

Modeling of the pulp mill and integrated refinery, and energy management

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Nonrenewable liquid fuels availability will ultimately decrease. Producing ethanol from plants may replace part or all of it. In a pulp mill, it comes up as a by-product, and will not compete with food production.

Producing pulp and paper requires high amounts of energy, either as vapor or electricity. Pulp mills also produce energy, mainly when burning cooking liquors.

In the future, pulp mills will extract part of the wood prior to cooking, and refine it for agro-fuel production. Integrating this new workshop will greatly impact the energy balance of the global pulp mill.

A standard mill will be simulated, with special care taken for using knowledge models detailing the physical reality of each unit workshop. The use of black-box modeling will be ruled out when not absolutely necessary. This model will be energetically optimized, without ruling out the pulp quality requirements.

A refinery will then be added to the model, resulting in a new balance. Pulp quality, yield modification, energy and carbon balance, economic balance will be studied.

The study first focuses on a physical simulation of the black liquor evaporation process and of the thermodynamic properties of concentrated liquors.