



## “Lean and Green” at a Romanian secondary tissue paper and board mill—putting theory into practice

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### Abstract

A three-year environmental project was implemented at the Petrocart S.A. paper and board mill, through the Danish Support Programme for Eastern Europe (DANCEE). The aim was to use “Lean and Green” Production to improve industrial compliance with the effluent regulations and with EUs IPPC Directive under implementation in Romania, thereby improving the environmental conditions in the Bistrita River running through the town. The results obtained included an 87% reduction of the discharge of wastewater from 5300 to about 700 m<sup>3</sup>/day. Previously, the effluent was subjected to primary treatment only. The reduction in flow reduced mill fibre losses and allowed discharge to an existing, underloaded, municipal treatment system, where primary and secondary treatment is operated. Further results obtained were better housekeeping (5S and Kaizen) and a Total Quality Management (TQM) organisation was implemented where product quality, environment and occupational health and safety are merged into one system. Twenty-eight TQM groups were formed, each with a representative from management and elected among workers. The mill’s employment is slightly higher today, and the gross turnover and profitability has almost tripled. Had Petrocart had the financial resources themselves carried the project through without DANCEE support, the payback time for the project would have been 3.7 years for the total of €2 million spent. Petrocart no longer pays penalties for environmental non-compliance. The performance contributes to IPPC-approval. The project was implemented within the framework of DANCEE’s procedures, which is based on the Logical Framework Approach (LFA) for project management. The PROjects IN Controlled Environments (PRINCE2<sup>TM</sup>) model for project management was also applied. This article analyses how

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the results were achieved and how Lean and Green thinking as well as good project management practices, such as LFA and PRINCE2 were applied to turn around an old Eastern European company to survive privatization.

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## 1. Introduction

The Danish Cooperation for Environment in Eastern Europe (DANCEE) – a department under the Danish Environmental Protection Agency (DEPA) – has supported the Piatra Neamt County in Romania since 1996. During 1998, the local Romanian Environmental Protection Agency in Piatra Neamt (REPA) developed a DANCEE supported programme called “Local Environmental Action Plan” (LEAP), which included environmental projects of priority in Neamt County (Neamt County, 1998). The Programme Steering Committee in Neamt County consists of representatives from the local REPA, local authorities, companies, institutions, and NGOs. This Committee reviewed and approved the LEAP. The Committee proposed 10 projects to be developed. The current Petrocart-project was ranked third in priority in the LEAP on grounds that it would significantly contribute to ensuring clean surface waters and clean drinking water in the Bistrita River, running through the town of Piatra Neamt. The objectives were to improve the environmental performance of the Petrocart recycled paper based paper and board mill and at the same time ensure its survival after privatization in order to secure jobs and prosperity in the County.

Results showed 21% increase in recycled paper consumption, 39% increase in tissue production, an 8% yield increase due to better fibre recovery, in addition to 87% water savings, 83% decrease in TSS, and 55% decrease in COD. Overall cleanliness and house-keeping improved, employment increased slightly and the profit rate and gross turnover about tripled.

### 1.1. The Petrocart Mill

Petrocart is located on an industrial site in the western part of Piatra Neamt, on the northern bank of the Bistrita River. The company was established in 1908 and privatised in 1998, being now a 100% privately owned company with a Romanian ownership consisting of its management, employees and a local investment company.

Prior to 1989, the company had 850 employees and produced 1500 t of paper and board per month on four paper and board machines. Today, about 400 employees produce 1250 t/month on three machines. The total production at the start of the project in 2000 was 12,000 t/year, a figure, which for 2004 is expected to increase to over 16,000 t/year, mainly because the output from the tissue machine has almost doubled due to the project. Twenty percent of the total capacity is exported. Today, the annual turnover is €5–7 million with a gross profit of €600,000, which so far has been invested in mill improvements.

Raw materials used in the production process:

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