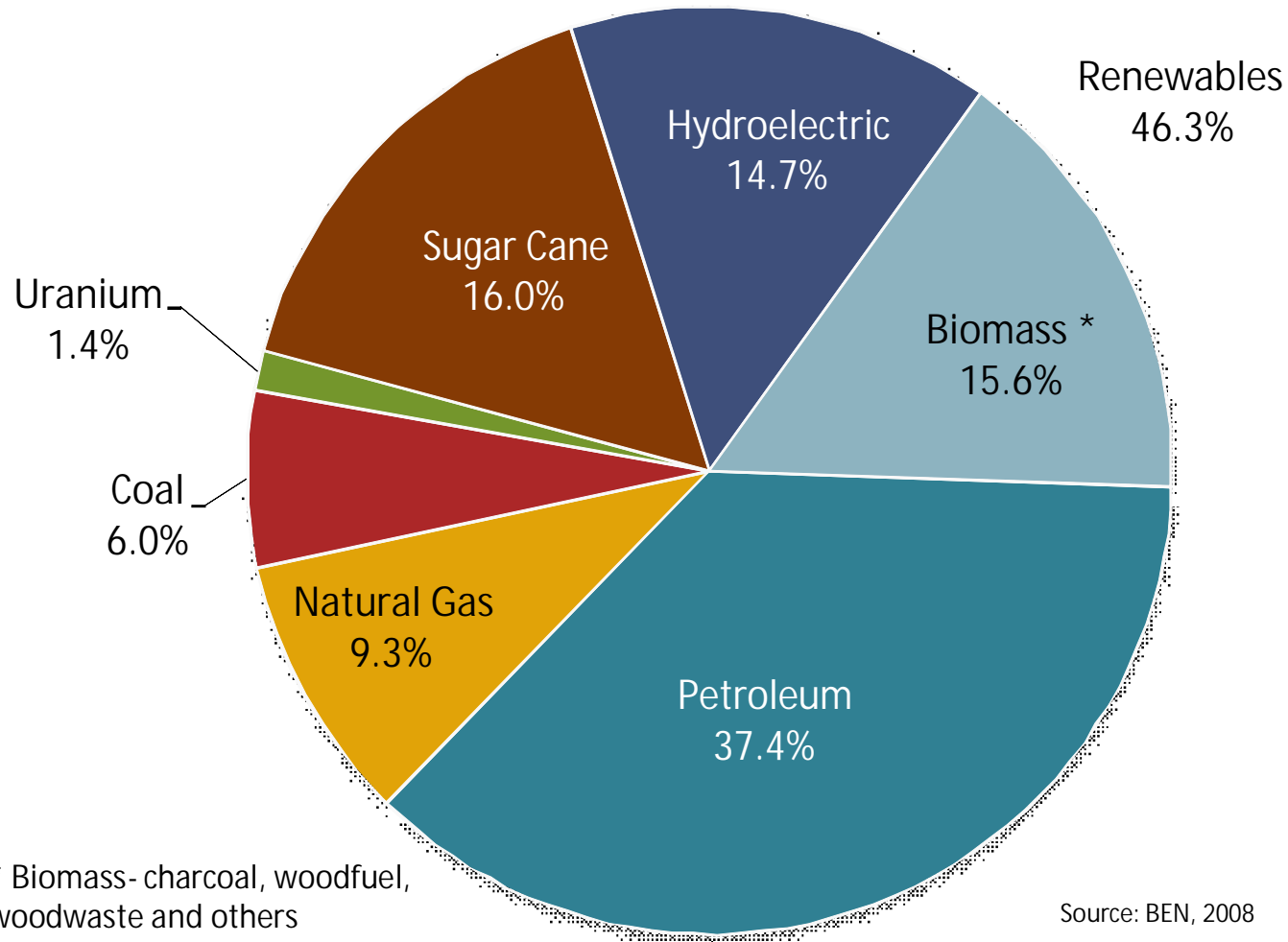
Biofuels

Brazil's Historical Evolution





Energy Demand



Source: BEN, 2008

Fossil Fuels and Biofuels Demand in Brazil

Fuel	1,000 m ³		
	2007	2008	2008 / 2007
Diesel	41,558	44,763	7.71%
Biodiesel *	404	1,164	188.12%
Gasoline C	24,325	25,174	3.49%
Gasoline A	18,244	18,881	3.49%
Anhydrous	6,081	6,294	3.49%
Hydrated	9,367	13,290	41.88%
Ethanol	15,448	19,584	26.77%
LPG	12,034	12,259	1.87%
Fuel Oil	5,525	5,172	-6.39%
Jet Fuel	4,891	5,227	6.87%
AV Gas	55	61	10.91%
Kerosene	31	24	-22.58%
TOTAL	137,963	151,892	10,10%

* 2007 – facultative; jan a jun 2008 – 2%; since july 2008 - 3%

➤ Ethanol types:

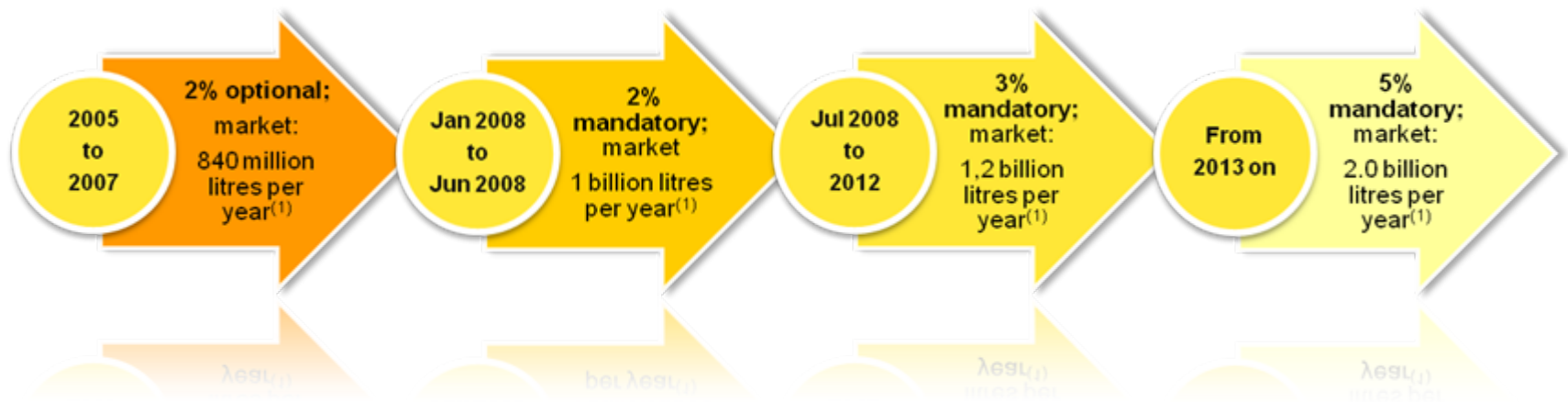
Anhydrous: blended with refinery's gasoline. The current mandatory amount is 25% (v/v) in the blend (this content could be changed by government in a range of 20 – 25%).

Hydrated: used in ethanol-fueled vehicles or according to consumer's decision in flex fuel vehicles (FFV).

2008

Brazilian production: 19.6 / export: 5.1 billion liters
Total flex fuel sales (2003-2008) : ~7 million unities
450 Ethanol Plants

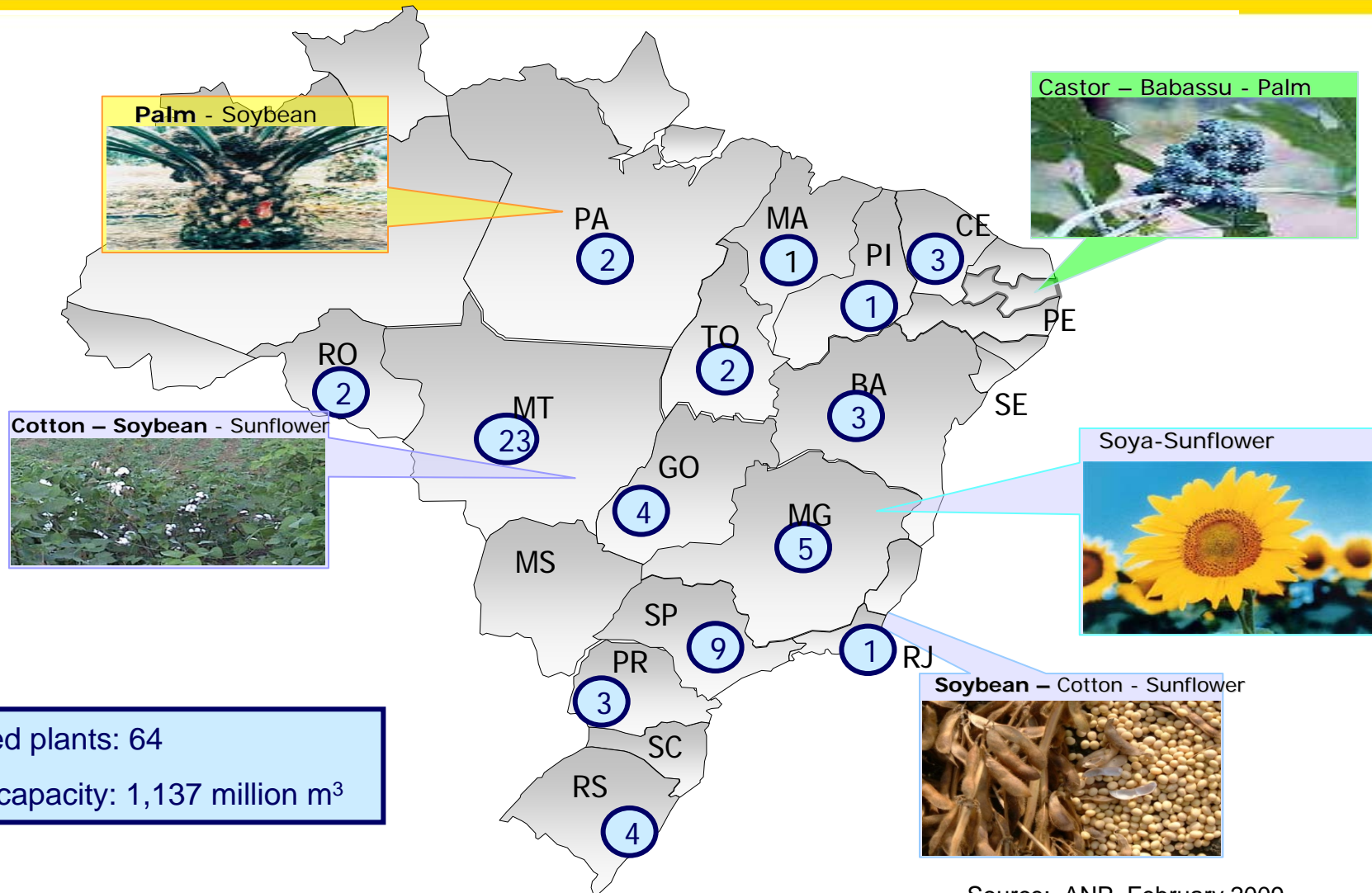
Biodiesel share



Biodiesel Demand	10 ³ m ³
2007	404
2008	1,164

Note: ⁽¹⁾ Considering 40 billion diesel liters/year

Biodiesel plants



Authorized plants: 64
Nominal capacity: 1,137 million m³

Goals

- To evaluate systematically the quality of fuels marketed in the country: gasoline, ethanol fuel and Diesel B3.
- To outline problems of non conformities in order to guide ANP's enforcement actions and also the institutions with which ANP maintains cooperative convenium.

maintains cooperative convenium.

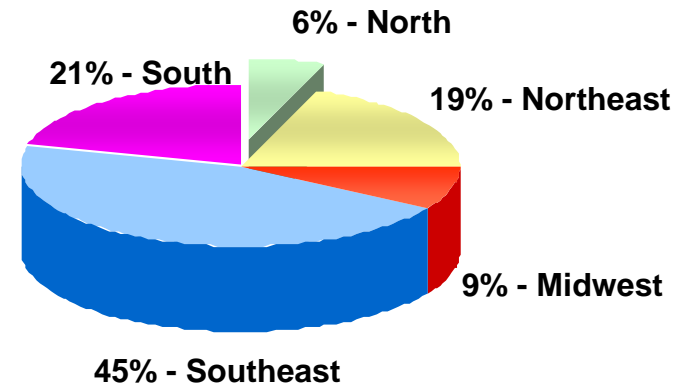
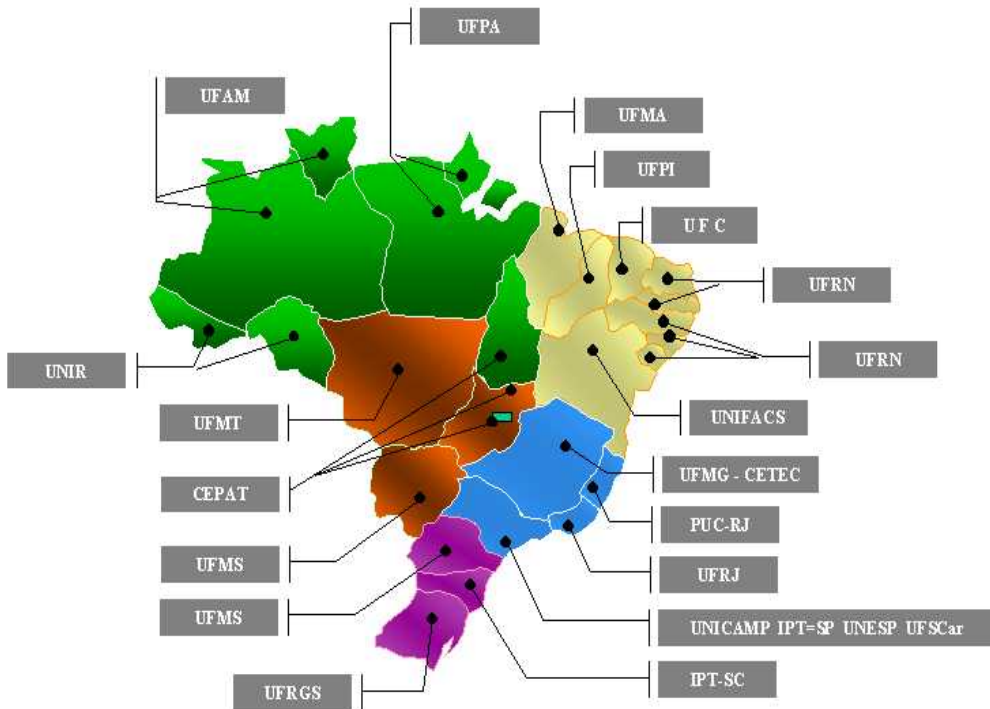
enforcement actions and also the institutions with which ANP

Operation:

- ***Universities***
- ***Research Centers***
- ***SBQ/ANP***

Fuel Quality Monitoring Program

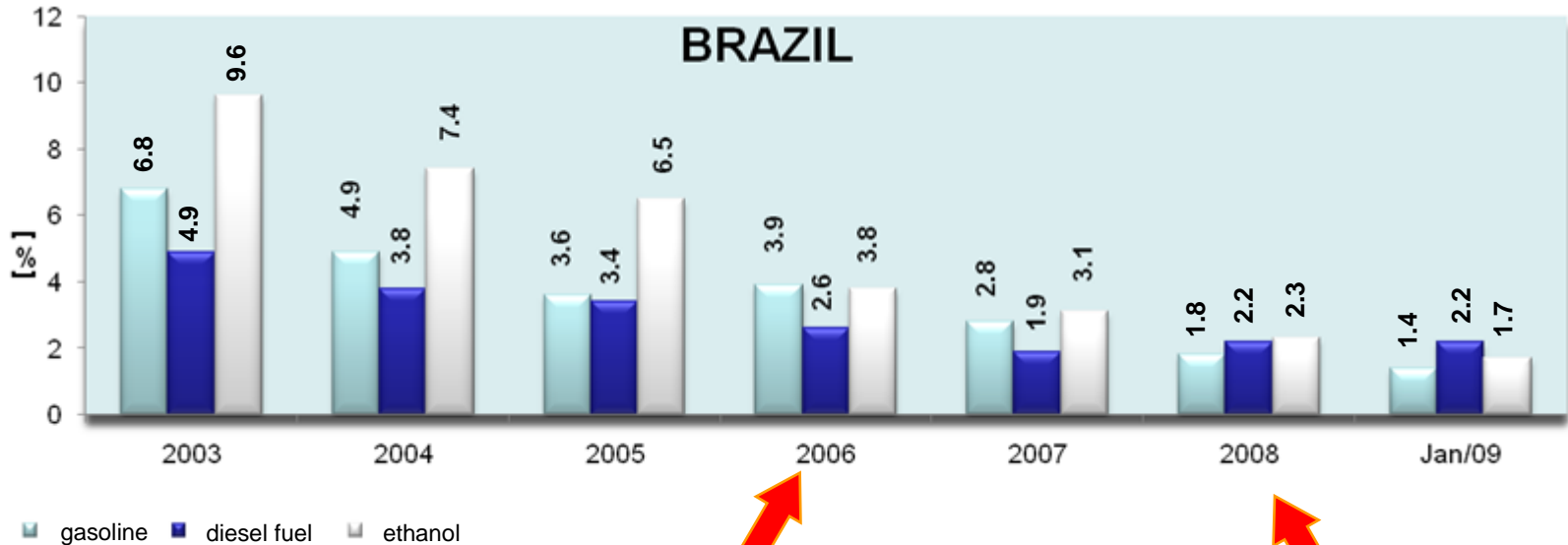
Regional gas station distribution



34,314 inspected service stations

189,000 samples/year

Fuels Quality 2003/2009 - Non conformities



DIESEL + B2 (since jun/06)

Diesel B3 (since jul/08)

**Monitoring and
Enforcing ANP's action**



Better fuels quality indexes

Challenges to the usage of biofuels in the global trade

- ✓ **Elimination of technical barriers is vital for sustainable biofuels in the world market.**
- ✓ **Acceptance of the biofuels in the market depends on transparency and trustworthiness of the fuel which should be obtained by standardisation.**
- ✓ **Deepening of standards harmonization has to take into account the development of world test methods appropriate for fuels from different sources, limits of properties wherever possible and also be consistent with different engines.**

Tripartite White Paper and Mercosur: Facilitating global biofuels trade

To improve the international cooperation to achieve sustainable biofuels market as well as to ensure the consolidation of ethanol and biodiesel as commodities.

Brazil / USA / EU: Development of “White Paper” for biofuels (ethanol and biodiesel) with identification of possible properties and limits to be harmonized: short, mid and long term. (January, 2008)

MERCOSUR: Report of biofuels technical standards task force activities. (December, 2008)

Next steps: Discussion of the proposals and cooperation to promote alignment and mitigate divergence among evolving standards and specifications.

Tripartite: White Paper on Internationally Compatible Biofuels Standards

- Scope: anhydrous ethanol (undenatured basis)
- Most parameters were considered aligned.
- Water content was not compatible due to different blends of ethanol and gasoline used in countries.
- Only EU has limit to phosphorous.
- Parameters could not be compared: residue of evaporation, acidity and pHe.

Mercosur: biofuels technical standard task force

- Scope: anhydrous and hydrated ethanol
- Most parameters were considered bridgeable in the foreseeable future with additional effort and seven were considered already aligned.

Bioethanol and Brazilian Actions

- Working on test methods to point out the similarities and differences (first stage: acidity, evaporation residue/gum content).
- Test method developed to analyse electrical conductivity.
- Revision of ethanol specification: alcohol content report, test method update.
- Collecting data of sulphur and phosphorous content.



TRIPARTITE - Ethanol

Category A : Similar	Category B: Significant differences	Category C: Fundamental differences
Color	Ethanol content	Water Content
Appearance	Acidity	
Density	Phosphorous content BR:Collecting data	
Sulfate content	pHe	
Sulfur content BR:Collecting data	Gum/Evaporation Residue	
Copper content	Chloride content	
Iron content		
Sodium content		
Electrical conductivity		

MERCOSUR - Ethanol

Category A : Similar	Category B: Significant differences
Color	Ethanol content
Appearance	Alcoholic content
Density	Methanol content
Sulfur content	Phosphorous content
Copper content	pHe
Electrical conductivity	Gum/Evaporation Residue/ Non volatile material
Acidity	Chloride content
	Iron content
	Sodium content
	Sulfate content
	Water content
	Hydrocarbon content

Tripartite: White Paper on Internationally Compatible Biofuels Standards

- Differences in end uses (light and heavy vehicles);
- Differences in composition and blends (B100 in Europe; B20 in USA and B3 in Brazil);
- Differences in source;
- Differences in legislated emissions;
- 24 properties: only 6 are already aligned.

Mercosur: biofuels technical standard task force

- 25 properties: 16 are aligned

Biodiesel and Brazilian Actions

- Revision of biodiesel spec:
 - ✓ limits narrowing: density, viscosity, acid number, methanol or ethanol, sulphur, total glycerol;
 - ✓ elimination of: water and sediments and distillation;
 - ✓ insert of water content, ester content, total contamination.

- Development of methods: ester content, methanol/ethanol, mono-, di-, triacylglycerols.



Biodiesel spec – Mitigate Limit Divergence

TRIPARTITE - Biodiesel

MERCOSUR - Biodiesel

Category A : Similar	Category B: Significant differences	Category C: Fundamental differences
Sulfated ash	Total glycerol content BR: 0.25 %m/m max	Sulfur content BR: 50 mg/kg max
Alkali and alkaline earth metal content	Phosphorus content BR: 0.001 %m/m max	Cold Climate Operability
Free glycerol content	Carbon residue	Cetane Number
Copper strip corrosion	Ester content BR: 96.5 %m/m min New Method	Oxidation stability
Methanol & ethanol content	Distillation temperature BR: elimination	Mono-, di-, tri-acylglycerols BR: New Method
Acid Number	Flash point	Density
	Total contamination BR: 24 mg/kg max	Kinematic viscosity BR: 3.0-6.0 mm ² /s
	Water content & sediment BR: 500 mg/kg max (water)	Iodine number
		Linolenic acid content
		Polyunsaturated methyl ester

Category A : Similar	Category B: Significant differences
Sulfated ash	Carbon residue 10%
Alkali and alkaline earth metal content	Water content & sediment BR: 500 mg/kg max (water)
Free glycerol content	Insoluble impurities
Copper strip corrosion	Total contamination BR: 24 mg/kg max
Methanol & ethanol content	Iodine number
Acid Number	Linolenic acid content
Ester content BR: 96.5 %m/m min New Method	Polyunsaturated methyl ester
Flash point	Lubricity
Oxidation stability	Cold Climate Operability
Total glycerol content BR: 0.25 %m/m max	Sulfur content BR: 50 mg/kg max
Density	
Phosphorus content BR: 0.001 %m/m max	
Kinematic viscosity BR: 3.0-6.0 mm ² /s	
Cetane number	
Mono-, di-, tri-acylglycerols BR: New Method	
Carbon residue	

- ✓ **Brazil has been working on recommendations from Tripartite White Paper not only on test methods for biodiesel and ethanol but also on the properties and limits for biodiesel.**
- ✓ **For ethanol, the main challenge is the definition of proper standards for test methods which could be solved in ISO's forum.**
- ✓ **For biodiesel, the ISO's standardization is necessary, but the Tripartite members should keep on working on categories B and C.**

- ✓ **To support the implementation of biofuels policy in order to keep increasing the renewable share in our diverse and sustainable energy matrix.**
- ✓ **To perform an active institutional role on issues related to the monitoring of the market with focus on price, quality and supply.**
- ✓ **To carry out research and regulating improvements to promote the development of sustainable biofuels industry.**
- ✓ **To support efforts towards global specifications for biofuels.**

Thank you for your attention!

Rosângela M. Araujo

Superintendent of Biofuels and Quality Product

phone: + 55 21 2112 8640

e-mail: rmoreira@anp.gov.br

www.anp.gov.br