Sustainability
Sustainability

Anthropocentric-oriented concept

Long term dynamic view
“Those people who plant forests are expected to think in the long term”
Several different focus to understand Sustainability
Different focus to understand Sustainability

- Business Sustainability
- Long term Sustainability of forest site productivity
- Environmental issues on Sustainability
- Social issues on Sustainability
Business Sustainability

• To be competitive is to perform better than the average of competitors with regard to the key competitive factors of any specific type of business.
Business Sustainability depends on

- Costs
- Quality
- Logistics
- Financial performance
- Environmental performance
- Immage
- Availability of resources
- Scale of production and “market share”
Kraft Pulp Industry Sustainability

- Cleaner technologies
- Eco-efficiency
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Cleaner and BAT’s technologies

• Modified kraft pulping
• Oxygen delignification
• Fluidized bed power boilers burning biomass fuel
  • ECF or ECF-Light bleaching line
  • Closing water cycle
• Evaporation plant to high solids content in black liquor to feed the recovery boiler furnace
• Separate washing and drying systems for lime mud to develop high consistency
  • Etc.; etc.
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Eco-efficiency

• Doing more
• Doing better
• Lower utilization of natural resources (water, fibers, wood, chemicals, etc.)
• Reduce wasting
• Resulting in lower pollution loads and costs
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How to reach these targets?

• Technology, technology and technology

• Management commitment

• Operation awareness

• Legal compliance

• Responsibility
Sustainability demands commitments
End-of-pipe and pollution abatement technologies

- Secondary or tertiary level WWTP’s
- Composting stations to decompose solid wastes converting them into forest and agriculture fertilizers
- Controlling air pollution; etc.; etc.
Landfills and mills oriented to produce fumes are leaving the sector scene... Forever, I hope...
Forest raw material certification

- FSC
- CERFLOR/PEFC
Product Eco-Labelling

Minimum impact along production and life cycle

Minimum hazards to users

A guarantee to conscious consumers
Summarizing:

Strong actions on:

• Eco-efficiency
• Eco-labels and certification
• Operations
• Management systems
• Safety and health at workplace
• Control and prevention of pollution
• Guarantee on sustainable production and supply of wood raw materials
• Citizen businesses with social commitment’s and performances
Critical Overview of Water Consumption in the Pulp & Paper Industry
Although improvements have been significant, there is still a long road to go ahead in terms of water use...

Past (1960’s)
250 m³/adt

Future
10 - 15 m³/adt
Zero?

Today?
25 - 40?
A substantial difference between water consumption and effluent generation...

Why such? 10 to 20% ??

- Overflows
- Spills
- Evaporation
- Smokes
- Flue gases
- Cooling towers

- Moisture in residues
- Steam losses
- etc.; etc.
Water consumption is function of...

- Technological age of the mill
- Balanced design of inter-related mill areas
- Managerial commitments
- Operators responsibility
- Water resources availability
But, in general...

There are no specifications or restrictions to water utilization in the process sectors of a pulp or paper mill, only to final effluent to comply with legislated parameters.
The concept to treat effluents till now is based on...

- Blend all effluent flows...
- Treat them at a huge, expensive and dinosauric WWTP...
- At a high cost and with low ecoefficiency !!!!
Water has till now been an inexpensive resource...

Treating effluent is a lot more expensive

- More water consumption ...
- More effluent to treat...
- More costs and impacts
- High heat losses in effluent (\(~4 - 5\) GJ/adt)
New concepts are required...

**Segregation** is the one of the most important...

It means to separate and to treat differently the different things

- Clean and low contaminated effluents;
- High SS but clean in terms of COD;
- Low SS but highly organic;
- etc.
New concepts are required...

Reuse water or effluent at the origin/effluent source is another of the most important...

This is the true and vital concept for closing water cycle

- and not just to send to someone else a dirty water, transferring the problem and creating unbalanced operations...
New concepts are required...

The water quality is another of the most important...

There is no need to use fresh water or clean industrial water to do every single job in the mill, even to wash the floors
New concepts are required...

The technological concepts are to change soon

- moving pulp suspension flows at low consistency is becoming obsolete;
- paper and pulp sheet forming also;
- reducing pulp and paper brightness levels is a need, even by law;
- etc.
The eleven strategies...

1. Reduce water consumption at the origin or at process effluent sources

2. Reuse as much as possible at the process area

3. Identify water and effluent quality at each sector of the mill, avoiding to contaminate with discharges to the gross untreated effluent
The eleven strategies...

4. Segregate different types of waters and effluents

5. Keep balanced operations and do not exceed the optimum sector and mill capacities

6. Remove or modify contaminants using kidney treatments (example - removal of chlorides and potassium from boiler ash, heat exchangers to recovery heat, etc.)
7. Treat different effluents by different methods, preferably at the process sites, with innovative methods

Ex.: 
- woodyard waters (*wetlands*);
- pulp machine effluents ("save all" screeners);
- water purge from boilers (*direct utilization as such*);
- clean condensates and hot water (*direct utilization as such*);
- hydrociclones discharges (*removal of solids and reuse of water*);
- cooling towers wet gases (*condensation and reuse of water*)
8. Close effluents lines at some specific mill areas where feasible to work without generating effluents

- digester room;
- pulp washing and screening;
- lime kiln and causticising;
- chemical plant;
- recovery boiler;
- etc.
The eleven strategies...

9. Recycle a fraction of the final treated effluent to some areas where feasible

10. Use other sources of water, as rain water, wood chips moisture, water in purchased chemicals, etc.

11. Deal with environmental control agencies to restrict losses of pollutants in load (kg/adt) and not just in concentrations (ppm)
Critical Overview of Air Emissions in the Pulp Industry
World changes fast...

- Odor – TRS - is no longer the unique worry for pulp industry
- NOx; SOx; Particles and Dust;
- Dioxins and Furans in flue gases
- NCGs
- CO and CO2
- Volatile Organic Compounds – VOCs
- Fugitive secondary emissions
- Fogs
- Chlorinated compounds, etc.; etc.
New concepts are required...

Understand the process of air pollution

Act to the root causes

- Overload of process systems
- Low quality combustion processes
- Old technologies
- Unbalanced operations
- Lack of responsibility, best practices and monitoring systems
The eleven strategies...

1. Establish a energy efficiency program to reduce needs of energy at the mill – better combustion means reduced air emissions

2. Understand the role of the process variables on air pollution – Ex.: Consistencies of black liquor and lime mud. Identify key process parameters to better control the operations – with responsibility...
The eleven strategies...

3. Balance mill operations and develop backup systems for critical areas

4. Technological upgrades mainly at equipment's working under restriction or having old technological age (Broby smelter, direct contact evaporators, etc.)

5. Technological changes: AQ low sulfur pulping, black liquor oxidation, collecting and burning NCGs, stripping condensates, etc.
6. Treat different flue gases by different methods, preferably at the process sites, with innovative methods.

7. Improve automation of key variables.

8. Safe and sound maintenance on end-of-pipe devices and on key combustion variables.
The eleven strategies...

9. Improve gas dispersion via fume modelling, weather conditions, etc.

10. Monitor the impact of air emissions in the mill area of influence (Odor perception network, environmental and outdoor air control stations, etc.)

11. Be prepared to act on seldom considered sources of pollution to air – WWTP, Landfills, etc.,
Critical Overview of Solid Wastes Generation in the Pulp Industry
The situation demands for changes...

Huge generation of solid wastes...
New concepts are required...

Reduction of solid wastes at the generation sources

It means to avoid the losses of fibers, chemicals, COD that will be converted into sludge, bark debris, etc., etc.
1. Reduce solid wastes at the origin or at process sources

2. Identify the root causes of solid wastes generation

3. Specify the quality (and quantity) of solid wastes similarly to the case of pulp or paper products – moisture content is the most critical solid waste quality parameter
The eleven strategies...

4. Segregate different types of solid wastes not blending all residues in just one useless garbage.

5. Do not landfill – this will be the ultimate option.

6. Find alternative uses for solid wastes at mill, forests and other type of neighboring industry.
The ten strategies...

7. Treat different solid wastes by different methods with innovative technologies

8. Close process areas, where applicable, to avoid generating solid wastes

9. Value all solid wastes in terms of discarded raw materials (fibers, caustic soda, organic matter, etc.)
10. Use other sources of process raw materials and new BAT’s technologies to prevent solid wastes generation

11. Work with eco-efficiency, eco-effectiveness and eco-efficacy
We need to speed up actions to fulfill commitments and to anticipate future problems with new demands on sustainable mill operations...
However, we have to work very hard
Thanks for your attention

Good luck with your achievements