

Presentation 1.2: How Brazilian pulp and paper industry faces energy challenges

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HOW BRAZILIAN PULP AND PAPER INDUSTRY FACES ENERGY CHALLENGES

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THE 30's AND 40's

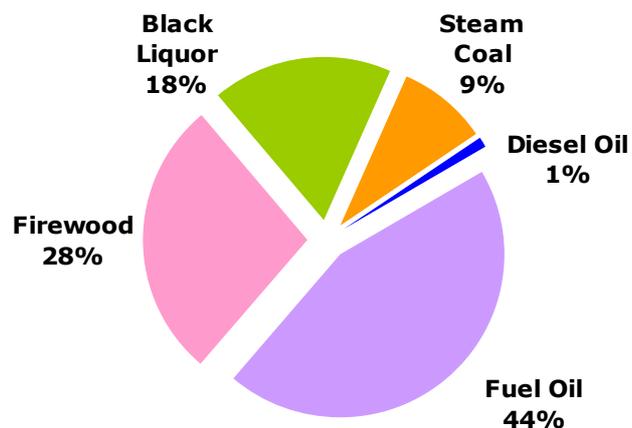
- ➔ Arising of the industrial era in Brazil
- ➔ Small paper mills, using exclusively firewood from idled steam locomotives

THE 50's AND 60's

- ➔ Foundation of Petrobrás and a government substitution program for using oil as energy.
- ➔ Firewood still available, mainly new mills adopted oil boilers.
- ➔ In 1970 - The first sector's energy statistical data available.

PULP AND PAPER INDUSTRY ENERGY MATRIX

1970

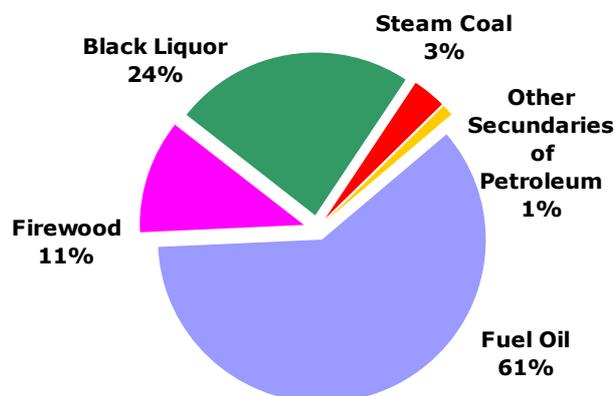


Source: Brazilian Energy Balance – 2005.

THE 70's

- ➔ Government forestation financing program led to wood surplus.
- ➔ Take off of the pulp & paper industry using excess of wood available.
- ➔ First oil crisis discouraging the use of oil did not impact the industry.
- ➔ New greenfield pulp mills were born in an energy crisis environment inducing the burning of black liquor and electric energy generation.
- ➔ The second oil crisis in 1978 brought significant changes – return to firewood use in boilers.

PULP AND PAPER INDUSTRY ENERGY MATRIX 1978



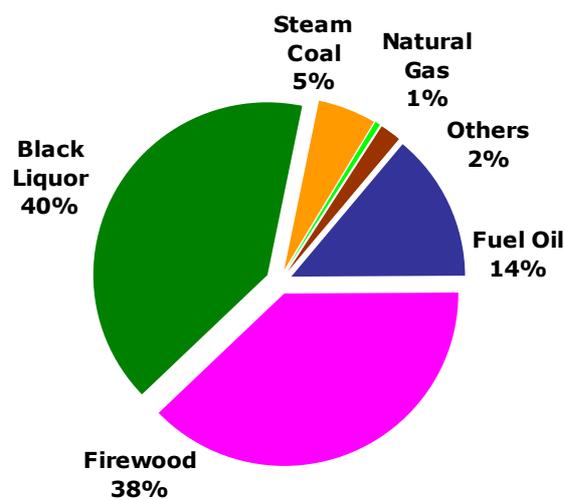
Source: Brazilian Energy Balance – 2005.

THE 80's

- ➔ Brazil reduces oil imports.
- ➔ Requested by government, the sector compromised to reduce oil share at energy matrix from 60% to 20%.
- ➔ The use of black liquor expanded significantly.
- ➔ The discovery of gas reserves close to pulp mills, brought a new alternative.

PULP AND PAPER INDUSTRY ENERGY MATRIX

1985



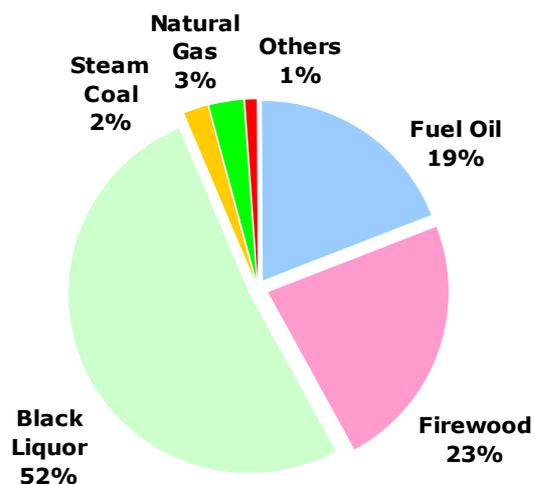
Source: Brazilian Energy Balance – 2005.

THE 90's

- ➔ The worldwide rise of oil prices led to consider all energy alternatives.
- ➔ Firewood use reduced and biomass as bark, chips and forest residues were used.
- ➔ A new pipeline bringing gas from Bolivia in a take or pay contract led Petrobrás to encourage this new alternative, changing again the energy matrix.
- ➔ Growing concern with efficient use of fuel, whatever it is.

PULP AND PAPER INDUSTRY ENERGY MATRIX

1995



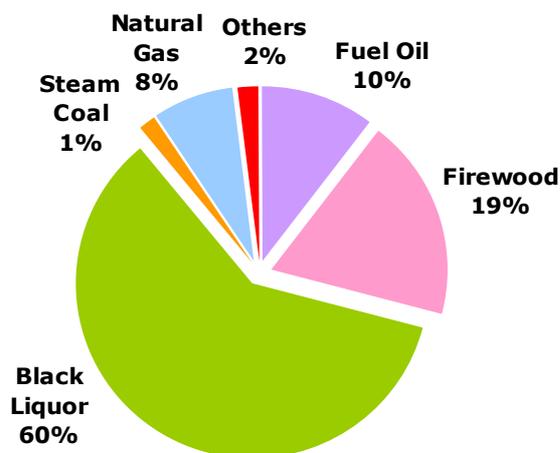
Source: Brazilian Energy Balance – 2005.

YEAR 2000

- ➔ Electric energy crisis: 2001's great draught and lack of investments in electricity production and distribution.
- ➔ Search for energy self sufficiency.
- ➔ Industry maintain various types of boilers according to resources availability.
- ➔ Lack of electricity supply and the move of new mills to countryside, forced investments in self generation.

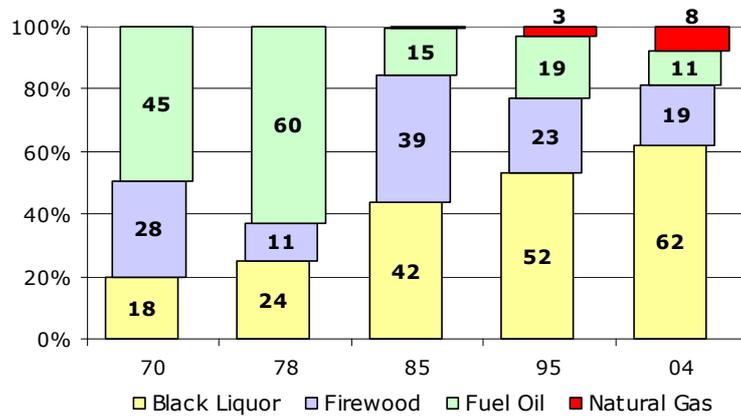
PULP AND PAPER INDUSTRY ENERGY MATRIX

2004



Source: Brazilian Energy Balance - 2005.

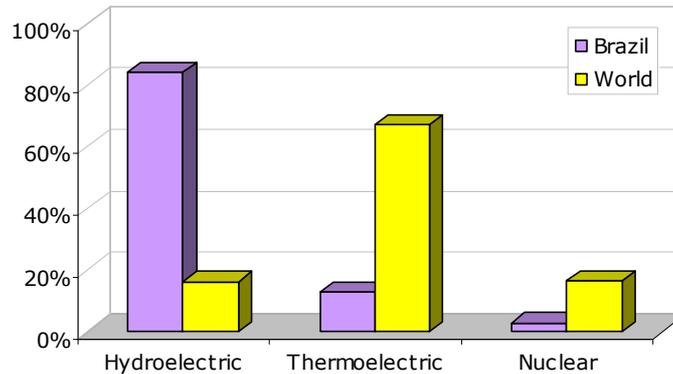
PULP AND PAPER INDUSTRY ENERGY MATRIX 1970 - 2004



Source: Brazilian Energy Balance - 2005.

ELECTRICITY

SUPPLY STRUCTURE ACCORDING TO GENERATION SOURCE

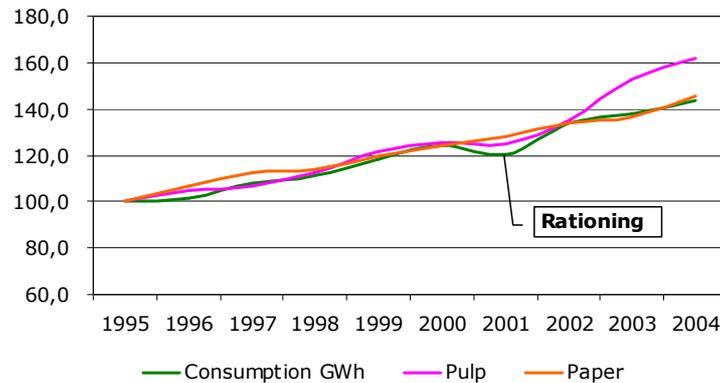


Source: Brazilian Energy Balance – 2005.

ELECTRIC ENERGY

- ➔ Until the end of the 90's the great hydroelectric units had energy surplus.
- ➔ Nowadays, the electricity generation concentrated in hydropower are facing difficulties:
 - environment restrictions
 - lack of investments
- ➔ New pulp mills located in areas with no available electricity supply.
- ➔ It is mandatory that the sector needs self generation.

PERCENTUAL EVOLUTION OF ELETRICITY CONSUMPTION VIS-A-VIS PRODUCTION



Source: Brazilian Energy Balance - 2005.

PERSPECTIVES

- ➔ The country's need to reduce its dependency on hydroelectricity led government to look after co-generation sectors.
- ➔ With natural gas available, there is an opportunity for the industry to install gas turbines generating steam and electricity in quantities twice that of their needs, being able to sell electricity.
- ➔ Bracelpa is negotiating with the Federal Government to quantify the potential of the sector to sell energy.