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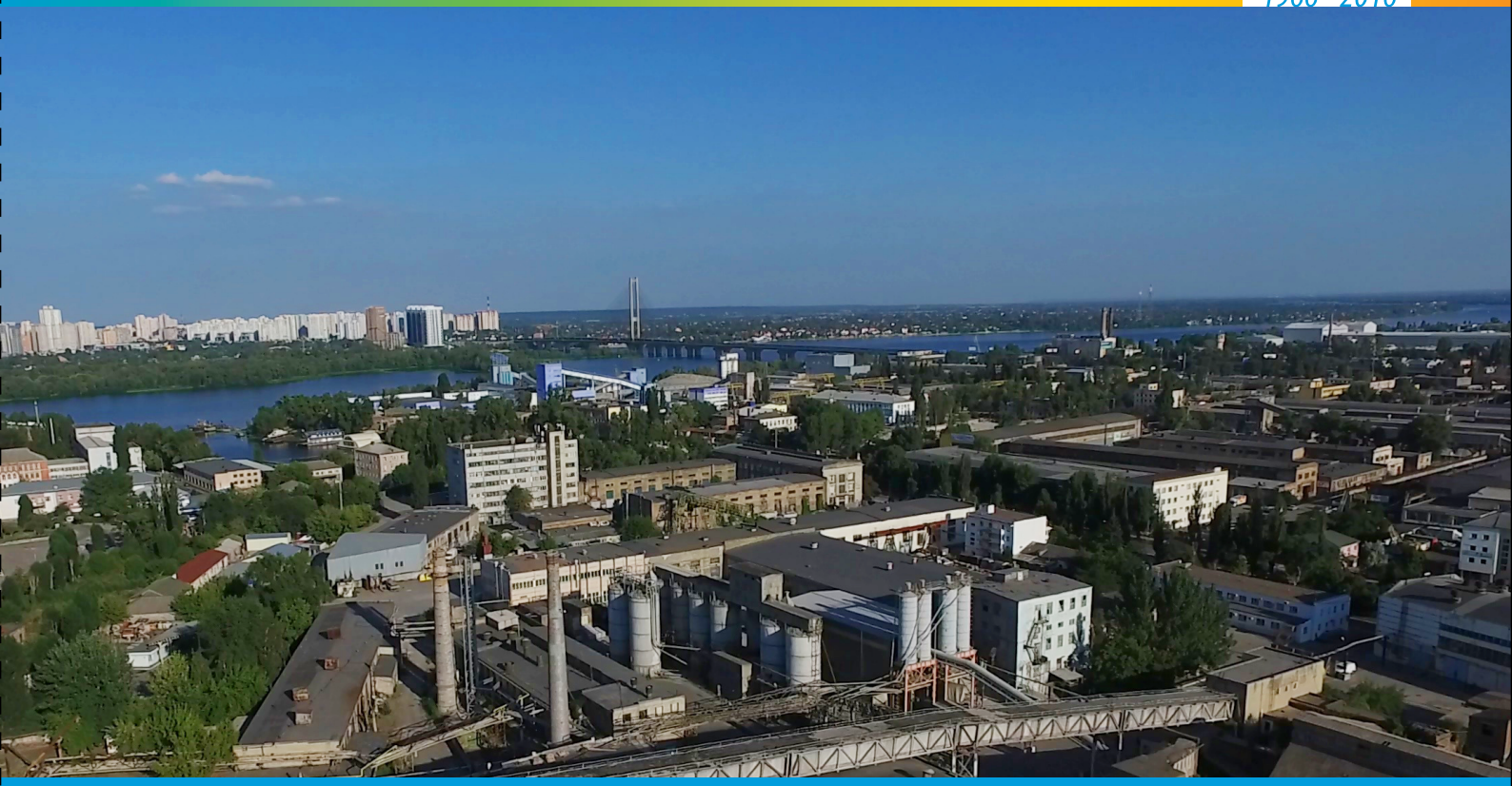

IMPLEMENTATION OF RESOURCE EFFICIENT AND CLEANER PRODUCTION AT THE ENTERPRISES OF UKRAINE 2015-2016

Construction materials sector

EaPGREEN
Partnership for Environment and Growth

This project is funded by the EU

OECD
BETTER POLICIES FOR BETTER LIVES

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«GREENING ECONOMIES IN THE EUROPEAN UNION'S EASTERN NEIGHBOURHOOD» PROGRAMME (EAP GREEN)

The «Greening Economies in the European Union's Eastern Neighbourhood» (EaP GREEN) programme assists six countries of the European Union Eastern Neighbourhood Partnership (Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine) in their transition towards green economies.

EaP GREEN programme is financed by the European Union with additional co-financing from the Government of Slovenia, the Development Bank of Austria and the implementing Organizations, namely the Organisation for Economic Co-operation and Development (OECD), the United Nations Economic Commission for Europe (UNECE), the United Nations Environment Programme (UNEP), and the United Nations Industrial Development Organization (UNIDO).

DEMONSTRATION PROJECT «RESOURCE EFFICIENT AND CLEANER PRODUCTION» (RECP)

The demonstration project «Resource Efficient and Cleaner Production» is aimed to accelerate and expand the application of RECP at national and regional levels, particularly in sectors such as agriculture, food processing, chemicals and construction materials production. The goals of the project are:

- identification and training of national experts in RECP methods and applications, as well as in supportive management/entrepreneurship topics;
- awareness raising and understanding of RECP opportunities and benefits at the national and regional levels among enterprises, government and civil society; and
- support of the transfer and deployment of key enabling technologies/equipment for RECP in the target sectors.

Enterprises and other organizations that adopt RECP "do more with less":

- increase the efficiency with which they use materials and energy;
- improve its productivity and thus its competitiveness; and
- reduce the amount of pollution and waste that they generate.

This booklet contains the business cases of Ukrainian companies that took part in the project during 2015-2016 and implemented UNIDO methodology "Resource efficient and cleaner production". These examples demonstrate the effectiveness of the RECP approach and its economic benefits.

Project implementator in Ukraine:
KCISOE «Resource Efficient and Cleaner Production Centre»

SLOBOZHANSKA BUDIVELNA KERAMIKA

PJSC with foreign investments «Slobozhanska Budivelna Keramika» is the largest brick and insulating block manufacturer in Ukraine, offering the complete production cycle from clay extraction to finished products shipment.

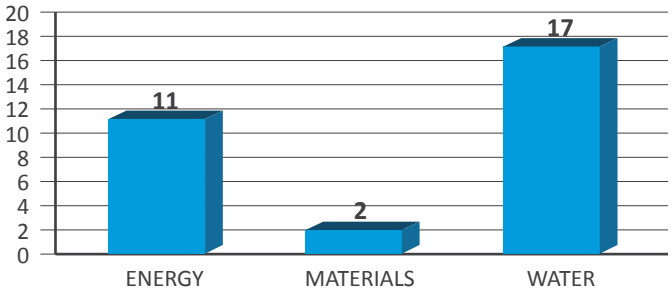
The first plant in Ukraine for porous ceramic blocks manufacture started its operation in 2009. It is situated in Ozera village (Kyiv region). Taking into consideration the activities of enterprise aimed to improve production processes the management of this plant was proposed to launch the RECP approach.

Joint efforts of team consisted of company specialists and RECP consultants provided the assessment of materials, energy and water use and the development of technical options aimed to rising resource efficiency of the enterprise. Some of these options don`t require significant investments and have been already taken for implementation. The options with higher investment cost are under consideration for the direct realization or demand the further investigations (as in a case of the replacement of natural gas with solid fuel).

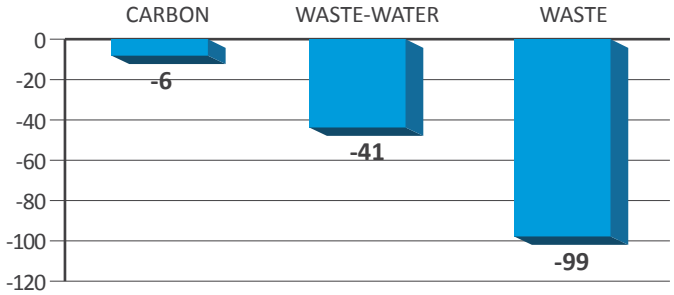
In its operation, the company has already used the methods that similar to RECP (for example technical parameters monitoring at the production). The cooperation during RECP assessment enabled the company to look at the manufacturing from different angle and to sustain the resource use efficiency.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



Note: This 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

OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Heat recuperation at the drier • Additional heat insulation of the drier • Partially loaded transformers disabling • Modernization of lighting system	116,090	202,410	4 553 150 kWh of energy 4 000 m^3 of water	966 t CO_2-eq. of air emissions
2. Water Management • Modernization of the sanitary equipment at the workshop	50	40	804 m^3 of water	804 m^3 of waste water
3. Material Management • Brick wastes processing and sales • Replacement of burnout supplements	7,170	5,140	n/a	2 447 t of wastes
Total for ALL options	123,310	207,590		

AGROMASH

PJSC "Agromash" produces approximately 3 000 t of hyper pressed bricks with different forms and colours per year. Its production capacities are situated in Rahny Lisovi village, Vinnytsia region, Ukraine. The company is relatively young, the issue of its development is highly relevant, and the efficient resource use is a key factor of the successful growth.

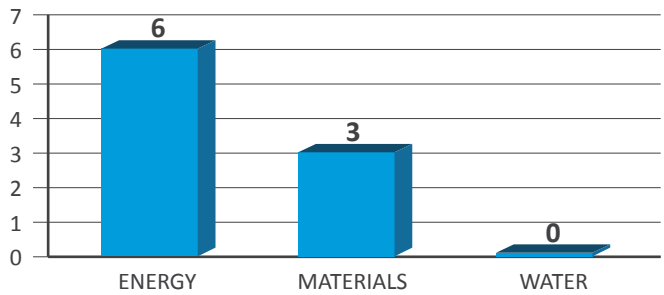
The assessment of the enterprise conducted under RECP methodology revealed the potential for energy use and materials consumption reduction. For example, electric drives produce large amount of reactive power and its compensation allows not only ensuring energy savings but also increasing the electric grid capacity. The latter will allow the wider usage of the industrial equipment and as a result the increasing production output.

The company already has an experience of efficient waste utilization. Thus, they sell the small fraction, which is generated after the rubble stones production, as the useful by-product. It is the source of additional income. During RECP assessment, the number of energy saving and material management options is developed. Total savings from all proposed options realisation reach 2,800 EUR per year, which is a good benefit for a small company.

The RECP methodology implementation supports the company management to achieve its goals in raising ecological and economic performance of manufacturing, and provides an opportunity to find the effective solutions for the most resource intensive areas of the technological process.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



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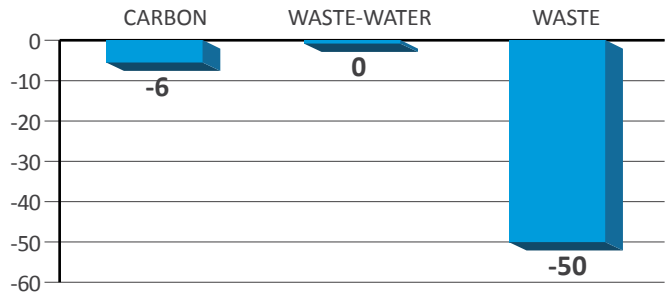

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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Installation of the reactive power compensators • Thermal insulation of steam generator and steam pipelines • Positioning of electrodes in the steam generator	580	620	2 910 kWh of energy	4 t CO_2-eq. of air emissions
2. Material Management • Crushing of waste and reuse • Installation of heat exchanger in hydraulic system of press for oil cooling	2,080	2,220	75 t of materials	75 t of wastes
Total for ALL options	2,660	2,840		

ZHYTOMYR STRUCTURAL STEEL PLANT

"Zhytomyr Structural Steel Plant" LLC is the producer of high-quality prefabricated steel structures with a span of 100 meters and other elements for the industrial construction. The plant was established in 1972. Nowadays, it belongs to PGSC "Ukrstalkonstruktsiya".

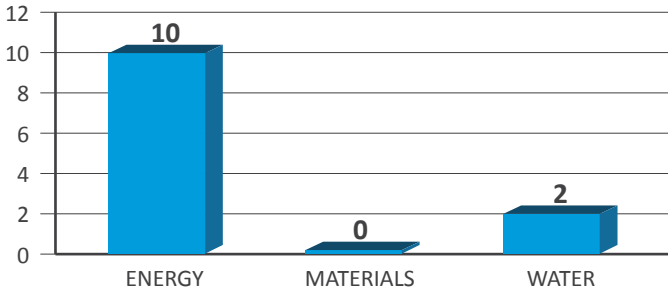
During its operation period, the piecemeal replacement and modernization of the equipment took place in order to increase the manufacturing efficiency and to improve the products' quality. Moreover, the enterprise applies the resource saving approach related to the use of steel, which is the most expensive input material. The steel residues are sorted and reused in the manufacturing process.

Analysis of the equipment efficiency and resource consumption was carried out at the enterprise in the framework of RECP assessment. There were proposed 10 feasible technical and organizational options based on the assessment results. These options enable to decrease the energy use by 10 %, which is accomplished with reduction of emissions generation by 6 %. The majority of developed options are low cost, and its payback period is about 1 year. More investment requiring options will be repaid in 3-4 years.

The potential economic benefit of RECP measures' implementation is about 9,700 EUR a year.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



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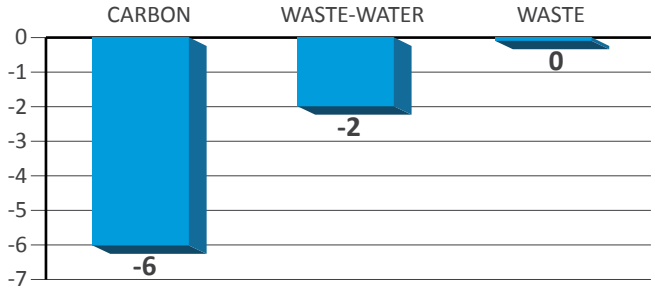

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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Installation of phase stabilizer in the electric grid • Automatized compensation of reactive power • Disabling of partially loaded transformers • Replacement of lamps with LED • Chemical cleaning of boilers • Elimination of compressed air leakages • Thermal insulation of administrative building	29,010	9,650	260 700 kWh of energy	136 t CO_2-eq. of air emissions
2. Water Management • Installation of faucet aerators	50	40	115 m^3 of water	115 m^3 of waste water
Total for ALL options	29,060	9,690		

MECHANICAL PLANT “SONET”

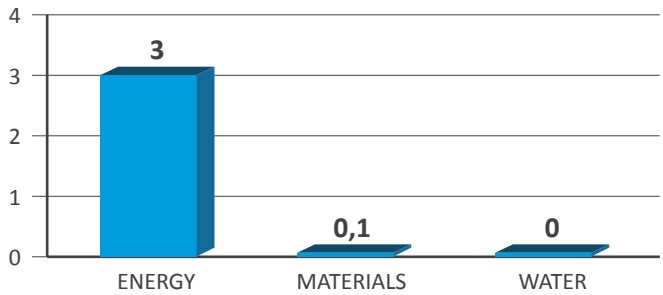
“Mechanical plant “Sonet” LLC is a middle sized enterprise situated in Brovary city, Kyiv region. Its key products are ventilated building facades and elevator cabins. The main goals of company’s participation in the demonstration RECP project were to analyse the equipment use efficiency, identify the possible ways for resource saving, reduce the operational expenditures and to increase the product output.

During the assessment of energy and raw materials consumption in production processes, it was found an opportunity for resource saving. The potential economic and environmental benefits from the options proposed by RECP experts could reach up to 3 % of energy saving and cut the waste generation by 6 %, and emissions – by 6 %. Its annual economic effect is estimated as 7,740 EUR. It is worth to note, that the proposed options have also indirect effect. For example, the installation of a modern chamber for powder painting and modification of the hydrophobizator applying process will provide the capacity not only to reduce the consumption of these expensive materials, but also to avoid an environmental pollution by the suspended substances, and to improve the working conditions at the production area.

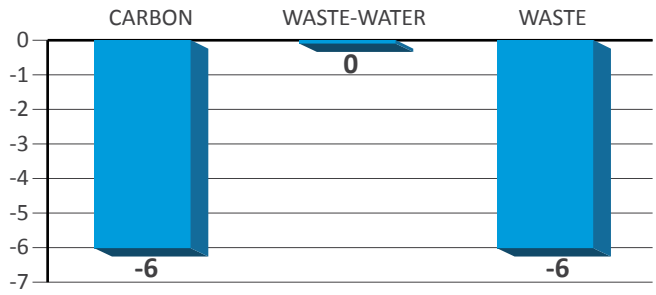
The RECP implementation facilitates the enterprise to increase its effectiveness even in challenging economic conditions, to reduce the harmful environmental impact and to raise the social responsibility level. In addition, the company has an opportunity to apply for investments in order to support its modernization and innovation projects.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Thermal insulation of heating chamber • Replacement of air compressor and auxiliary equipment	3,700	3,570	35 450 kWh of energy	47 t CO_2-eq. of air emissions
2. Material Management • Replacement of painting chamber • Rearrangement of hydrophobisator applying process • Collection and selling of peat ash as useful subproduct	4,180	4,170	2 t of materials	17 t of wastes
Total for ALL options	7,880	7,740		

DNIPROPETROVSK STRUCTURAL STEEL PLANT NAMED AFTER I.V. BABUSHKIN

PJSC "Dnipropetrovsk Structural Steel Plant named after I.V. Babushkin" belongs to the "Ukrstalkonstruktsiya" holding. It produces high-quality welded steel structures for metallurgical, energy and construction sectors.

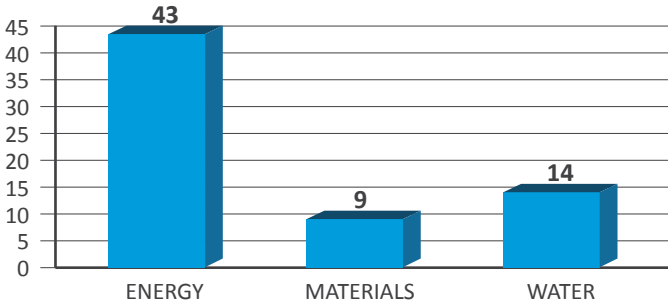
The metalworking is one of the most energy intensive industries. That is why the company was highly interested in discovering the ways to increasing energy efficiency of production. The participation of the enterprise in demonstration project gave the opportunity to try the RECP methodology in practice. The assessment results became a basis for series of managerial decisions towards resources saving.

An output of collaborative work of RECP experts and enterprise's team was 18 options aimed at reducing energy, water and materials consumption and decreasing amount of harmful emissions and wastes. The total savings from the proposed options implementation can reach 94,000 EUR per year. Moreover, the implementation of main part of these options does not need significant investments and its payback period is about 1 year. As an expensive option, the thermal modernization of buildings was considered and its payback period was estimated as 5 years.

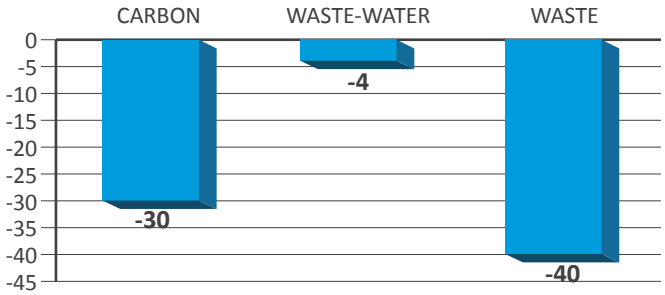
PJSC "Dnipropetrovsk Structural Steel Plant named after I.V. Babushkin" has long and successful history. At the same time, the actual RECP assessment of company's production processes became a valuable basis for the understanding of its current efficiency, productivity and environmental performance, and helped to identify targets for further development of the enterprise.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Compensation of reactive power • Nonloaded transformers disabling • Replacement of pneumatic tools with electric ones • Replacement of lamps in lighting system with energy efficient • Heat insulation of administrative building	112,240	53,480	1 295 020 kWh of energy	1 030 t CO_2-eq. of air emissions
2. Water Management • Collection of rainwater for watering of territories and lawns	210	460	2 000 m^3 of water	-
3. Material Management • Usage of paints which do not require the shot-blast cleaning of metal surfaces • Prevention to wasted metal generation	14,130	39,730	175 t of materials 158 400 kWh of energy	158 t of wastes 209 t CO_2-eq. of air emissions
Total for ALL options	126,580	93,670		

JAGUAR

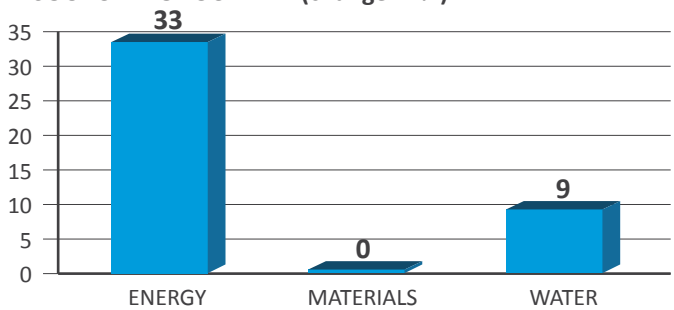
Building company “Jaguar” LLC from Kyiv performs all types of civil and construction works. The enterprise is focused on dynamic development and its management realizes an importance of the efficient resource use for successful business. To find a potential for resource and energy savings, the small workshop of metal-plastic doors and windows manufacturing was chosen for the RECP assessment under the United Nations Industrial Development Organization methodology.

RECP experts in cooperation with the company specialists collected and analysed the data on product output and consumption of the main types of resources during the first year of operation of metal-plastic windows’ workshop. Calculated specific indicators showed the quite high efficiency level of the production. At the same time, the energy consumption can be reduced without decreasing product output. The RECP team developed and suggested for implementation of 6 RECP options, including the maintenance of equipment, modernization of lighting systems, and optimization of power supply system. The proposed options implementation would enable company to reduce, for instance, the energy use at the production of metal-plastic constructions by 25 %. All proposed options are low cost and cut down the electricity and water bills by 330 EUR for one of production workshops.

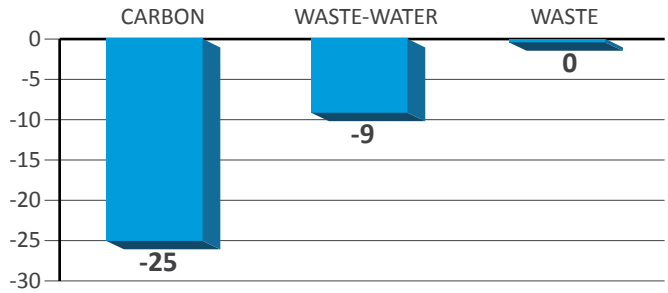
The RECP methodology raised high interest among employees of “Jaguar” LLC, and was positively accepted by the company. It promotes the further improvement of production processes and the search of new opportunities for resource efficiency increase.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/ or waste generation (per annum)
1. Energy Management • Elimination of leakages in compressed air system • Modernization of lighting system • Optimization of electric supply system	530	310	4 410 kWh of energy	6 t CO_2-eq. of air emissions
2. Water Management • Modernization of sanitary equipment	40	20	56 m^3 of water	56 m^3 of waste water
Total for ALL options	570	330		

KURYAZHSKY PLANT OF SILICATE PRODUCTS

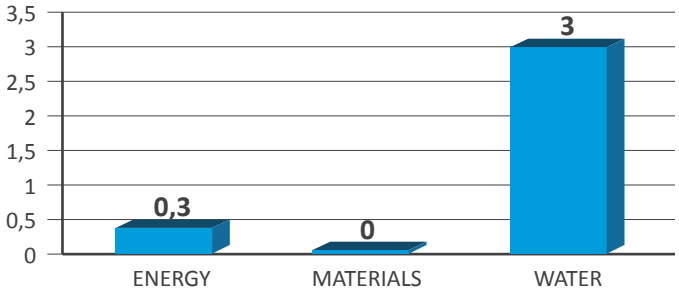
"Kuryazhsky Plant of Silicate Products" LLC from Kharkiv region has a long history in the Ukrainian market of construction materials. The main products of the enterprise are silicate bricks, dry mixes, primers and lime.

To implement the RECP methodology at the enterprise the working group of RECP experts and company representatives was created. The analysis of production processes, the assessment of equipment performance and raw materials consumption were conducted, and therefore a range of technical and organizational options were developed and presented to company's management. They are aimed to reduce the resources use, for example, the prevention of heat losses leads to reduction of the natural gas consumption. Big attention was paid to the rational consumption of compressed air, which is one of the most expensive energy resources. The usage of other fuels, such as coal or wood waste from nearby enterprises, was considered for replacement of natural gas. In addition, it was proposed to pay more attention to the waste management. The implementation of the developed RECP options could save 4,000 EUR annually.

The outcomes obtained during RECP assessment became a good basis for determination of the company's future goals and improvement of its manufacturing productivity.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



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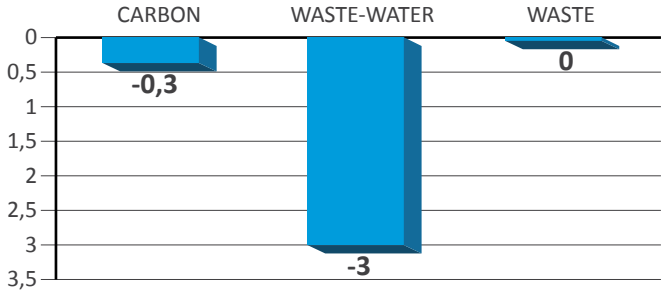

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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/or waste generation (per annum)
1. Energy Management • Upgrading of heat insulation of autoclaves • Elimination of compressed air leakages	2,320	2,900	94 300 kWh of energy	36 t CO_2-eq. of air emissions
2. Water Management • Application of water spray gun at washing area	10	10	76 m^3 of water	76 m^3 of waste water
3. Material Management • Scrap metal collecting and sorting	-	1,460	n/a	n/a
Total for ALL options	2,330	4,370		

DYCKERHOFF UKRAINE

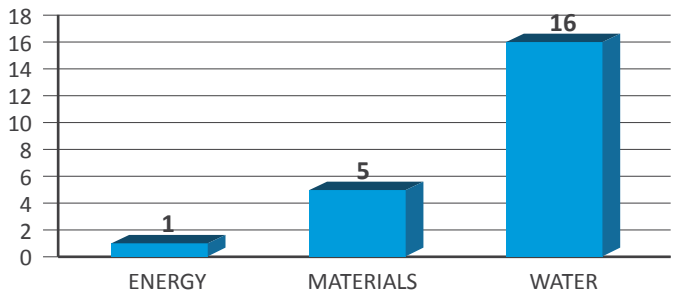
LLC with foreign investments "Dyckerhoff Ukraine" is situated in Kyiv and produces ready-mixed concrete. The enterprise is a member of Buzzi Unicem Group, which annually publishes the report about its sustainable development and manufacturing impact on the environment. The resource efficient and cleaner production concept is fully compatible with an environmental policy of the Group, and a desire to improve management processes towards sustainable production facilitated the participation of the company in RECP demonstration project.

To assess the efficiency of energy, water and material use, the RECP working team was created. It developed the options aimed to improve resource efficiency and to obtain economic and environmental effects. The proposed options implementation allows to decrease the consumption of key resources, thus saving 8,650 EUR annually. The volume of waste generation can be decreased up to 50 % due to enabling of the recycling system installed at the enterprise. Thus, useful materials (e.g. sand, water etc.) from the mixer washing wastewater are separated and can be reused in the production.

Striving to make the manufacturing more effective and profitable, the company management continues the usage of RECP methodology. The positive experience could be also extended to other Ukrainian branches for raising the environmental and economic standards of manufacturing and improving the quality of products.

RECP PROFILE OF COMPANY

RESOURCE PRODUCTIVITY (change in %)



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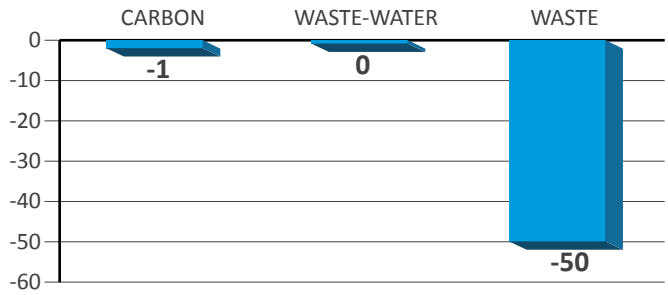

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OPTIONS GENERATED

PRINCIPAL OPTIONS	BENEFITS			
	Economic		Resource use	Pollution generated
	Investment [EUR]	Cost-saving [EUR/y]	Reductions in energy use, water use and/ or materials use (per annum)	Reduction in waste-water, air emissions and/or waste generation (per annum)
1. Energy Management • Heat insulation of pipelines from boiler house • Replacement and maintenance of compressed air pipelines	185	320	6 320 kWh of energy	3 t CO_2-eq. of air emissions
2. Material Management • Reuse of solid waste from concrete mixers	-	330	690 m^3 of water	-
3. Water Management • Enabling of water recycling system	-	8,000	2 110 t of materials	1 055 t of wastes
Total for ALL options	185	8,650		

United Nations Industrial Development Organization (UNIDO) is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. UNIDO was established on the 17th of November 1966 by the resolution of United Nations General Assembly. As of today, 170 States are members of UNIDO.

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EMPOWERING
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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