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RECP Experiences at KNJAZ MILOS Arandjelovac

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 Knjaz Milos, Arandjelovac, Serbia

Achievements at a Glance

Cleaner production activities are aimed at energy saving and waste water return to the treatment facility and its repeated use in the process, as well as better water utilization. The majority of the solutions proposed refer to the technological modification and good housekeeping measures. Some of the proposed improvements have been implemented during the project realization. Implementation of the said measures provided CO_2 emission reduction of 436 t/y and water consumption saving of 90,000 m^3/a.

Overview

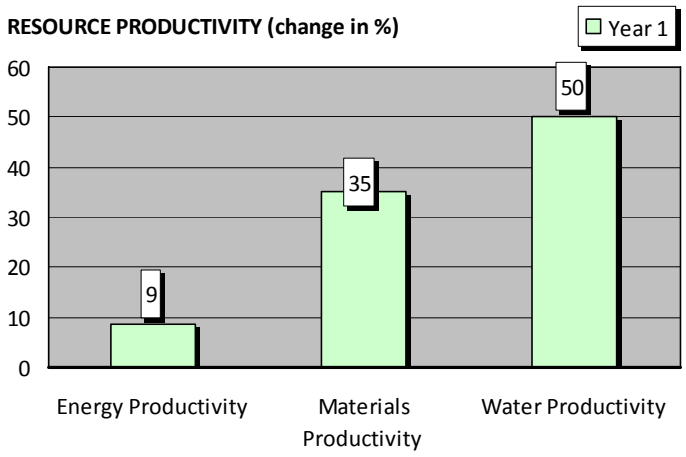
The company Knjaz Milos has already existed for 200 years, with a vision of becoming a regional leader in the production of mineral water. The mission of the company is developing, producing and placing its goods onto the market of natural, healthy water and beverages offering consumers the vitality throughout the day.
With about 900 employees of which 230 are in production process at ten production lines, two syrup plants and two water treatment units including auxiliary services for electric machine maintenance, energy and preparation of water and juice, Knjaz Milos makes more branded products (carbonated mineral water Knjaz Milos, 65%, non-carbonated mineral water Aqua Viva – 20%,Energy beverages, fruit juices and other drinks represent 15% of the total production volume.

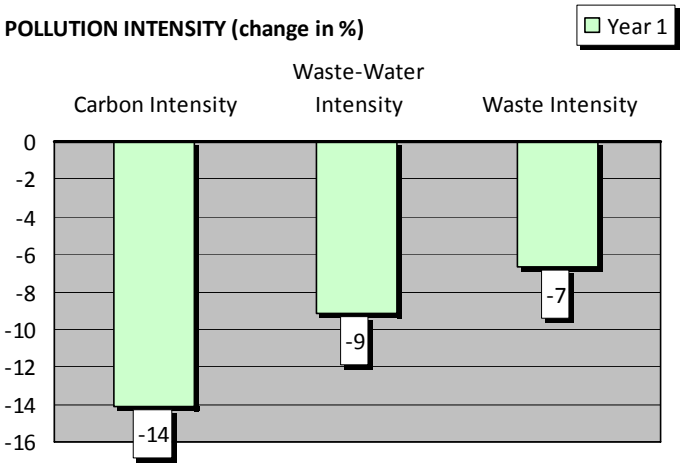
Benefits

Due to the complexity of production, it was decided to implement cleaner production project as a pilot project for line for the production of carbonated mineral water Knjaz Miloš. Given the comprehensiveness of company energy supply, it was decided to visit all the energy systems and to do the energy analysis at the level of the whole company. The company allocates substantial funds for water and energy (electricity and natural gas).
The total investment for all proposed options will be around 700,000 EUR and evaluated savings 260,000 EUR/a, which means that payback period is 3 years.

Absolute Indicator	Change (%) Year 1	Relative Indicator	Change (%) Year 1
Resource Use		**Resource Productivity**	
Energy Use	-1	Energy Productivity	9
Materials Use	-21	Materials Productivity	35
Water Use	-29	Water Productivity	50
Pollution Generated		**Pollution Intensity**	
Air emissions (global warming, CO_2 equivalent)	-8	Carbon Intensity	-14
Waste-water	-3	Waste-water Intensity	-9
Waste	-0	Waste Intensity	-7
Production Output	0		

RECP Profile





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

The results were achieved through the implementation of the following measures:

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)
Collecting of rinsing water from one of the lines for washing new bottles and its further use as make up water for steam boilers and supply for cooling towers for compressor	14,000	25,000	Reduction of city water consumption by 17,000 m3/year.	
Pre-heating boiler feed water by using solar energy	10,000	9,000	Raising the inlet temperature of boiler feed water reduces the required amount of natural gas, as a non-renewable natural resource for heating, evaporation and overheating of boiler water or steam;	Reduction of natural gas consumption by 30,000 m3/year and reduction of CO2 emissions by 64 t / yr.
Collecting water in the exhaust lines 1,2,3 PET and cans and further use for cooling sugar syrup and partial supply of cooling towers of high pressure compressors	35,000	68,000	Reducing consumption of city water for cooling sugar syrup in PET's syrup plant,; - water saving by 39,000 m3/year.	
Exhaust cooling water collecting after cooling of the PET's pasteurizer 2 and the use as a power option of the "Berkefeld" system	20,000	53,000	By reusing water on the Berkefeld system, consumption of city water is reduced by 34,150 m3/year.	
Installation of system for heating of sanitary water by recuperation of waste heat of flue gases from steam boilers	50,000	9,000		- Reducing consumption of natural gas by 30,000 m3/year Reducing CO2 emissions by 64 tons / year. - Reduced emissions of waste heat.
Installation of system for heating of sanitary water by recuperation of waste heat from production lines PET 1, 2, 3, 4 and Cans	49,000	7,000	- Reducing electricity consumption by 140 MWh / year;	Reduced CO2 emissions by 135 t / yr.
Chemical leasing for dry lubrication of conveyor belts	12,000	6,000	- Reduced consumption of chemicals for lubrication of belts by 70% by changing to the system DRYEXX; - eliminated consumption of water for lubricating conveyor belts (savings 1,500 m3/year).	
Chemical leasing for CIP - "Advantis"	9,000	4,250	- Reduced consumption of chemicals for CIP compared to	Reduced CO_2 emission by 230 t

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)
			the previous MIP funds VL by 40%; - Reduced energy consumption for heating of CIP; - less time preparing agents for CIP.	

Approach taken

RECP is a great cost-saving tool that has enabled the company to reduce CO_2 emission and savings in investments in waste treatment and savings in utility raw materials/chemicals. The implemented measures lead to decrease of energy consumption by 1% , raw material (mineral water) use for 21 % and decrease of greenhouse gas emissions by 436 t CO_2e. Also, Company improves product quality and recover a part of materials that were wasted. Special attention is paid to good housekeeping measures such as insulation of pipelines, valves and flanges, replacement of malfunctioning condensate separators, condensate return, or repairs of water steam leakage, which is one of the results of this RECP project. Chemical Leasing business model application reduced usage of chemicals by 40 %.

Business case

In the case of Knjaz Milos resource efficient and cleaner production methodology was used, but adopted to the conditions and needs of the plant. The company continues to work on RECP activities, especially related to usage of chemicals, where Chemical Leasing business model principles have been introduced in company procurement procedures.

Testimony Box
National Cleaner Production Centre (NCPC)
Cleaner Production Centre of Serbia (CPCS) started to work on September 1, 2007 and it is located on the Faculty of Technology and Metallurgy, University of Belgrade as its host-institution. CPCS represents a Faculty department with an Advisory Board, composed of representatives of all stakeholders (government, academia, industry, consulting companies). The Centre, with specialization in resource efficiency, works with number of educated and highly specialized national and international experts on different projects in Serbia and in the Region. The CPCS offers a broad service portfolio, including, amongst others RECP trainings, plant assessments and audit services for companies, water and energy efficiency audits, Ecoprofit projects for municipalities using the RECP methodology, IPPC consulting servicies etc. The Serbian Cleaner Production Center has worked for over 70 companies (large enterprises and SMEs) from a variety of industrial sectors, has trained more than 60 consultants on RECP methodology and has conducted Ecoprofit Projects with two Municipalities. Furthermore, since 2010, the Centre's representatives have also been working as experts in resource efficiency and cleaner production of the International Finance Corporation (IFC) on projects in Serbia, Russia, Croatia, Bosnia and Herzegovina, Ukraine and Kazakhstan. The CPCS works with the support of the Ministry of Environment and Serbian Chamber of Commerce and has good cooperation with different organisations, academia, consulting companies etc.
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English Abstract (where applicable)

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 (RECP*net*). 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 RECP*net* 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.