

ENTERPRISE BENEFITS FROM RESOURCE EFFICIENT AND CLEANER PRODUCTION

SUCCESSSES FROM KENYA

Taking care of materials, energy, water, waste and emissions makes good business sense. Resource Efficient and Cleaner Production (RECP) is the way to achieve this. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of Chandaria Industries Ltd., Haco Industries and Pwani Oil Products in Kenya.

Successes at a glance

The Kenyan enterprises covered here demonstrate that it makes good business sense to improve resource productivity and reduce pollution intensity.

RECP implementation by the paper manufacturer **Chandaria Industries Ltd.** has led to annual savings of USD 0.6336 million and has facilitated the attainment of ISO 9000:2001 certification in Quality Management Systems. In addition, the company has won several awards. The recognition gained for its RECP achievements has enabled access to a larger market share including gaining sole supplier status for a range of products to UN agencies and several multinationals.

Haco Industries produces stationery, shavers, personal care and household hygiene products. The RECP programme achieved annual savings of more than USD 548,000. RECP has also contributed to improving product quality and work safety and the closed loop effluent treatment plant will contribute to further improving the company's environmental performance.

Pwani Oil Products Limited is a manufacturer of edible oils and fats as well as laundry bar soaps. As part of its RECP programme, the company installed new technology that enabled an expansion of production capacity and an improvement in production efficiency. Annual RECP benefits include USD 623,768 in savings, which fuelled company expansion, including the creation of new jobs and new business ventures.

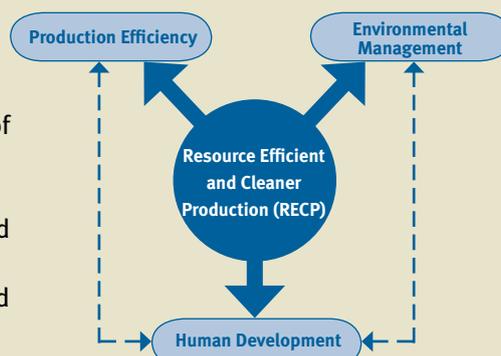
These successes were achieved with the assistance of the Kenya National Cleaner Production Centre, which is part of the global RECP Network established with support of the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP).

Resource Efficient and Cleaner Production (RECP)

RECP builds upon Cleaner Production and related practices to accelerate the application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses the three sustainability dimensions *individually and synergistically*:

- **Production Efficiency**: optimization of the productive use of natural resources (materials, energy and water);
- **Environmental management**: minimization of impacts on environment and nature through reduction of wastes and emissions; and
- **Human Development**: minimization of risks to people and communities and support for their development.



CHANDARIA INDUSTRIES LTD.

Overview

Chandaria Industries Ltd (CIL) is a leading Nairobi based paper manufacturing and conversion company located at Baba Dogo in Nairobi, Kenya. The company's core business is tissue paper manufacturing through waste paper recycling and virgin pulp blending into hygiene grades that include toilet tissues, tissue napkins, paper towels, facial tissues, and recycling of cotton fibres into absorbent cotton wool.

Benefits

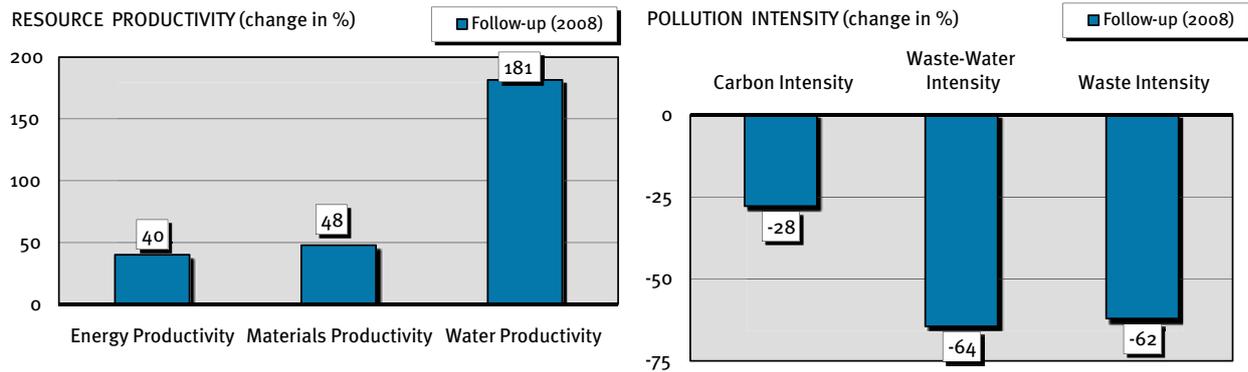
The Resource Efficient and Cleaner Production (RECP) audit started in 2005 and monitoring has been going on since then. As a tool, RECP keeps on reminding CIL that improvements meant to achieve these goals are continually enhanced. This has generally improved their operation through cost reduction, efficient resource use, improved environmental performance, and, subsequently, their contribution towards sustainable development. The company makes an annual saving of USD 0.6336 million. RECP implementation also made it easier to obtain ISO 9000:2001 certification in Quality Management Systems. In addition, CIL is a top award-winning firm gaining Cleaner Production Awards in the years 2007 to 2009 and COYA (Company of the Year Awards) in Creativity and Innovation.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	-25	Energy productivity	40
Materials use	-29	Materials productivity	48
Water use	-63	Water productivity	181
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	-24	Carbon intensity	-28
Waste-water	-63	Waste-water intensity	-64
Waste	-60	Waste intensity	-62
Production output	6		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

CIL RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases.

Areas of improvement

The factory is powered by electricity which is mainly utilized in the paper mill, conversion, and cotton milling plants. Electrical energy consumption stood at an average of 416,000 kWh/year but was reduced by 15% after RECP implementation. Thermal energy use, characterized by high consumption of furnace oil, was attributed to the running of the boiler for paper milling operations. The highest water consumption intensity is in the paper and cotton mill plants; water use has been reduced by more than 60%, equivalent to 150,000 m³ annually. Previously, all water used was discharged as effluent directly into the sewer system but there has since been a reduction of up to 150,000 m³ of wastewater annually. A reduction of biological oxygen demand (BOD) from 750 mg/l to 380 mg/l has been achieved through effluent treatment and wastewater recovery and recycling. Solid waste generated after improvements consists mainly of sludge estimated at 600 tons per year.

RECP has been, and continues to be, achieved by applying know-how from regular training, improving technologies, better process control and technology change. Comprehensive training and awareness raising sessions were conducted, which led to the formation of an in-house RECP team. Operational improvements and good-housekeeping options have been implemented at no cost. The RECP strategy includes the following measures: monitoring water consumption and wastewater generation through metering and sub-metering of all usage and discharge points; development of key performance indicators and monitoring productivity levels; improving operation of the dissolved air flotation (DAF, Krofta) system through optimization, monitoring of efficiency and establishing a preventive maintenance program to control leakages, spills and overflows.

Various „low investment cost“ options of better process control and equipment modification have been implemented including process monitoring, monitoring of first pass retention, and ash content tests from which data generated was used to control pulping time and refining loads. Further measures include installation of inclined screens to avoid overflow losses and installation of water saving devices such as borehole pump timers, effluent control pumps and level transmitters. New process chemistries involving the use of ionised polymers for improved flocculation that improved stock dewatering were introduced to improve first pass retention. This was a high investment cost option, which led to multiple benefits in terms of decreased resource use.

Energy efficiency has been achieved by implementing sub-metering of electricity at key usage points; data analysis, monitoring trends and development of key performance indicators; retiring over-sized motors, introduction of variable speed drives (VSDs), motor downsizing, introduction of inter-lock systems of pumps and agitators; steam pipe lagging and infrared heat analysis for heat losses in the boiler house. This has reduced energy use by an estimated 5,367,429 kWh per year.

As a water conservation measure, the company practices rain water harvesting and steam condensate recovery. To reduce effluent, wastewater is treated through the DAF system and clarified water is recycled for reuse in production dilutions and improved shop floor cleaning. Best practices in waste management include waste segregation at source, quantification of generation levels, recycling of sludge for production of egg trays. Furthermore, Green Procurement and 3R (reduce, reuse and recycle) approaches were promoted and applied.



Before: Housekeeping lapse- poor storage of equipment



After: Housekeeping benefits- secured and well organized storage area

TABLE 2: OPTIONS IMPLEMENTED

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost-saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
Option 1: Energy Management <ul style="list-style-type: none"> • Sub metering of electricity at key usage points. • Retiring over-sized motors, introduction of VSDs. • Introduction of inter-lock systems of pumps and agitators. • Data analysis, trend forecasts and development of key performance indicators. • Boiler efficiency monitoring and infrared heat analysis. 	USD 4,802	KES 19,240,000 (USD 0.26 million)	Reduction in energy use: 5,367,429 kWh	Reduction in air emissions: 1,456 t CO ₂ -eq.
Option 2: Water Management <ul style="list-style-type: none"> • Metering and sub metering of all points of water use/discharge and use of performance indicators. • Preventive routine maintenance of machinery and fixing of all leakages. • Recycling of clarified water. • Reduced washing cycles of waste paper due to the procurement of high quality waste paper. • Use of poly-electrolytes for wastewater treatment. • Reuse of clean water in paper washing processes. 		KES 1,598,400 (USD 0.0216 million)	Reductions in water use 150,000 m ³	Reductions in waste water: 150,000 m ³ Reduced pollution load to sewer: BOD from 750mg/l to 380mg/l
Option 3: Material Management <ul style="list-style-type: none"> • Process monitoring, first pass retention and ash content. tests. • Data used to control pulping time and refining loads. • Introduction of new process chemistries; ionised polymers for improved flocculation that improved stock dewatering and hence improved first pass retention. • Installation of inclined screens to avoid overflow losses. • Procurement of high quality waste paper resulting in reduced washing cycles. 		KES 6048000 (USD 0.352 million)	Reductions in materials use: 3,200 tons Better quality raw material	Reductions in waste generation: 900 tons Reduced sludge disposal material
Total of ALL implemented Options (1)		KES 46,886,400 (USD 0.6336 million)		

1 Note that the total of ALL options can be greater than the some of the key options detailed in the table 2.

Approach taken

CIL commenced the programme, which is still on-going, in 2005. This success story presents audit and monitoring results up to 2008. RECP was implemented following the initiation of the Cleaner Enterprise Programme undertaken by Kenya National Cleaner Production Centre and the company has proceeded to play a leading role by assisting other companies such as Madhu Paper (K) and Kenya Paper Mills to embrace RECP and related Best Practices. RECP has been achieved by applying know-how, improving technology and by changing attitudes through regular audits, training and awareness raising activities for capacity building. The company began by implementing 'no and low cost investment options' such as sub-metering of electricity and water consumption, process monitoring, preventive maintenance program, wastewater treatment and recycling. CIL has so far achieved great economic benefits from cost-cutting measures, in addition to ensuring compliance with the national legislative framework governing environmental management. Through their experience they have learned that top management commitment is critical to the successful implementation of RECP. Another important insight was that since RECP is a continual process, the savings gained from the implemented 'no cost options' can be ploughed back as investment for 'low and high hanging fruits' i.e. savings can be utilized to implement options requiring investments.

„As a company, we have realised that adoption of (RE)CP provided us with interesting and challenging opportunities to rethink and improve on our operations for better resource use, improved market competitiveness through cost reduction, improved environmental performance and sustainable growth.“

Mr. Linus Muchenya, EHS Manager

Business case

CIL has gained recognition and thus, access to a larger market share as a result of the successful implementation of RECP. The company has acquired sole supplier status of an array of hygiene tissue products to the UN agencies as well as several multinationals doing business in the country. The company has also realized that CP certification, as proof of environmental best practices and eco-friendly products, has increasingly become a requirement by a range of clientele/customers who promote the ideals of sustainable consumption and production.

HACO INDUSTRIES

Overview

HACO Industries is one of the leading companies in the East African/ COMESA region, dealing in stationery products, shavers, personal care and household hygiene products. They are manufacturers and distributor partners of TIGA brand, PLI Alberto-Culver USA, E.T. Browne Co. USA, Société BIC France and Jeyes UK. The company was established in 1974 and has a market coverage of East and Central Africa and has 540 employees.

Benefits

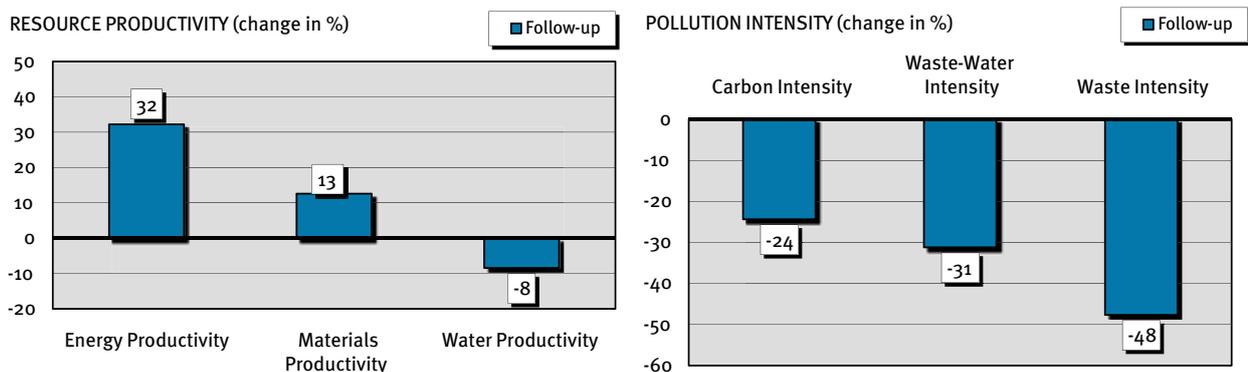
Cleaner production in this company started in 2005. In its Resource Efficient and Cleaner Production (RECP) programme, the company specifically focused on water, material and energy efficiency and in some production processes, as well as wastewater reduction. In regard to energy efficiency, the company focused on zoning of the respective user section consumption trends: (i) Bic factory (ii) Cosmetics Factory (iii) Head office. The entire RECP programme achieved annual savings of more than USD 548,000.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	-11	Energy productivity	32
Materials use	5	Materials productivity	13
Water use	29	Water productivity	-8
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	-11	Carbon intensity	-24
Waste-water	-19	Waste-water intensity	-31
Waste	-38	Waste intensity	-48
Production output	18		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

HACO RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases.

Areas of improvement

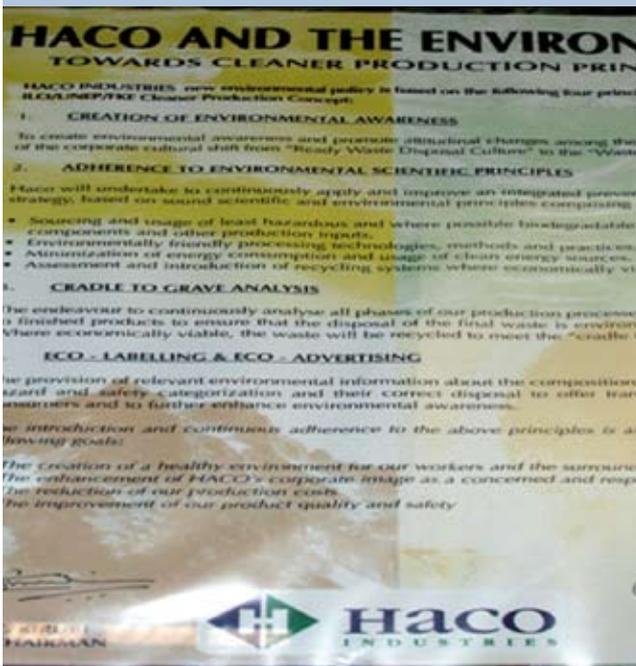
As part of HACO Environmental Policy, the company has adhered to the Resource Efficiency Cleaner Production (RECP) concept, i.e. creating more products while using fewer resources and creating less waste and pollution. The concept is geared towards sustainable economic development.

The following critical aspects have been considered to achieve (RECP), among others:

- A reduction in the material intensity of the products manufactured
- A reduction in the energy consumption
- Improved recyclability
- Use of renewal resources where available
- Greater durability of products

TABLE 2: OPTIONS IMPLEMENTED

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
<ul style="list-style-type: none"> • Installation of internal meters to monitor the consumption trends of respective user zones. • Sensitization of staff by affixing 'switch off the lights' stickers. • Continuous energy savings improvements by replacing the fluorescent light tubing from 12 mm to 8 mm. • Heat loss measurement using Infra red sensors and subsequent insulation of all heaters. • Energy conservation proactive approaches e.g. switching off machines not in use. • Implementation of Kaizen continuous improvement principles such as Single Minute exchange of die which focuses on reducing the change over times (faster start ups). Autonomous maintenance where the machine is regularly monitored to eliminate breakdowns. • Use of natural light (transparent sheeting). • High energy user - electrically heated hot room converted to use steam. • Use of wind driven cyclones instead of electric fans. 		547,727.39	Reductions in energy use by 286,847 kWh.	Reductions in carbon dioxide emissions.
<ul style="list-style-type: none"> • Switch from running water hose vessels cleaning to cycle batch cleaning where they meter the amount of water into the vessel, clean, discharge the water and rinse with metered water quantity hence less water is used with better results. • Installation of water consumption meters in four major water consumption points (Cosmetics, Ace dilution, Caustic unit and the Reverse Osmosis unit). • Switching from running water hose cleaning to fixed quantity cleaning using a mop and a bucket. • Adoption of a shut down procedure where all tank outlets (except the fire tank) are closed at the end of the shift. 		532.89 including: <ul style="list-style-type: none"> • Reduction in the cost of water. • Reduction in the cost of electrical energy used to pump water. • Reduction in the cost of water treatment. • Reduction in the cost of labour to discharge the waste water. 		Reductions in waste water generation.
<ul style="list-style-type: none"> • Reusing treated waste water from the plant. • Timing the processes by measuring water feeding. 				



HACO industries declaration to cleaner production



Closed loop Effluent treatment plant at the factory

Approach taken

HACO industries is a signatory to the UNEP declaration on cleaner production and the company supports the ten principles of the United Nations Global compact in respect to the environment. By continual implementation of Cleaner Production concepts, the company experienced growth in manufacturing and reduced environmental burdens by considering the use of least hazardous (safe) materials. HACO industries have installed a state-of-the-art effluent treatment plant that has greatly improved water treatment and recycling. Recently, the company entered into partnership with TIGA Brand of South Africa to diversify its products .

„With the continual implementation of (RECP), we are confident that HACO Industries through its strong value base and strategic foresight will continue to prosper as new markets evolve and mature“.

Mr. Earnest Ndwiga (Head of Quality Assurance)

Business case

HACO Market Coverage includes Kenya, Uganda, Tanzania, Ethiopia, Rwanda, Burundi, Djibouti, and Eritrea with a population in excess of 180 million people. To meet the demands of clients, the company expanded its production capacity as well as entered into partnership with TIGA Brand of South Africa. Due to the RECP programme, the company has significantly excelled in product quality, occupational health and safety and general environmental performance.

PWANI OIL PRODUCTS

Overview

Pwani Oil Products Limited (POP) is a leading manufacturer of edible oils and fats as well as laundry bar soaps in Kenya. Since starting its operations in 1985, it has steadily expanded its capacity and improved its manufacturing technology to become an efficient and competitive company. It exports products to East and Central Africa, positioning the company strongly in the region.

Benefits

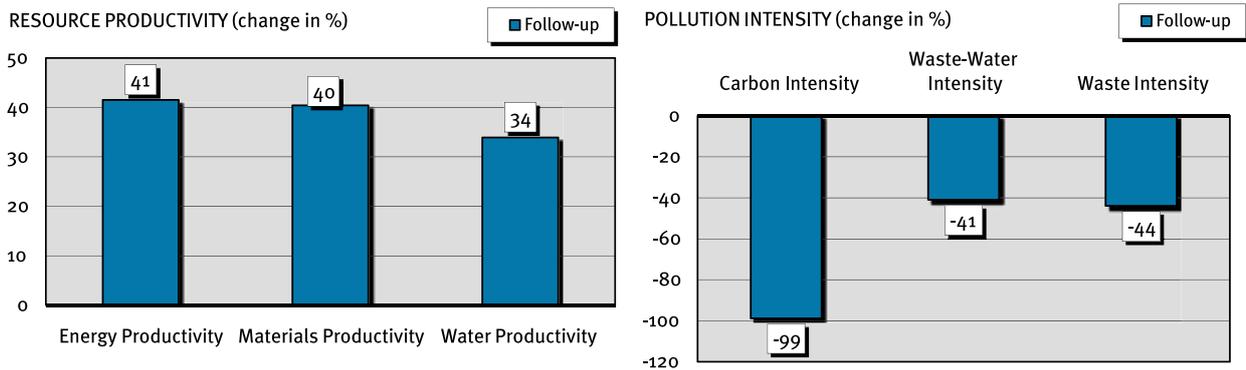
After an initial (Resource Efficient) and Cleaner Production (RECP) audit carried out by KNCPC in 2001 (Nyakang'o and Khisa, 2001), the company implemented some of the options generated during the audit and as a result commissioned a new refinery plant to replace the old inefficient refinery as part of its technology change. POP further installed additional storage tanks thus expanding production capacity from 150 to 300 tons/day of refined oil in order to meet the rising demand of its products as well as to maximize production efficiency. POP has invested in capacity building and has recently recruited highly qualified staff to meet the rising demand of quality products without compromising environmental protection. Those recruited include Chief Operations Manager, Quality Assurance Manager and Environmental Safety Officer. Annual RECP benefits include USD 623,768 saved through energy, water and material efficiency. Energy efficiency improvements amount to USD 422,372/yr, material use efficiency contributes USD 20,347/yr, water use efficiency saves USD 653/yr while gaseous emission reduction saves USD 180,396 /yr.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	-5	Energy productivity	41
Materials use	-5	Materials productivity	40
Water use	0	Water productivity	34
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	-98	Carbon intensity	-99
Waste-water	-21	Waste-water intensity	-41
Waste	-25	Waste intensity	-44
Production output	34		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

PWANI OIL RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases.

Areas of improvement

The RECP programme was based on an integrated approach including energy efficiency improvements and improved material and water use, as well as measures aimed at decreasing GHG emissions and reducing the generation of waste water and waste.

Approach taken

Cleaner Production was started in Pwani Oil Products (POP) in 2001 after the company was almost closed down by the Environment Regulator due to heavy pollution. The initial orientation was to design a state-of-the-art effluent treatment plant. After contacting the Kenya National Cleaner Production Centre, this problem was converted to a business opportunity by embracing Cleaner Production. The company has been a regular participant of the National Annual Cleaner Production Award that is organised by the Kenya National Cleaner Production Centre (KNPCPC). It was among the sponsors of this award in 2006 when the scheme was started. In 2009, they were the overall winners of the award.

“CP is a money saving tool. Its effect has been profound. Now we want to venture into CDM activities.”

Mr. Cyrus Kinyanjui, EHS Manager

Business case

Productivity improvement has led to further expansion of the current production capacity from 300 to 500 tons/day at the refinery plant. The expansion programme will include a new, state of the art toilet soap plant. This will generate additional employment of 150 staff members to add to the current 300. A new fleet of six diesel-driven transportation trucks will be purchased to alleviate the problems encountered through the current hiring of trucks from external sources. Each truck will have a capacity of 30 tons. Other changes envisaged by the company in the short and long term include the decommissioning of the old refinery.

POP has diversified its market niche to cover East and Central Africa. The company has also expanded its product range to offer more competitive and quality goods which match the ever changing market tastes and preferences. Two years ago Pwani Oil entered a strong expansion phase fuelled by savings from production efficiency. This growth phase included the acquisition of new business holdings in Foods and beverages sector including TruFoods Ltd in Nairobi and Kabazi Cannery in Nakuru. The growth also included the construction and launch of a hygiene soap processing plant in Kikambala, Mombasa. With a capacity of 400 tons per day, Jomvu factory is one of the big edible oil processing plants in Kenya.

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
1. Energy Use <ul style="list-style-type: none"> • Installation of energy saving lamps. • Installation of timers to control security lighting. (20 security lamps each of 0.4 kWh). • Replacement of old air compressors with efficient ones whose motors are fitted with variable speed drives. The average consumption dropped from 146.25 kWh/hr to 110 kWh/hr. • Replaced one sleeving machine which was using electric heaters with a steam sleeving machine (initial machine was using two heaters of 7.5kWh each and running the machine for 24hrs). • Invested in capacitor banks for quality and maintained power supply (power factor of 0.96 compared to previous 0.93). The cable and transformer losses have been reduced from 2.82% to 1.6%. • Servicing of steam traps. • Fixing steam leaks. • Correction of bypasses. 		422,372	5% reduction in energy use (reduced by more than 2,774,400 kWh).	
2. Material Use <ul style="list-style-type: none"> • Installation of a more efficient refinery of capacity 350-400 tons/day. • Process unit synchronization to avoid material overflows. • Reduction of reworks of non-conforming soap. • Reduced spillages and leakages through repairs of pumps. 		20,347	5% reduction of material use (reduced by more than 5,500 tons)	25% reduction in waste (reduced by 240 tons)
3. Water Use <ul style="list-style-type: none"> • Leakages sealing/fixing. • Onsite treatment and reuse of waste water. • Reuse of reject water from RO plant to flush toilets & general cleaning. • Condensate trapping for boiler feed water (an average of 15,000L/day of condensate recovered). • Metering all major water consuming units. 		653		Waste water was reduced by 21% (almost 3,070 m ³)
4. Gaseous Emission Reduction <ul style="list-style-type: none"> • Use of biofuel pitch to run boilers (plant to refine all by products into distilled fatty acids – DFA for quality soaps). • Installation of an extra deodorizer column. • Switch from furnace oil to biomass (4 biomass boilers to replace furnace oil use). • Installation of feed water pre-heater for boiler flue gases. 		180,396		98% reduction in carbon dioxide emissions (reduced by almost 22,550 tons)
Total of ALL implemented Options		623,768		



Spillages witnessed before CP

ABOUT THESE SUCCESS STORIES

The United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate in their joint Resource Efficient and Cleaner Production (RECP) Programme. The RECP Programme aims at improving the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with a network of National Cleaner Production Centres (NCPCs) that have currently been established in some 50 countries. This series of enterprise success stories documents the resource productivity, environment and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity. A Primer for Small and Medium Sized Enterprises*, published by UNIDO and UNEP in 2010. The primer with accompanying calculator tool and further case studies are available at www.unido.org/cp and www.unep.fr/scp/cp.

Kenya National Cleaner Production Centre

The Kenya National Cleaner Production Centre was established in 2000 and has since been registered as a national trust governed by an Advisory Committee. The main activities are training, awareness raising, in-plant cleaner production (CP) assessments, environmental audits, environmental impact assessments and policy advice. By mid 2010, the centre had conducted more than 450 training and awareness raising events, almost 200 Cleaner Production assessments and environmental audits had been carried out and the centre had also participated in the development of 5 policy documents. The centre was cooperating with China, India, Mexico, Brazil, and South Africa to implement an international eco-labeling project (www.cpkkenya.org).

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