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Ecoefficiency: the relentless pursuit for cleaner production

Producing with less environmental impact is one of the sector's goals, which by encouraging practices such as less water and electricity consumption, also ensures the financial health of businesses

By Marina Faleiros

It is not a recent thing that pulp and paper makers are engaged in investing in technologies that contribute to the environment, ridding itself of that old somewhat negative image of its production processes. Sustainability and social responsibility have become a part of the vocabulary of companies for good

and, more recently, another concept has gained momentum: ecoefficiency.

In short, having ecoefficiency means producing more and better while consuming less natural resources. But there's more to the concept goes, as explains Nei Lima, coordinator of ABTCP's Technical Environmental Committee and an EcoÁguas Consultant. "There are various factors, like raw materials, that directly impact environmental performance, such as the electricity

consumption, since more electricity consumed means the more fuel wasted, resulting in more emissions", he exemplified.

According to Fundação Getúlio Vargas (FGV) researcher Saulo Gomes, who worked in the study *Accumulation of Technological Capabilities, Innovation, Learning Strategies and Competitive Performance: Proof of Companies in the Forestry and Pulp & Paper Sectors in Brazil (1950-2006)*, companies that developed

and improved the financial health of their business are also those that reduced their consumption levels. "There's a considerable number of companies that reached the technological limit and, as a result, their processes consume less power and water", he said. The study represents 90% of Brazil's production, for which nine pulp and eleven paper companies were analyzed.

Measures discovered in the study for increasing ecoefficiency include the continuous pursuit for closing more circuits in mills and increasing the recovery of raw materials, such as fibers. "Companies have been investing continuously in this. There isn't anybody that is not looking at these aspects", he said.

But the fact that Ecoefficiency-related concepts are widely disseminated does not mean that the sector's work is done. Such is Celso Foelkel's opinion, a consultant at Grau Celsius Consultoria and former president of ABTCP: "Ecoefficiency is making the best with less, but the sector still wastes a lot and has a lot to improve. There is still a lot that can be done with ecoefficiency, especially in terms of reducing water consumption and fiber losses." An example provided by the consultant is that, even in state of the art paper mills, roughly 10% of wastepaper is still recycled internally. "That is, machines are producing 10% of paper that returns to pulpers as waste."

According to him, there is still a significant amount of mismatched information regarding the meaning of the word "sustainable". "It's no use for a company to pride itself for having the biggest waste-

water treatment station, since that mean that it is also producing a lot of waste that needs to be treated." Foelkel explains that ecoefficiency goes to the source of the problem and how to reduce wastage, and not only on the final stage of cleaning the "dirt of the process".

Additionally, Lima points out that the subject matter is ecoefficiency; only respecting environmental laws does not suffice. "A company may be in conformity with legislation parameters, but consume twice as much than another company, which means it could be more efficient". According to him, it is important to remember that when a company has emissions, this always means that its process has flaws. "The company is wasting its money in the form of waste", he says.

ECOEFFICIENCY INDICATORS

Brazil does not yet have specific parameters for measuring ecoefficiency, but several studies are being conducted towards this end, including by ABTCP's Environmental Committee, which together with consulting firm Bachmann has developed some benchmark indicators relating to ecoefficiency. The study comprises 35 mills of various types of paper.

In the mean time, the only data divulged is the specific consumption of water by paper machines, whereby for arriving at the benchmark indicator, the average of the 20% best results was considered. For mills as a whole, the benchmark consumption is 6.4 m³ of water per ton of paper produced. The lowest rate identified was 3.4 m³/t and the highest

91.3 m³/t, which shows that there still exists a major difference among companies within the same sector. Coincidentally, the lowest and highest rates are in the packaging papers industry.

The FGV study also presents the historical evolution of interesting figures, but only considers the average of companies surveyed. As Saulo Gomes informed, the data was separated according to type of company. One example is the specific consumption of water in pulp production, which went from an average of 41.3 m³/t in 2000 down to 36.78 m³/t in 2006, representing an annual reduction of 1.91%. In the table I, it is possible to also check all the values obtained in the FGV study for electricity consumption, steam consumption and fiber losses.

In global terms, a value base to be achieved is that of the European Community's Integrated Pollution Prevention and Control (IPPC). The figures were published in 2001 and used until 2007 as benchmark by the World Bank. As Celso Foelkel points out, these parameters are outdated and a lot has changed in the industry. Therefore, new IPCC indicators are expected to be presented in 2009. In the table II, it is possible to see the European Community's parameters for wastewater and gas emissions.

WHAT IS BEING DONE IN BRAZIL

The image of the pulp and paper sector has been many times marked by distrust on the part of local communities, governments and NGOs. Also on account of this, a major part of large companies

Table I - Historical consumption comparison between years 2000 and 2006 - FGV

	Pulp		Writing & Printing Paper		Kraft and Packaging Paper		Tissue Paper	
	2000	2006	2000	2006	2000	2006	2000	2006
Electricity (Kw.hour/t)	737.03	571.02	627.5	547	457.51	391.95	412.07	918
Steam (tons/t)	4.92	3.63	3.12	2.49	1.9	1.9	1.9	1.43
Water (m ³ /t)	41.30	36.78	28	17.1	31.65	47.7	34.8	23.3
Fiber Loss (tons per day)	13.16	10.92	-	-	-	-	-	-

Source: FGV

Table II

Integrated bleached kraft pulp and paper mill		
Parameter	Units	Objective
Wastewater	m ³ /adt	50
pH	-	6-9
TSS - Total Suspended Solids	kg/adt	1.5
COD - Chemical Oxygen Demand	kg/adt	20
BOD - Biochemical Oxygen Demand	kg/adt	1
AOx - Chlorinated Organic Compounds	kg/adt	0.25

Integrated unbleached kraft pulp and paper mill		
Parameter	Units	Objective
Wastewater	m ³ /adt	25
pH	-	6-9
TSS - Total Suspended Solids	kg/adt	1,0
COD - Chemical Oxygen Demand	kg/adt	10
BOD - Biochemical Oxygen Demand	kg/adt	0.7

References for pulp and paper mill emissions			
Parameter	Type of mill	Units	Objective
TSS - Total Suspended Solids	Integrated bleached and unbleached kraft mill	kg/adt	0.5
SO ₂ as S	Integrated bleached and unbleached kraft mill	kg/adt	0.4
NOx as NO ₂	Integrated bleached and unbleached kraft mill	kg/adt	1.5 (short fiber pulp) 2 (long fiber pulp)
TRS as S - Total Reduced Sulphur	Integrated bleached and unbleached kraft mill	kg/adt	0,2

Source: IPPC

in the country now pay considerable attention to social responsibility and eco-efficiency in their processes, with clear indicators that are open to the public. Of the companies interviewed by *O Papel* magazine, all stated that the environment and mill efficiency have been key concerns since their founding and that they improve every year through new technologies and production processes.

For some companies like International Paper (IP), developing these aspects was a means identified for growing. In the company's case, legislation in effect where the Mogi Guaçu mill is located, was extremely strict, since it is located along the Piracicaba river basin. "We had a very big restriction and legislation had even prohibited the creation or expansion of pulp and paper companies in the region. Since

then, all our projects began to foresee environmental improvements, which changed the sector's image in a positive way", says Wanderlei Peron, IP's sustainability manager. The company's last major project, in 2006, aimed to eliminate elemental chlorine from its bleaching process, boiler substitution, a new wastewater treatment station and odor treatment, having invested US\$ 129 million.

Umberto Cinque, VCP's corporate environmental manager, explains that social responsibility has always been a concern, but it was in 2005 that the company started up its first cleaner production movement, having adopted practices defined by the United Nations Environment Program (UNEP). "We established a partnership with Senai to create an "ecoteam" and develop

production, plant floor and managerial personnel. They all underwent training in the P+L methodology, a much more comprehensive assessment and analysis of the process".

According to the executive, the company has already proved that for every R\$ 1.00 invested, the company receives a return of between R\$ 7.00 and R\$ 12.00. "When working with ecoefficiency, you revisit the process many times and always identify something that hadn't been looked at in the day-to-day routine. With this, we are able to identify things to improve on and in which areas there is raw material or utilities wastage", he said.

Júlio César Batista Nogueira, Klabin's corporate environmental manager, says that ecoefficiency is in the company's DNA. "Since its founding 109 years ago, the company has based itself on a model that allows combining the creation of wealth with social well-being and the protection of nature", he says. A good example of this was the recent improvement made at the Piracicaba paper unit, which substituted fossil oil for natural gas, with the objective of having a more ecoefficient process by reducing greenhouse gas emissions. "This created the opportunity to sell carbon credits relative to the 87 thousand ton reduction of CO₂, which we just concluded."

Another company that has already sold carbon credits was Suzano, which substituted its energy grid from fossil oil to natural gas and was able to reduce its waste production. "We consume less energy now, which is a positive thing in a scenario of increasing prices. Therefore, the better the ecoefficiency result, the better it is for the company", says Luiz Cornacchioni, Suzano's institutional relations manager. He also mentioned that one of the main forms of evaluating the company's ecoefficiency has been its emissions inventory, conducted annually and which calculates even the emissions resulting from the airplane flights of its employees. "We continuously have programs that focus on water, energy and waste consumption, with the objective of closing circuits and obtain operational results", he said.