

EaP GREEN

Partnership for Environment and Growth



Programme carried out with the financial assistance of the European Union

“Greening Economies in the European Union’s Eastern Neighbourhood”
(EaP GREEN)

IMPLEMENTATION OF RESOURCE EFFICIENT AND CLEANER PRODUCTION AT THE ENTERPRISES OF UKRAINE – 2014

(construction materials sector)

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION (UNIDO)
RECP DEMONSTRATION PROJECT

Kyiv, 2015



ABOUT EAP GREEN PROGRAMME

The «Greening Economies in the European Union's Eastern Neighbourhood» (EaP GREEN) programme aims to support the six Eastern Partnership (EaP) countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine) to move towards green economy.

Duration period of the Programme is four years (2013-2016). It is structured around three components:

- ◆ Governance and financing tools for promoting sustainable consumption and production (SCP) and green economy.
- ◆ Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) accompanying SCP policy implementation.
- ◆ Demonstration projects of Resource Efficiency and Cleaner Production (RECP) implementation, dissemination and replication.

EaP GREEN is financially supported by European Commission and jointly implemented by four international organizations: Organisation for Economic Co-operation and Development (OECD), United Nations Environment Programme (UNEP), United Nations Economic Commission for Europe (UNECE), and United Nations Industrial Development Organization (UNIDO). Additional support is provided by European countries.

ABOUT DEMONSTRATION PROJECT IN UKRAINE

The UNIDO Regional RECP Demonstration Component Projects are a part of the Regional Action of the European Union to support the greening of economies in the EaP countries. The UNIDO component supports:

- ◆ Creation of human and institutional capacities for RECP;
- ◆ Demonstration, dissemination and replication of RECP in priority sectors (chemicals, food and construction materials);
- ◆ Transfer of and investment in RECP technologies.

In Ukraine the UNIDO Demonstration project focuses on construction materials sector as it has good development potential. Moreover, construction materials are overall fundamental for greening of buildings and sustainable urban and infrastructure development.

In 2014 the RECP assessments were conducted at 5 Ukrainian enterprises producing concrete and insulation materials. As a result, the technical and organizational solutions (options) increasing the efficiency of materials, reduce waste, air emissions and wastewater volumes were developed and reasoned.

This booklet presents business cases of companies that have implemented the UNIDO method «Resource efficient and cleaner production». These examples demonstrate the effectiveness of this approach and its economic benefits.



Implementing organization in Ukraine:
KCISOE «Resource Efficient and Cleaner Production Centre»

BUILDING INDUSTRY PLANT



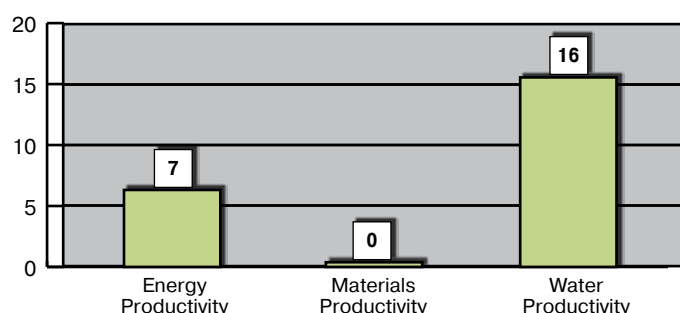
Building Industry Plant is specialized in concrete and reinforced concrete production, located in Kyiv, Ukraine. The company is the biggest national manufacturer of reinforced concrete tubes by vertical forming for sewage collectors, also it produces ready-mixed concrete, cement mortar, foundation blocks, etc.

Building Industry Plant was established in 1949, so the majority of capacities are obsolete, traditional technology of concrete production is quite energy- and resource-intensive. Company's management clearly understand this problem.

RECP PROFILE OF COMPANY

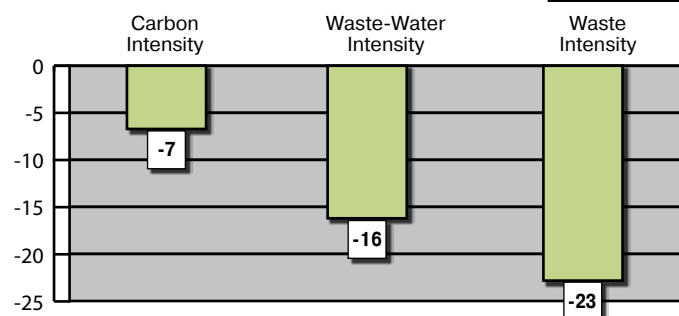
RESOURCE PRODUCTIVITY (change in %)

■ Year 1



POLLUTION INTENSITY (change in %)

■ Year 1



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.

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)
Option 1: Energy Management <ul style="list-style-type: none"> Avoiding of heat losses during concrete curing by the additional thermal insulation Optimization of heating period 	510	27 215	329 358 kWh of energy	35.8 t CO ₂ -eq. of air emissions
Option 2: Water Management <ul style="list-style-type: none"> Water consumption control Maintenance of sanitary equipment 	960	2 215	4 220 m ³ of water 1 166.5 kWh of energy	4 220 m ³ of waste water 1.5 t CO ₂ -eq. of air emissions
Option 3: Material Management <ul style="list-style-type: none"> Concrete wastes prevention Reuse of concrete residues Utilization of reinforcement steel wastes 	7 450	8 787	23 m ³ of water	237.4 t of wastes
TOTAL OF ALL OPTIONS	8 920	38 217		

As a tool, RECP helps the company to identify trends and track progress from year to year on resource productivity and pollution intensity.

HOUSE BUILDING FACTORY #3



House Building Factory #3 is a reinforced concrete plant, situated in Kyiv, Ukraine. The company manufactures and offers for sale a wide range of reinforced concrete products, ready-mix concrete and mortars.

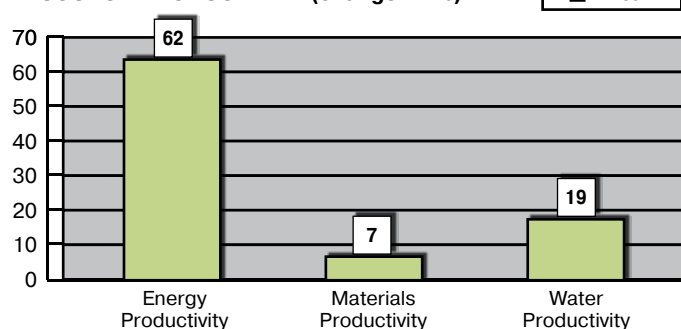
RECP project was aimed at detailed assessment of company's resource efficiency and further recommendations on its improvement. According to request of management, special attention was paid to energy consumption, which decreasing has a significant economic impact due to its high cost.

After in-depth RECP assessment options for increasing of production processes efficiency were developed and calculated. The annual economic effect of its implementation could reach up to 438 670 EUR. Some of the proposed options do not require any investments or are low-cost options.

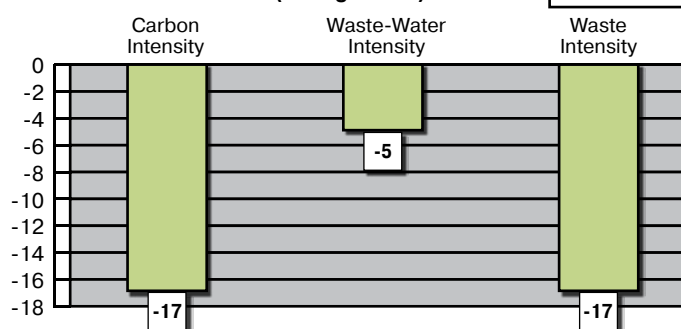
In addition to financial benefits, activities aimed at sustainable production and consumption improve the company's image and competitiveness on the market.

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)
Option 1: Energy Management <ul style="list-style-type: none"> Using of concrete admixture Optimization of curing regimes 	From 250 000	230 000	7 255 580 kWh of energy	2 032 t CO ₂ -eq. of air emissions
Option 2: Water Management <ul style="list-style-type: none"> Reduction of steam consumption Saving water use 	No need	670	2 600 m ³ of water	780 m ³ of waste water
Option 3: Material Management <ul style="list-style-type: none"> Modernization of the concrete mixing line Recycling of the waste concrete Utilization of reinforcement still wastes 	290 000	195 000	11 265 t of materials	290 t of wastes
TOTAL OF ALL OPTIONS	540 000	438 670		

The management of company recognized the applied RECP approach as accessible, informative and appropriate for further use for saving resources, reduction of waste and pollution,

obtaining additional incomes. Results and lessons learned from participation in the project are used in planning of company's development.

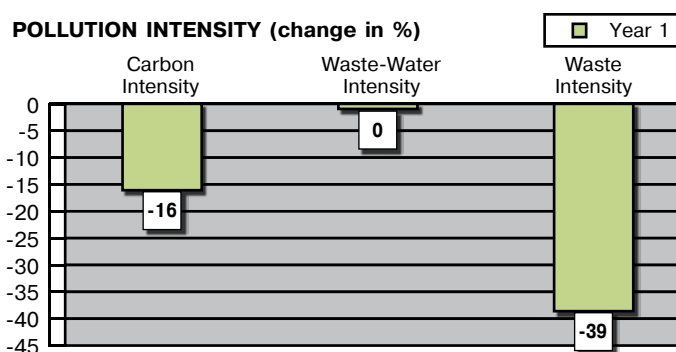
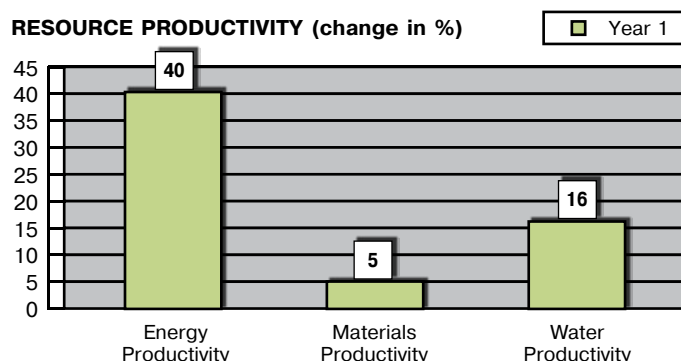
Company PROMIMPEX is established in December 2012 in the city of Kharkiv, Ukraine. Their principal activity is manufacturing of mineral-wool products: thermal and noise insulation for residential, industrial premises and equipment.

Mineral wool manufacturing is a highly energy intensive process. PROMIMPEX shares the 'green' approach, therefore the selected main line of development is advancing towards European environmental standards. As a result, measures for reducing of energy consumption and greenhouse gases emissions were approved as the priority directions for company's RECP assessment. The example of developed

RECP options is replacement of CO-afterburning system burner with a more energy efficient one, which gives the opportunity to reduce consumption of natural gas from 200 to 120 m³ per hour. Waste generation was also considered as an actual problem due to a lot of mineral wool residues formed at the cutting stage, it could be reduced by 39 %.

Based on the analysis and calculations, eight technical and organisational measures (options) were developed in order to increase resource efficiency. Potential economic effect of proposed options implementation is up to 1 377 000 EUR. A half of them requires no investments.

RECP PROFILE OF COMPANY



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)
Option 1: Energy Management <ul style="list-style-type: none"> Modernization of polymerization chamber Optimization of heating process Installation of heat exchanger 	1 704 398	933 074	21 380 145 kWh of energy	7295.21 t CO ₂ -eq. of air emissions
Option 2: Water Management <ul style="list-style-type: none"> Effluents prevention Steam condensing system installation 	Not required	2106,60	4 124 m ³ of water	
Option 3: Material Management <ul style="list-style-type: none"> Adjusting of mineral wool carpet cutters Packaging material change Waste management 	Not required	304 117	18 t of materials	828 t of wastes
TOTAL OF ALL OPTIONS	1 704 398	1 376 591		

Participation of PROMIMPEX in this project promotes their positive image and improve public confidence. Presently, company's policy is aimed at using best technical and technological solutions through integration of international

quality standards for both products and production processes. Promoting energy saving concept is the priority of the development strategy of PROMIMPEX.

REINFORCED-CONCRETE CONSTRUCTION PLANT #1

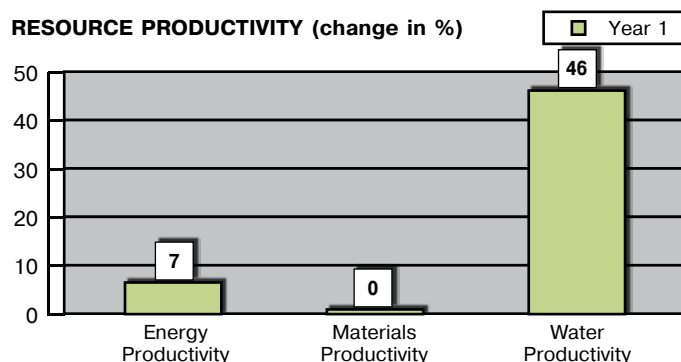
Reinforced-Concrete Construction Plant #1 is situated in Kyiv (Ukraine) and produces wide range of concrete products for the civil construction and all kinds of building mortars.

Starting the work in RECP project, company's management planned to reduce energy consumption, since energy is the most expensive resource. Raw materials and water savings were also in the focus of interest. As a result of RECP

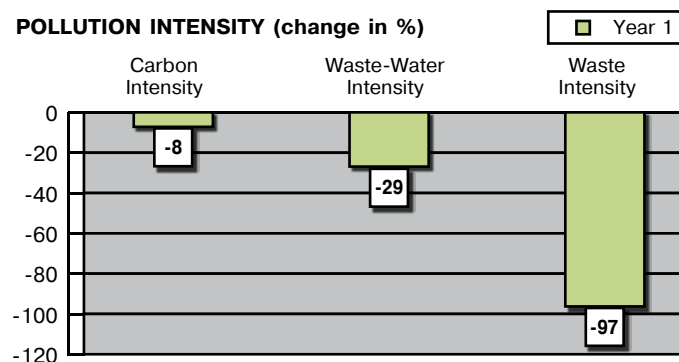
assessment 12 options were generated and considered as feasible for implementation. It includes modernization of equipment, thermal insulation, prevention of waste generation, controlling of energy and material flows, regular maintenance and repairs. Cost savings after all generated options implemented annually could amount to 41 500 EUR.

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)
Option 1: Energy Management <ul style="list-style-type: none"> Improving of compressors functioning Modernization of shot-blasting machine Heat insulation of manufacturing equipment 	34 575	25 410	173 000 kWh of energy 45 870 m ³ of natural gas	238 t CO ₂ -eq. of air emissions
Option 2: Water Management <ul style="list-style-type: none"> Elimination of water pipes breaks Installation of water saving equipment Rain water utilization 	1 520	2 215	64 700 m ³ of water 44 400 kWh of energy	59 t CO ₂ -eq. of air emissions 13 100 m ³ of waste water
Option 3: Material Management <ul style="list-style-type: none"> Reducing of cement losses during a transportation Reuse of waste of concrete and reinforcement steel 	265	12 120	432 t of materials	377.9 t of wastes
TOTAL OF ALL OPTIONS	36 360	41 530		

Project results were positively accepted by the company. Management, using the methodology for calculation of specific

resource efficiency indicators, started to consider a wider range of RECP options and their possible implementation.

Plant Spetsbeton operates since 1947 and specializes on production of concrete wall blocks with granulated metallurgical slag (Kyiv, Ukraine). In 1975 the plant was renovated and until now it works in the same production buildings and using the equipment from renovation period. Nowadays main products of the plant are concrete products, slag blocks and expanded-clay concrete blocks.

According to the results of conducted technical RECP audit, it was defined that materials consumption is on the very good level. Concrete wastes and residues after washing of equipment are reused in products. The focus of assessment

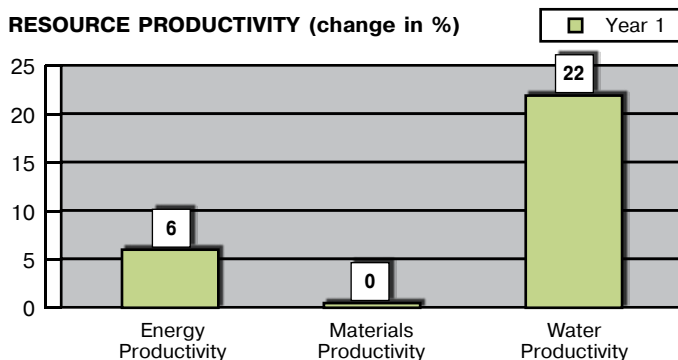
was on identifying the internal potential for the energy efficiency improvement and the water consumption reduction.

RECP team generated and justified 5 options for reducing electricity, fuel and water consumption. It could be reached by installation of energy saving lighting system, replacement of loader with more energy efficient one, as company consumes a great amount of diesel fuel used for powering of internal transport, and saving water consumption.

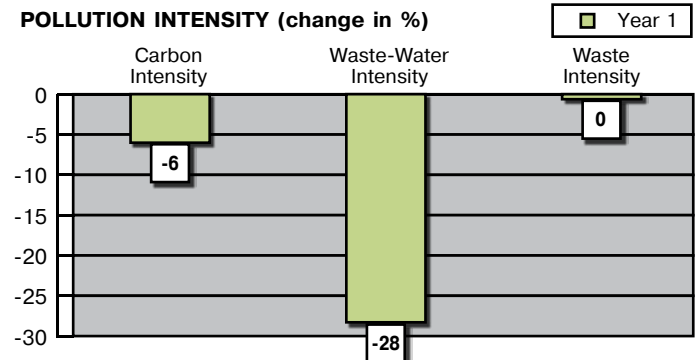
Annually the cost savings of all options can reach to 4 480 EUR, that is noticeable for the small sized enterprises.

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)
Option 1: Energy management <ul style="list-style-type: none"> Energy consumption control Modernization of lighting systems Improvements in transportation processes 	5 544	4 319	10 836 kWh of energy 3 250 litres of diesel fuel	25 t CO ₂ -eq. of air emissions
Option 2: Water management <ul style="list-style-type: none"> Water consumption monitoring Maintenance of sanitary ware 	75	161	522 m ³ of water	287 m ³ of waste water
TOTAL OF ALL OPTIONS	5 641	4 480		

Using the RECP approach the company management opens the opportunity to achieve economic benefits and improving of environmental performance through the efficient consumption of resources. Moreover, even no-cost options can improve

efficiency of the production processes. Gained experience of RECP project implementation will continue to be used by management for further improvements of company.

The Demonstration project with the Resource Efficient and Cleaner Production implementation is in progress.

If you have interested in participation, please contact the RECP Centre as a local representative.



PROJECT TEAM

United Nations Industrial Development Organization

Address: Vienna International Centre, PO Box 300, A1400, Vienna, Austria

Carolina GONZALEZ-MUELLER

Project manager, Industrial Resource Efficiency Unit

Tel.: +431 26 026 38 14

E-mail: c.gonzalez-mueller@unido.org

Tatiana CHERNYAVSKAYA

International Coordinator

Tel.: +431 26 026 30 17

E-mail: t.chernyavskaya@unido.org

Web page: www.unido.org/eapgreen

www.eap-green.org

Resource Efficient and Cleaner Production Centre (Ukraine)

Address: 37 Peremogy Ave., build 6, office 3, Kyiv, 03056, Ukraine

Igor SHYLOVYCH

Director RECP Centre

Tel.: +380 44 406 80 62

E-mail: ncpc@ukr.net

Mariia TSYBKA

National Coordinator

Tel.: +380 44 227 83 78

E-mail: ncpc@ukr.net

Web page: www.recpc.kpi.ua

www.recpc.org