

PROCESS ENGINEERING AND MILL OPTIMIZATION

Mill economic optimization, together with energy and environment, has been one of the three main focus areas for EKONO during the 30 years the company has serviced the North American pulp and paper industry. Thorough understanding of the pulp and paper business and interrelationships between operating costs, capital, product quality, plant reliability, energy management and environmental issues is essential for overall optimization. Also, the objective of the optimization varies depending on mill specific requirements, market prices and corporate goals. EKONO's strengths in economic optimization are:

- We believe that our staff has superior **chemical engineering skills** to quickly and cost effectively identify and evaluate cost reduction opportunities and to develop a realistic optimization program.
- No-capital and low-capital improvements are an essential part of an optimization program. We can provide an **unbiased opinion**.
- We have **benchmarking data**. This includes the most recent technologies applied in North America and in Scandinavia. We keep updated on environmental regulations, actual mill performance and market trends. Understanding of future needs, is essential for successful investment planning.
- We use and continually refine our **modeling tools** - e.g. process simulation tools, energy balance models, boiler models and power house optimization tools

The references below include recent selected mill optimization projects.

- Several **Efficiency, Energy and Environmental Audits** in pulp and paper mills both in North America and Scandinavia. The key objective of these audits is to provide a quick assessment of mill's situation conducted by a small team of professionals. The specific objectives of these audits vary but typically include one or more of the following: energy and water, bleaching chemicals, recovery loop chemicals, wood yield, staffing and environment. Recent clients include Buckeye Technologies, Canfor, Tembec, UPM-Kymmene, and Weyerhaeuser.
- **Process engineering services** for the preliminary design and class 10 estimate, for example of an oxygen delignification installation and other process improvements at Weyerhaeuser, Grande Prairie, Alberta.
- **Mill Debottlenecking Studies** are typically feasibility level evaluations to determine opportunities to increase plant throughput and result in Class 25 capital and operating cost estimates for the alternatives. Recent clients include Tembec, Smooth Rock Falls, ON; Tembec, Temiscaming, PQ; Weyerhaeuser, Grande Prairie, AB, Prince Albert, SK and Longview, WA; and Buckeye Technologies, Foley, FL.
- The Cluster Rule promulgated by the U.S. EPA in early 1998 requires the US pulp mills to comply with the MACT I portion, of the rule during the next 3-8 years. The scope of work for EKONO has typically included development of methanol balances, identification of condensate treatment options, energy optimization and development of capital and operating cost estimates. These type of studies are good examples of **simultaneous optimization of economic performance, energy and environment**. As an example EKONO was retained by Georgia-Pacific to carry out a Cluster Rule Study at their Palatka, FL; Port Hudson, LA; Ashdown, AR; Cedar Springs, GA; Woodland, ME; Monticello, MS and Crossett, AR mills.
- Byproducts from the pulp and paper mills have often been a neglected area although they can represent several million dollars in revenues for an average pulp mill. EKONO has conducted several **Studies on Byproducts** including soap, soap derivatives, turpentine, lignosulfonates, xylose, alcohol and acetic acid. Clients include Weyerhaeuser, Tembec, Raisio, Xyrofin and Potlatch.
- EKONO's **expertise in pulp and paper business and processes** has also been recognized by several well known institutions such as AFPA, NCASI, CEFIC and Finnish Forest Products Association. For example, in 1997 AFPA retained EKONO to conduct an extensive literature review comparing ECF and TCF pulp production processes with respect to pulp quality, environmental effects and operating/capital costs. Also, in November 1997, NCASI retained EKONO to help identify and evaluate technologies to meet the Kyoto agreement, which requires countries to lower their carbon dioxide emissions to 6-8 % below the 1990 level.