



MED TEST Case Study

## PULP and PAPER sector — EGYPT

# Paper industry — National Paper Company (NPC)

### Company overview

NPC is a large-size privatized paper enterprise owned by EMAK Paper Company (El-Kharafi Group) and producing approximately 72,000 tons/year of cardboard, Kraft linear, printing and fluting paper for the local market and for export (5%).

NPC joined the MED TEST project to identify opportunities for increasing resource efficiency through solving the existing problems, which mainly include: high water consumption, cellulosic fibre and energy losses, in compliance with law limits for the discharged effluents.

The company received MED TEST's technical assistance to design and implement an integrated management system for quality, environment and safety according to ISO 9001, ISO 14001, OSHAS 18001 standards.

### Benefits

The MED TEST project has identified annual total savings of \$US 1,731,170 in water, raw materials, fuel and electricity with an estimated investment of \$US 1,228,167. Some options have excellent return on investment and immediate payback period. The identified measures have partially been implemented by the company in 2011; the rest are scheduled for 2012.

Water costs would decrease by 52% by adopting good housekeeping measures, implementing a monitoring and control system for water consumption, installing an empty cement sacks shredder, recycling of process water, and closing compressor and refiner cooling water circuits. Recirculation of some water streams limits fibre losses and eventually increases productivity.

The upgrade of the steam distribution system would reduce thermal energy costs by more than 11%. Electricity costs will decrease by 20%, mainly by improving the power factor of the turbines.



**“MED TEST provided a good framework for the company to apply cleaner production, save resources and increase productivity while achieving compliance with the environmental legislation.”**

Eng. Ibrahim SALEH, Chairman

Environmental benefits would be reached by reducing the annual wastewater pollution loads (corresponding to 6% BOD, 2% COD and 28% TSS), through good housekeeping measures, the upgrade of the automatic dosing system for the water treatment unit, and the installation of an empty cement sacks shredder with a dust removal filter. The identified measures would reduce the investment and operational costs of the WWTP at the design stage, which has a design capacity of 20,000 m<sup>3</sup>/day.

In parallel to the identification of saving opportunities, the company has received technical assistance through MED TEST to design and establish ISO 9001, an EMS according to ISO 14001 and safety system in line with OSHAS 18001 standards, and fully integrating resource efficiency into company policy, action plans and internal procedures. This will ensure sustainability of all identified actions at company level as well as the development of new cleaner production projects. The company plans to achieve the ISO 14001 certification in 2012.

MED TEST is a UNIDO green industry initiative to promote sustainability and competitiveness in the private sector in Egypt, Morocco and Tunisia. TEST integrated approach includes tools like resource efficiency and cleaner production, environmental management system and accounting, cleaner technology transfer and CSR.

Learn more about TEST approach at [www.unido.org](http://www.unido.org)

MED TEST is sponsored by the Global Environment Facility, the Italian Government and the MedPartnership.

## Saving opportunities

| Measure  | Economic key figures |                  |            | Resource savings per year  |               |
|--|----------------------|------------------|------------|--|---------------|
|  | Savings [USD/yr]     | Investment [USD] | PBP [yr]   | Water, Chemicals   | Energy [MWh]  |
| Water conservation                                     | 183 427              | 42 833           | 0.2        | 3 057 120 m <sup>3</sup> water   |               |
| Steam system   | 705 504              | 475 000          | 0.7        | 90 288 m <sup>3</sup> water  | 41 367        |
| Preventive maintenance and good housekeeping           | 318 863              | no cost          | immediate  | 902 880 m <sup>3</sup> water<br>982 tons fibre<br>213 tons materials     |               |
| Empty Cement Sacks Shredder                            | 157 810              | 700 000          | 4.4        | 660 000 m <sup>3</sup> water<br>293 tons chemicals<br>1 100 tons product |               |
| Chemical dosing system at process water treatment unit | 13 333               | 8 334            | 0.6        | 355 tons chemicals   |               |
| Power factor of the turbines                           | 352 233              | 2 000            | < 0.1      |  | 8 453         |
| <b>TOTAL</b>   | <b>1 731 170</b>     | <b>1 228 167</b> | <b>0.7</b> |  | <b>49 820</b> |

**Water conservation:** Several identified measures have reduced the overall water consumption by 29%: installation of water meters with an effective monitoring plan; recycling of process water, and closing compressor and refiner cooling water circuits in paper making plant.

**Steam system:** The measures introduced to reduce steam consumption include: installation of a centralized tank to collect condensate from the paper machines; replacement of the existing old control valve on paper machines with a steam trap; pipes and turbines insulation; replacement of nine differential pressure control valves in paper machine by an equivalent system to recycle steam for other sections' heating; installation of steam flow meters with an effective monitoring of energy consumption. These measures would reduce energy and steam consumption by 11% and 8% respectively, as well as the hydraulic load to the WWTP.

**Preventive maintenance and good housekeeping:** Implementing regular maintenance programmes, eliminating excessive floor washing and all sources of spillage and water leakages, closing/sealing running water taps, using screens to prevent solids from entering the wastewater channels and blocking them: such options would save 10% of water

consumption, reduce fiber losses by 10%, raw and auxiliary materials by 8%, BOD by 160 tons/year and COD by 82 tons/year.

**Empty cement sacks shredder:** The installation of an empty cement sacks shredder with a dry system and an aerodynamic separator and dust removal filter will enable collection of cement dust. The latter currently causes severe problems during washing process as it turns into paste with water and rapidly solidifies, resulting in clogged pipes and productivity losses. This option will reduce water consumption by 7% and chemicals used to break the solidified cement by 293 tons/year; thus increasing site productivity. The TSS pollution load will decrease by 28% (2,524 tons/year).

**Chemical dosing system at process water treatment unit:** Replacing the manual dosing system of chemicals with an automatic one at the process water treatment unit would save 5% of chemicals used and lead to reductions in BOD by 3% (160 tons/year) and in COD by 1% (82 tons/year).

**Power factor of the turbines:** 20% reduction in electricity consumption could be achieved by increasing the load capacity of the electricity generated at the site, thus decreasing the amount of purchased electricity from the grid.



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