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RECP Experiences at Tivoli Hotel

The efficient and environmentally sound use of materials, energy and water - coupled with the minimization of waste and emissions - makes good business sense. Resource Efficient and Cleaner Production (RECP) is a way to achieve this in a holistic and systematic manner. 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 Tivoli Hotel Maputo in Mozambique.

Achievements at Tivoli Hotel

The implementation of Resources Efficiency and Cleaner Production (RECP) will contribute to continuous improvement of Tivoli Hotel performance indicators, where was expected reduction in the overall power consumption of approximately 33% because of the on-going energy conservation measures at the hotel, covering replacement of high energy consumption bulbs, by energy savings ones and LED lights technology, installation of presence and movement sensor detectors in the corridors, and public bathrooms, including workers' awareness raising and training program, on conservation and efficient resources use, in term of monetary savings on electricity bill achieved by the hotel is equivalent to USD 19,782/year.

Tivoli Hotel has demonstrated that taking care of the environmental impact of its Hotel activities, make it more competitive, ensuring that guests can spend more their time at Tivoli Hotel complex, in proper hygienic conditions, and showing alternatives to the hotel management that highlights options, to minimize the environmental impact that might arise from the effluents generated in the hotel area.

Overview

Tivoli Maputo Hotel, located in the downtown area of Maputo City, at the corner of Avenues, 25 de Setembro and Vladimir Lenine, which is one of the prime shopping area and businesses center of Maputo.

Its main targeted costumers are nationals and foreigners markets who seek comfort and quality of services. It has been recently refurbished in 2012, by TD group that is one of the best international contractor for civil works based in Portugal and this Hotel is a part of it the, it has a rating of 3 stars hotels classification with 88 rooms: being 51 standards rooms, 17 single rooms, 16 junior suites, 4 suites, bar, restaurant and five conference rooms up to 90 participants.

It was defined as priority and concerns of the company as follows: reduce water consumption, reduce energy consumption and reduce solid waste management generation by looking for

measures to exploit the waste recovering and recycling initiatives, including training and workers awareness raising on resources conservation needs.

Benefits

The RECP programme was mainly focused on reduce water consumption, energy consumption and for waste management reduce its generation looking for measures to exploit the waste recovering and recycling initiatives, including training and workers awareness raising on resources conservation needs.

The benefit gained by replacement of 123 incandescent bulbs of 60 W by energy saving bulbs of 11 W to reduce the energy consumption consisted in improvement of energy efficiency and reduction of hotel's electricity bill.

A number of energy saving bulbs are in place in the hotel and still existing in the hotel around 8% of conventional bulbs but when fused are replaced by energy saving bulbs.



Figure 1: Energy saving bulbs

The benefit gained by replacement of 113 halogen spots of 50 W, by Led lights of 3 W to reduce the energy consumption were improvement of energy efficiency and substantial reduction on energy bill.

The LED lights technology are the best solution to reduce the electricity bill particular in the accommodation sector, as they use a lot of halogen spots for lighting and decoration but the halogen spots consumes a lot of energy and create heat causing AC demand that its also create additional electricity consumption.

LED lights are still expensive in Mozambique and also there are very few suppliers of good quality products due this reasons the hotel is doing the replacement gradually and importing the bulbs from Lisbon.

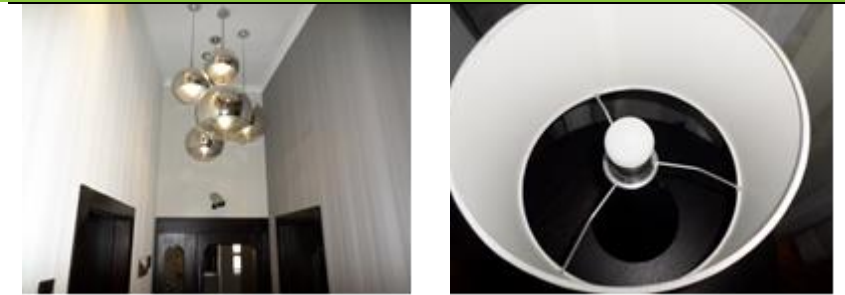


Figure 2: Led lights in place

Were introduced 3 waste containers: Organic waste, glass bottle and Pet to cover the hotel waste streams: paper, cardboard paper, aluminum cans and plastic. Environmental benefits recovering for recycling of 72% of recyclable materials taken to the landfill site equivalent to 4 tons of solid waste equivalent to USD 777.34/year of financial savings from sale of recyclable materials.



Figure 3: Waste containers with waste segregated labelling of containers to be improved

The benefit gained by staff training and awareness raising on resource conservation was their substantial improvement in good housekeeping practices, waste management in also added value to the internal Hotel employees training done once per year by international Consultant from TD group HQ in Portugal the training is covering other hospitality management issues, the workers have been trained to switch off the AC and Lights in vacant rooms, close the taps and shower unnecessarily open and other several good housekeeping and operational issues.



Figure 4: Use of natural lights use in the Figure 5: Staff training and

restaurant

awareness raising meeting

The benefit gained to installation of water-saving devices in the appropriate places (e.g. water flow sensors, self-closing taps, *etc.*) consist to reduce water consumption in bathrooms.



Figure 6: Dual flush tanks and water flow regulators in taps and shower caps

Table 1: Results at Tivoli Hotel

Indicator	Unit	Year 2013) Baseline (B (Before RECP intervention)	Year 2014 A (After RECP implementation)	Change (C) C=100*(A-B)/B [%]
Resource use				
Energy Use	[MJ/yr]	32.772.256,67	48.453.098,50	47,85
Materials Use	[ton/yr]	0,00	0,00	0,00
Water Use	[m3/yr]	5.477,30	5.575,58	1,79
Pollution				
Carbon dioxide	[ton CO2-eq/yr]	1.925,76	3.057,31	58,76
Waste-Water	[m3/yr]	0,00	0,00	0,00
Waste	[ton/yr]	4,32	3,60	-16,67
Product Output				
Product Output: Guest	[Number of guests /yr]	18.584,00	16.993,00	-8,56

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.

RECP Profile

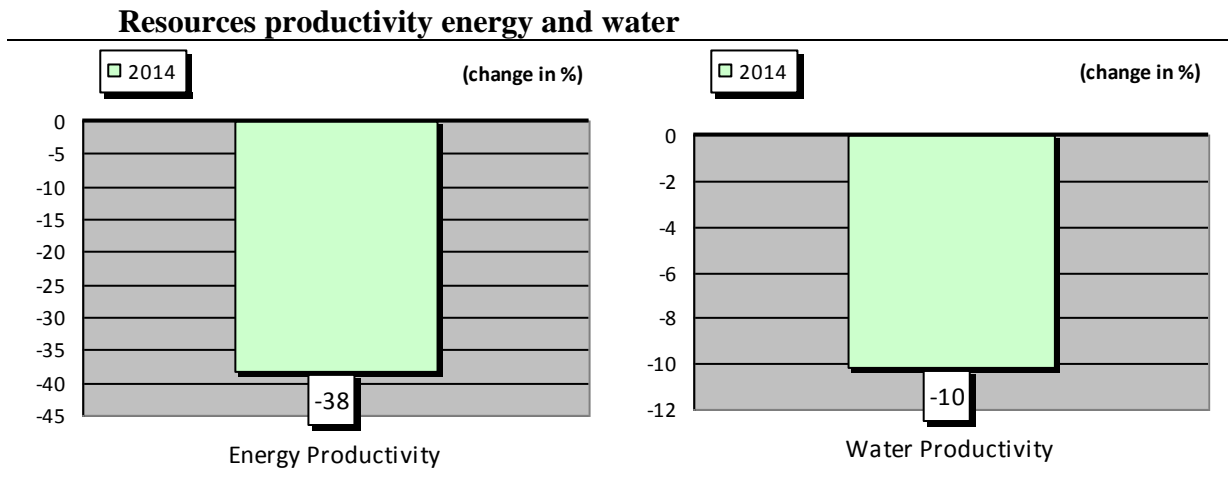


Figure 7: Resources productivity energy and water

Because of different energy saving devices implemented in the hotel, under the RECP recommendations in specifically, the energy-saving bulbs, LED lamps, presence and movement sensors detectors, the Tivoli Hotel Maputo had reduction on electricity consumption of 33.8%, but because of gas and diesel consumption increase the energy resources productivity decreased to around 38%, and the water productivity was also decreased by 10% as shown in the chart above.

The reason for increase in gas diesel and water consumptions, is associated with hosting of several conferences and workshops, where the participants were not accounted in the hotel occupancy rate.

In future years it's expected that the water productivity will also increase once the Tivoli Hotel Maputo has already installed the water saving devices (namely: water flow rate regulators in the tapes and showers caps, including dual flush cisterns in bathrooms) to minimize the water consumption.

The employees have been also already trained and raised their awareness on water and energy resources conservation so this will also contribute to the Hotel continuously improvement

meeting good performance on efficient resources utilization in mid and long term and gets very good financial savings.

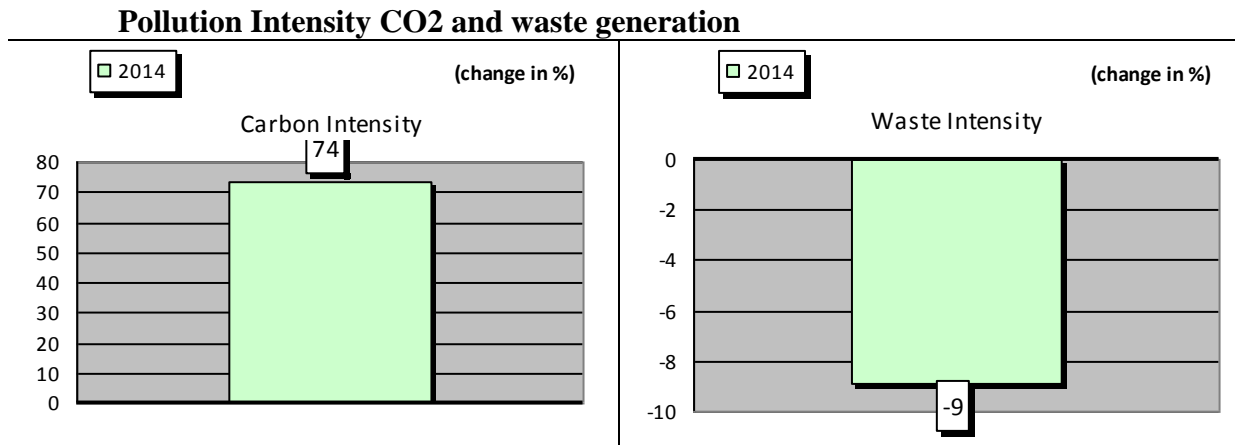


Figure 8: Pollution Intensity CO2 and waste generation

The CO2 emissions intensity from energy consumption increased by 74% because of the increased gas and diesel consumptions, associated with conferences and workshops and with all energy conservation measures in place at Tivoli hotel Maputo we believe that it will decrease in the coming years.


Regarding the pollution intensity from solid waste generation decreases by 9% and is related to decrease in the number of guests in 2014.

Resource Efficient and Cleaner Production (RECP)

Resource Efficient and Cleaner Production (RECP) entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses three sustainability dimensions individually and synergistically:

- *Production efficiency*
 - > Through improved productive use of natural resources by enterprises
- *Environmental management*
 - > Through minimization of the impact on nature by enterprises
- *Human development*
 - > Through reduction of risks to people and communities from enterprises and supporting their development



Success Areas

- Replaced 123 conventional incandescent bulbs of 60W by energy saving bulbs of 11 W to reduce the energy consumption;
- Replaced 113 halogen spots of 50W, by Led lights of 3W to reduce the energy consumption;
- Introduced waste segregation system to recovered 72% of recyclable materials;
- Hotel Staff were trained on awareness raising on resource conservation;
- Distributed brochures and flyers, or post stickers and posters, inviting guests to save water;
- Installed water-saving devices in the appropriate places (e.g water flow sensors, self-closing taps, etc.).

Table 2: Option 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)
Replaced 123 incandescent bulbs of 60 W by energy saving bulbs of 11 W to reduce the energy consumption	351,78	2.543,03	Environmental benefits reduction in hotel's energy consumption of 26.398,26 kwh/year	Reduction of 14% of CO2 emission
Replaced 113 halogen spots of 50 W, by Led lights of 3 W to reduce the energy consumption	2,260.00	2,240.92	Environmental Benefits reduction in hotel's electricity consumption of 23,262.18 kwh/year	Reduction of CO ₂ emission and reduce costs of electricity bills

Approach taken

The Tivoli Hotel Maputo management as concerned on resource efficiency and environment conservation issues, in their complex. For this purpose the Mozambique National Cleaner Production Center (MNCPC), offered assistance and conducted RECP in plant assessment through the MNCPC team of national experts together with hotel CP team and several no and low cost measures, were recommended and successfully implemented, the high cost investment

were related to the installation of solar thermal water heating system in the guest rooms, and Installation of 88 master switch key cards, to control the electricity for lighting and AC in the guest rooms not implemented yet.

So that the Solar thermal water heating system could reduce electricity consumption for water heating, with consequent reduction of the Environmental impact.

Master switch cards could also control electricity consumption when the guest leaves their room and this avoid to have the AC and lights on in the guest vacant rooms.

The financial savings expected from implementation of the master switch key cards is around USD 13,875.84/year. With estimated investment of USD 2, 240.92.

The economic benefit expected from implementation solar thermal water heating system is equivalent to financial savings of USD 4,944.00/year and with estimated investment of around 13,033.00 USD.

Business case

The RECP not only allows companies to achieve savings from decreased resource use, but also decreases pollution to the environment, which benefits the surrounding community.

Testimony Box

National Cleaner Production Centre (NCPC)

The Mozambique National Cleaner Production Centre (MNCPC) was officially established in 2001, and operates as the executive arm of FEMA - Business Forum for the Environment, under the policy advice component is the focal point of Ministry of Land, Environment and Rural Development (MITADER) and with the support and expertise from UNIDO and UNEP's RECP net.

The Centre offers service in the areas of Resource Efficiency and Cleaner Production, Waste Management, Energy Efficiency and Renewable Energy, and Sustainable Management.

Summary of MNCPC achievements 2010-2014

- **18** Awareness Raising Seminars and Training were carried out for the national experts, managers and company technicians, public officials and the municipalities of Maputo and Matola representatives.
- **33** National experts trained on UNIDO methodology RECP toolkit;
- **65** Hotel Managers, companies technicians, government officials and Municipalities of Maputo and Matola representatives have attended the Awareness Raising Workshops on Resources Efficiency Use and Cleaner Production and **146** Hotel and company technicians

<p>trained on RECP;</p> <ul style="list-style-type: none"> • Wide Seminars for dissemination of RECP concepts delivered for 165 students and teachers of Instituto Industrial de Maputo (IIM) and Escola Superior de Hotelaria e Turismo de Inhambane (ESHTI) that is Eduardo Mondlane University Branch; • Awarding Ceremony Workshop and Presentation of Results of the First Round of RECP assessments conducted and Awards of 7 hotels by good performance and commitment on environmental conservation and resource efficiency use in 3 of November 11 at VIP hotel Maputo jointly organized by UNIDO, MICOA, MITUR and MNCPC. <p>Total of 21 companies being (16 hotels and 5 supply chain industries of food products to the tourism sector) were subjected to the RECP assessments and their respective RECP reports document the results have been delivered with financial savings options, including investments, environmental and technical benefits.</p>
<p>Contact Details</p> <p>Centro Nacional de Produção Mais limpa (CNPML) Address: Road Kibiriti Diwane (Ex. Francisco Barreto), 322 Maputo Mozambique Phone Number: +258 2148 5768. PO.Box 4595 Email: mncpc@tvcabo.co.mz</p>
<p>English Abstract (where applicable)</p>
<p>N/A</p>

ABOUT RECP EXPERIENCES

Through the joint Resource Efficient and Cleaner Production (RECP) Programme, the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate to improve the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with the Global Network for Resource Efficient and Cleaner Production (RECPnet). This series of enterprise success stories documents the resource productivity, environmental and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

These successes were achieved with the assistance of the National Cleaner Production Centres, which are part of RECPnet established with support of the UNIDO and UNEP. The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity*, UNIDO/UNEP, 2010. The primer with accompanying calculator tool and further case studies are available at www.recpnet.org, as well as on www.unido.org/cp and www.unep.fr/scp/cp.