

**EKONO Inc.
STRATEGIC STUDY**

Study Abstract

**ENVIRONMENTAL PERFORMANCE,
REGULATIONS AND TECHNOLOGIES
IN THE PULP AND PAPER INDUSTRY**

2015

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2015 Report

Study Abstract

1. GENERAL

For the past eighteen years, EKONO Inc. has issued an annual publication entitled "*Environmental Performance, Regulations and Technologies in the Pulp and Paper Industry.*" The objective of the report is to provide information on current environmental performance data and issues as well as technologies available to meet current and expected future requirements. The highlights of the 2015 issue are:

- Environmental performance in the pulp and paper industry. EKONO's data base includes information from about 615 pulp and paper mills, mainly from North America, South America and Europe. The total annual production for these 615 mills is about 184 million tons of pulp and paper
- Presentation of the permit limits in different environmental regulatory regions, states and provinces for different types of pulp and paper mills. Mill specific permits are illustrated with bar charts. The final draft of EU's BAT report is summarized.
- Status of environmental certification and environmental labeling in the pulp and paper industry
- CO₂ emission data for the year 2013 from over 430 pulp and paper mills in Europe, North America, and South America.

The focus of our study is with the North American, South American and European pulp and paper industries.

2. ENVIRONMENTAL PERFORMANCE

Actual air emission and effluent discharge data from are analyzed and presented in the report for nine different mill categories. The statistical data used for the evaluation are from calendar year 2013 in most cases except U.S. air data. For U.S. air data, data was collected from individual states and when 2013 data was not available, 2012 data was used. If air data was not available from a specific state, data from the most recent National Emissions Inventory (NEI) was used, which was 2011 data. The analyses include graphical and numerical presentations of emission data from more than 615 pulp and paper mills in North America and Europe. The data presented in the report are taken from EKONO's database,

which is updated annually based on publicly available data sources and on a review of environmental reports to the authorities and corporate annual environmental reports.

Samples of the performance data are given in Figure 1 and Figure 2. The report includes some 200 different benchmarking charts.

3. ENVIRONMENTAL REGULATIONS AND PERMIT

This section includes examples of mill specific limits shown on benchmarking charts for different types of pulp and paper mills in North America, South America, and Europe.

This section also documents U.S. EPA's MACT regulation, including the new MACT IV regulation issued in January 2013. The final limits for industrial boilers and the monitoring and reporting requirements are documented including the energy assessments required for submission to the EPA.

EU BAT-AEL's and technologies are documented. The final BAT document was issued in 2015 and has new BAT ranges for effluent and air emissions for the pulp and paper mills.

4. ENVIRONMENTAL MANAGEMENT STANDARDS AND ENVIRONMENTAL LABELING

The European Union EMAS environmental management system is updated and sample mills with EMAS certification are listed. Many pulp and paper companies are revisiting the environmental labeling concept. The relationship of various labeling schemes with different environmental management systems is discussed in the report. The environmental labeling systems, including the European Union Flower, Nordic Swan and the Canadian EcoLogo are described. The status of ecolabel registration of pulp and paper companies is reviewed in the study.

5. CO₂ EMISSIONS

Benchmarking charts are provided for comparison of CO₂ emissions for different types of mills in different areas on the same basis. The direct CO₂ emissions from burning fossil fuels in boilers, lime kiln and dryers are included. The EKONO database includes CO₂ emission data for over 430 pulp and paper mills. The total annual production for these 430 mills is about 139 million tons of pulp and paper.

Figure 3 shows the CO₂ emissions from sample bleached market kraft mills.

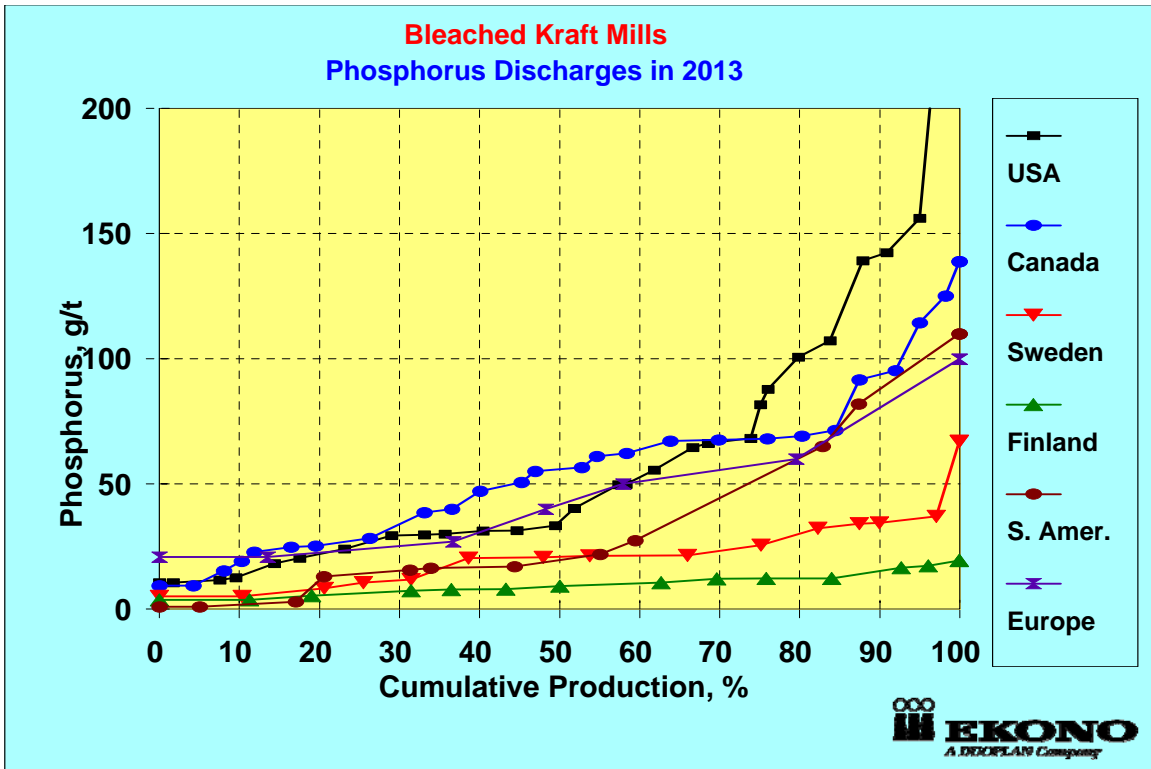


Figure 1 Effluent Phosphorus Discharges in Bleached Kraft Pulp Mills

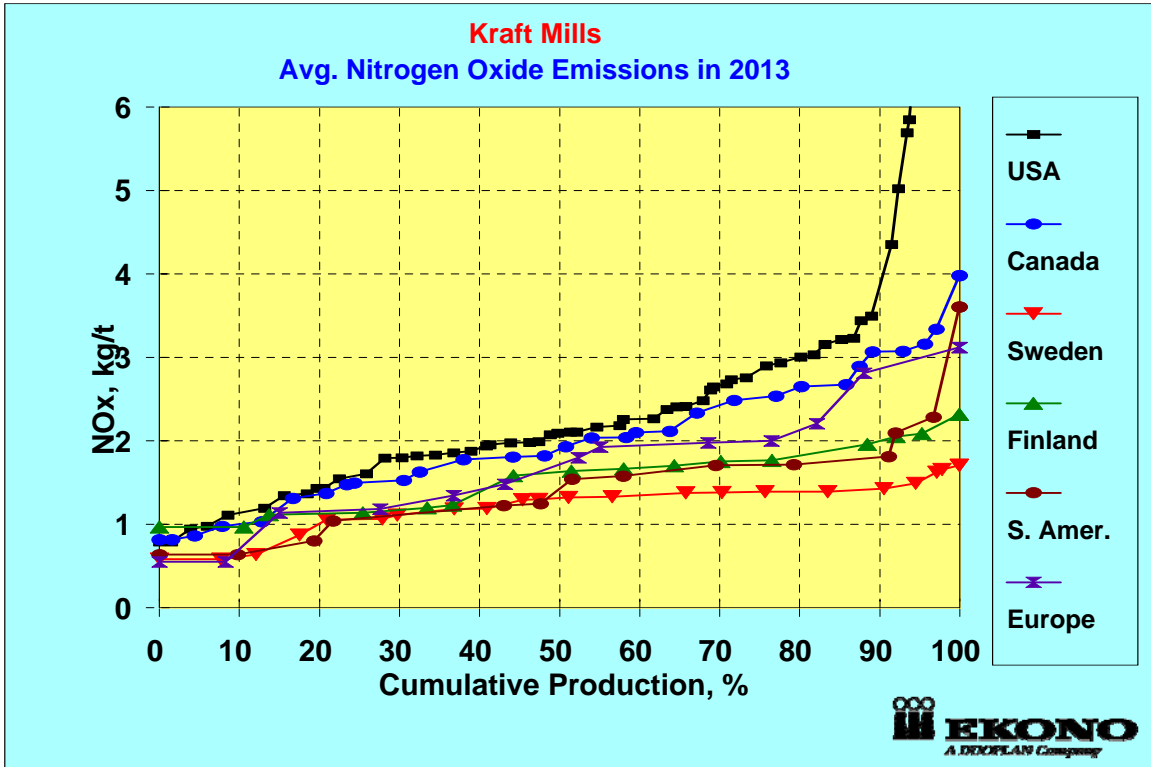


Figure 2 Nitrogen Oxide Emissions from Kraft Mills

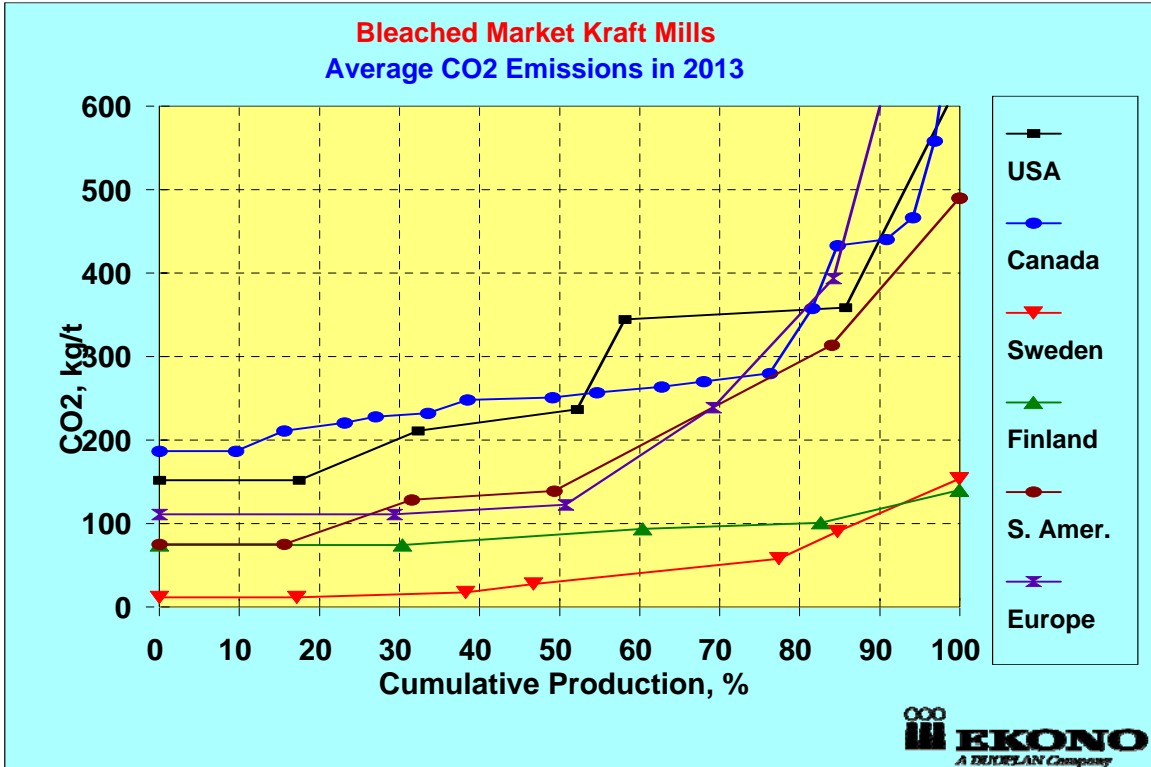


Figure 3 CO₂ Emissions from Fossil Fuels in Bleached Market Kraft Mills