



The Pulp and Paper Industry and Climate Change mitigation



The pulp and paper industry has a heavy impact on greenhouse gas emissions, due to the high energy requirements of its production process. We can basically differentiate three types of sources for these emissions:

First, the consumption of fossil fuels required in the various phases of the production process, such as: the boilers or gas turbines for energy production, the recovery boilers, the incinerators, the lime and baking kilns, the scrubbing of waste gases or the dryers powered by fossil fuels.

Second, electricity consumption for the operation of the business, due to automation of the process and general technological development.

Finally, emissions can be generated from organic process waste, either during treatment of waste waters or on disposal into a landfill.

The mitigation alternatives also centre around three strategies:

1. Improving the energy efficiency of the process.
2. The use of cleaner fuels and the reuse of biomass generated by the process.
3. The use of cogeneration to cover the electricity and heat needs.

Alternatives for reducing greenhouse gas emissions

IMPROVING ENERGY EFFICIENCY

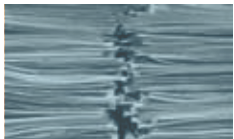
- Installation of fuel economisers on boilers.
- Change and adjust burners on boilers.
- Improve the insulation on steam and condensate lines.
- Optimisation of the pulp manufacturing process.
- Optimisation in evaporation, burning and causticising.
- Optimisation of the pulp preparation process.
- Improve the overall efficiency of the factory.

USE OF CLEANER FOSSIL FUELS

- Emissions from biomass are considered neutral due to their biogenic origin
- The industry has potential for reusing biomass as a fuel as it generates wastes of an organic origin.
- A double benefit is obtained by using biomass: the reuse of a waste product and the substitution of a fossil fuel.

THROUGH THE USE OF COGENERATION

- Combined generation of heat and electricity to reduce the loss of both
- Reduction in the use of fuel and consequently of emissions into the atmosphere.
- A well known and developed technology that can be applied for both new and existing factories. No significant problems have been detected in its use
- The energy requirements and the heat / electricity ratio in the paper and cardboard industry are most appropriate for the use of cogeneration.
- The emissions per unit of heat or electricity are considerably reduced as the result of greater thermal efficiency.
- The overall thermal efficiencies can reach 93%, thus reducing the rate of carbon dioxide emissions by about 50% compared to conventional systems.



Case study:

Papelera Peninsular, S.A, Madrid (Spain)

(Source: Fenercom)

Papelera Peninsular, SA installed a cogeneration plant for the production of paper to reduce their CO₂ emissions to the atmosphere through the implementation of one of the recommended alternatives for the manufacture of pulp, paper and paperboard. The potential for reduction of CO₂ emissions in this sector by using cogeneration is high because the paper industry production process requires large amounts of heat and electricity.

GENERAL MEASURES TO REDUCE EMISSIONS

- Use of a cogeneration plant consisting of a gas turbine, a steam turbine and a heat recovery boiler. The steam turbine activates an electrical generator and is also responsible for supplying more steam to the factory, as it has a post-combustion burner of natural gas.
- The energy produced by the cogeneration plant is 365 GWh and energy consumption is 207 GWh, which has resulted in a surplus. The surplus energy can be sold

RESULTS

Cogeneration Plant	
Energy produced	365 GWh
Energy consumed	207 GWh
Energy fed into the grid	158 GWh
Primary energy saving	15%

INVESTMENT COST AND AMORTIZATION

The economic cost of investment was 30 million Euros and its repayment period is between 8 and 10 years.