Pulp and Paper

Medium Risk Sector M

Processing of wood into pulp and paper, which may be further processed into cardboard and paper articles.

Related Sectors:
- Printing
- Forestry

Production Processes

The primary raw material for pulp and paper manufacture is **wood**. The trees are debarked, chipped and washed before the fibers may be used for paper production. The raw material is first converted into pulp, a concentrated mixture of fibers suspended in liquid. Part of the raw material may also stem from **recycled paper**. Fibers have to be separated from impurities and washed. Usually they are also bleached or dyed in order to alter the appearance of the final product.
The pulp mixture is then further diluted with water, resulting in thin **slurry**. The diluted slurry is drained through a moving fine-mesh screen to form a fibrous web. This moving web is pressed and dried into a continuous sheet of **paper**. Alternatively, in the molding process, a quantity of the pulp is placed into a mould with a wire-mesh base, so that the fibers are left coating the mesh and excess water can drain away. At this time, pressure may be applied to squeeze out more water. The paper may then be removed from the mold, wet or dry, and go on to further processing.
Paper that contains only pressed and dried pulp is very absorbent (for example, blotting paper), and does not provide a good surface for writing or printing. Hence, a variety of **additives** such as dyes, china clay or glue are used improve the structure of the paper. It may also be dried several times during its manufacture. In the finishing process the paper is cut and packaged for sale or further processing
Cardboard is produced employing a similar production process as for paper. Cardboard is thicker, stiffer and more durable than paper, because of its heavy wood-based type of paper.

Sustainability Issues

H	Energy
M	Water Use
H	Emissions to Water
M	Waste
M	Emissions to Air
L	Ecosystems
M	Workplace Health & Safety
M	Disaster Risk
M	Site Contamination

Sector Rating

H	High risk issue
M	Medium risk issue
L	Low risk issue

Risks & Opportunities

- **Pulp and paper production consumes large amounts of energy for pulping and bleaching.**
  Chemical pulping requires energy in the form of heat, which is mainly supplied as steam generated by incinerating production waste. Mechanical pumping requires mechanical energy, usually supplied as electricity. Cost savings from energy efficiency improvements may be considerable.

- **Effluents from paper mills may contain toxic and non-toxic substances, both of which may have a negative impact on water quality.**
  Examples of non-toxic substances are organic solids, resins and fatty acids from raw materials, pulp and paper. These are an issue for water quality as they may be discharged in very large amounts.

- **Emissions to air can be a nuisance in the surrounding areas of pulp and paper plants and entail material risks to human health.**
  Typical air pollutants emitted by pulp and paper productions are: Dust, sulfur, nitrogen oxides. Emissions depend primarily upon production processes, sources of energy and the level of technology.

- **A reliable and sustainable supply of high-quality fresh water is essential.**
  Producing pulp and paper may require large amounts of fresh water. A reliable supply is essential for ensuring continuity of production. Where water supply is limited, conflicts with other uses may arise.

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