

WIND ENERGY DEVELOPMENT IN BRAZIL

Networks of Expertise in Energy Technology - NEET Workshop

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Brasília, Brazil
November 20th, 2007

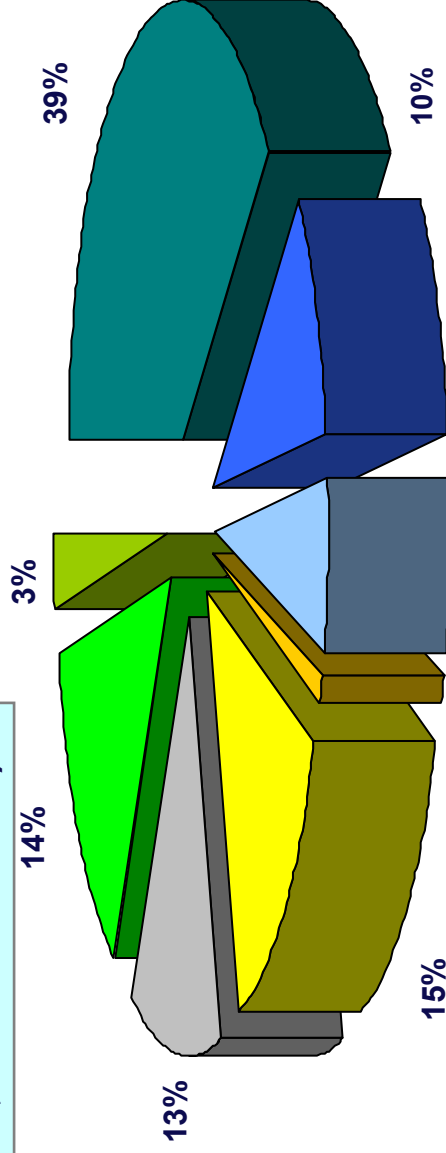


Ministério de Minas e Energia

National Energy Mix – 2005 / 2030

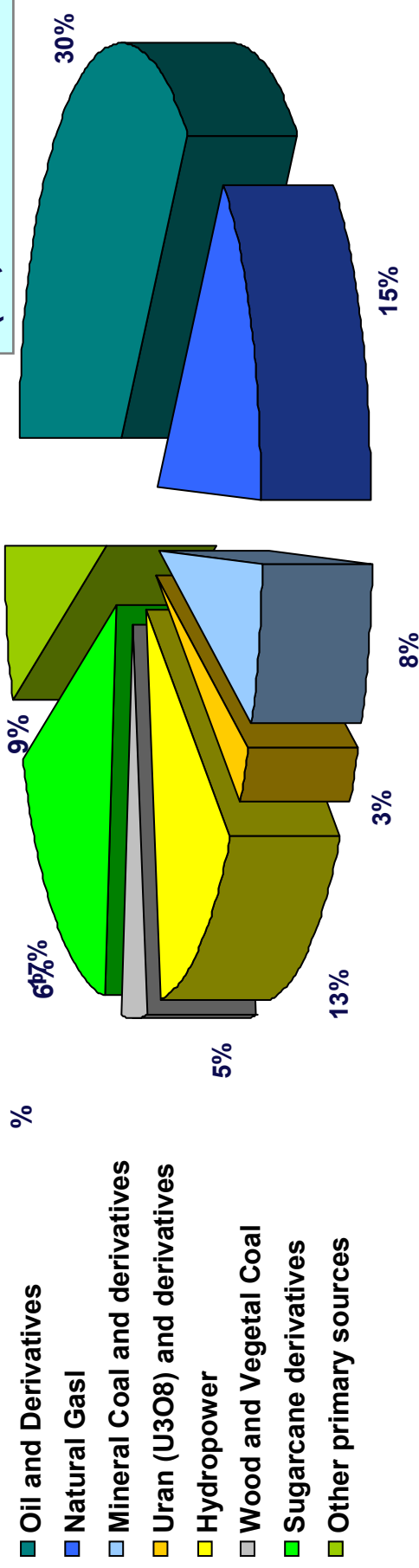
2005

218.7 million tons of oil equivalent
(44,5% Renewables)



2030

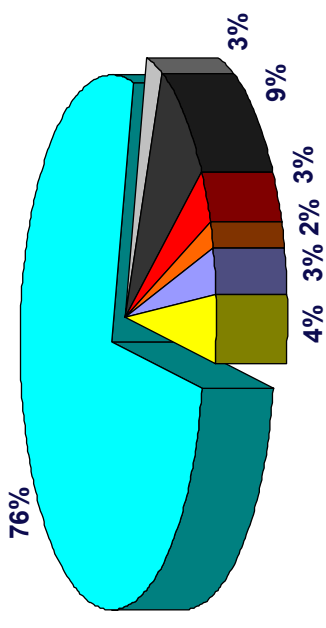
576.6 million tons of oil equivalent
(45,1% Renewables)



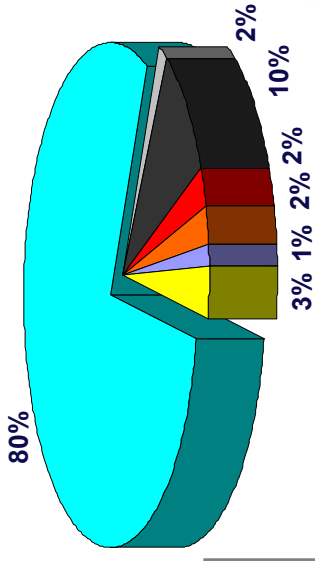
- Oil and Derivatives
- Natural Gas
- Mineral Coal and derivatives
- Uran (U3O8) and derivatives
- Hydropower
- Wood and Vegetal Coal
- Sugarcane derivatives
- Other primary sources

Power Generation

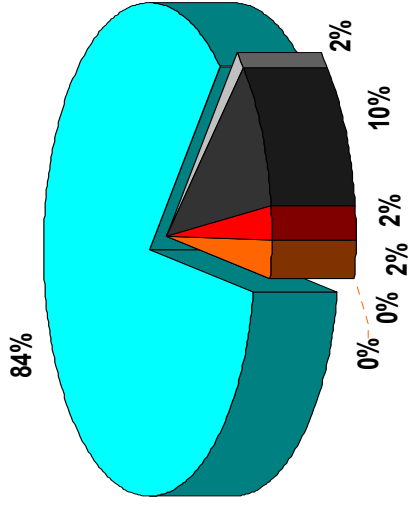
**2030 (Scenario B1)
(Renewables: 83,1%)**



**2015 (Decennial Plan of EE)
(Renewables: 83,7%)**



**2005
(Renewables: 84%)**



- Hydropower (incl. SHP and Itaipu imports)
- Thermalpower (Coal)
- Thermalpower (Natural Gas)
- Thermalpower (Nuclear)
- Thermalpower (Oil and Derivatives)
- Biomass
- Wind and others

STRATEGIC OBJECTIVES

- **Diversifying the Brazilian Energy Mix, increasing supply security in a sustainable way**
- **Reducing Greenhouse Gases Emissions**
- **Capacity building and internalization of new technologies**

SPECIFIC OBJECTIVE

- **Install 3,300 MW of power until December, 2008, distributed among the sources wind, SHP and biomass.**

**PROINFA.
O Brasil
valorizando
o potencial
de cada
região.**

Current Status of PROINFA

Source	Start up by Program		Concluded and waiting for Start up Period	Under Construction	Construction not initiated					
	Count	Percentage			With EPC	Without EPC	Total			
PCH	Qde	13	20,6%	44	1	1,6%	3	4,8%	4	6,3%
	MW	241,74	20,3%	867,80	18,00	1,5%	38,70	3,2%	56,70	4,8%
BIOMASSA	Qde	17	63,0%	2	3	11,1%	0	0,0%	3	11,1%
	MW	484,34	70,7%	15,00	2	2,2%	0,00	0,0%	91,50	13,4%
EÓLICA	Qde	5	9,3%	15	16	29,6%	17	31,5%	33	61,1%
	MW	208,30	14,6%	117,53	8,3%	35,2%	526,16	37,0%	1.027,09	72,2%
TOTAL	Qde	35	24,3%	61	20	13,9%	20	13,9%	40	27,8%
	MW	934,38	28,3%	1.000,33	30,3%	18,5%	610,43	17,1%	564,86	1.175,29
Sub total PCH	Qde		58			40,3%				
	MW		1.125			34,1%				
Sub total BIO	Qde		20			13,9%				
	MW		514			15,6%				
Sub total EOL	Qde		20			13,9%				
	MW		326			9,9%				
Sub total Geral	Qde		98			68,1%				
	MW		1964,71			59,5%				

Obs.: para o PROINFA foi considerado a potência contratada

Faced Difficulties

1. Lack of sufficient expertise to develop wind energy financing contracts by financial agents
2. Small producers (PIA) inadequately prepared to face the risks and investment requirements of the projects
 - Changes in the societal structure of the projects, to provide equity to the small producers
 - Revision of some projects by the new owners, in order to minimize risks
3. New requirements to emission and revalidation of Environmental Licenses
4. Difficulties for obtaining Public Utility Declarations (SHP) and of ownership/right of use the land for wind farms
5. Grid connection problems, due basically to the distance of the wind farms from the grid – sharing problems

Faced Difficulties

6. Insufficient supply capacity of the industries in time for the Program
7. Great increase of the international market (2005, 2006) – the few national equipment suppliers have turned their focus to these markets (USA, India, China, Spain)
8. Other suppliers have moved back – there was no indication of continuity of the wind market post-PROINFA
9. Associated to the nationalization rate of 60% and to an increase in the prices of these equipments – difficulties for celebrating supply contracts.

➤ Delay in the operation start up of the Program to 2008

Actions to overcome the problems

1. Import tariff on wind turbines has been reduced from 14% to 0.
 - Elevation in the nationalization rate of the projects
2. PIA figure was extinguished
 - Project developers were allowed to associate with more prepared investors, including public service facilities, and also to participate in the new electricity auctions.

Expectations:

- Regularization of equipment supply worldwide from 2008 and on
- Better preparation of financing agents and project developers

Alternative Sources Specific Auction

1. Conformation to the new regulation for the electrical sector in Brazil - Law # 10,848, of May, 2004
2. Energy purchase shall only be realized through auctions based on the “lowest tariff” model and only with an energy distribution facility pool.
3. First specific auction for alternative sources - June 18th, 2007
4. Maximum price of USD 70.00 (higher than the competitive price of large hydro plants - USD 58.00)
5. Specific contracts for each source
6. Specific public – SHP projects – brought down the ceiling price, to avoid concurrence of other energy sources, such as wind

Alternative Sources Specific Auction - Results

1. Technically classified projects: 87 projects - 2,803 MW
2. Wind energy projects represented 939 MW - 16.75% of the total power classified

➤ **BUT no wind farm selected has negotiated its energy**

Fonte	Potência	Energia	Preço
Biomassa (bagaço de cana-de-açúcar)	511,9 MW	115 MW médios	R\$ 138,85 /MWh
Biomassa (criadouros avícolas)	30 MW	25 MW médios	
PCH	96,74 MW	46 MW médios	R\$ 134,99 /MWh
Total Geral	638,64 MW	186 MW médios	R\$ 137,32 /MWh

3. Wind energy needs flexibility and some adjustments in few areas of project development to become able to compete in the market with the traditional energy sources.

Continuity Model for Incentives for Alternative Sources - Main Guidelines

1. A clear signal of continuity for the participation of wind energy in the national energy mix is essential for market development and installation of industries;
2. Need of specific targets for the insertion of renewable energies in the national mix, in order to assure a demand for the market;
3. Design of specific auctions for wind energy, once this technology has peculiarities that do not allow a competition between different sources of energy;
4. Establishment of an industrial police to provide a background to the international wind manufacturers to install in Brazil;
5. Taking in consideration the positive externalities of the wind energy in the definition of the strategy of development of this energy source in Brazil.

Continuity Model for Incentives for Alternative Sources - Final Considerations

1. Success of the development of the wind energy in Brazil depends on the level of knowledge and consciousness of the society about this technology – development of capacity building, sound financing lines, technology innovation
2. Benefits of wind technology for:
 - supply security, associated to the low environmental impact;
 - great contributions to reducing the SIN's greenhouse gases emissions;
 - social and economical benefits that the insertion of this technology can bring to Brazil

must be disseminated and acknowledge as important drivers for the sustainable development of the country.

