



RECP IN GEORGIAN ENTERPRISES 2014-2016

FOOD PROCESSING

CHEMICALS PRODUCTION

CONSTRUCTION MATERIALS PRODUCTION



**EaP GREEN Program: Greening Economies in the
European Union's Eastern Neighbourhood**
Resource Efficient and Cleaner Production (RECP)
Demonstration Project in Georgia

RECP IN GEORGIAN ENTERPRISES 2014-2016

Tbilisi, 2017



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Resource Efficient and Cleaner Production (RECP) Project in Georgia

RECP project in Georgia aims at improving the resource productivity and environmental performance of enterprises and other organizations through the application of Resource Efficient and Cleaner Production (RECP) methods, techniques and policies to put sustainable industrial development into practice

What is RECP

Resource Efficient and Cleaner Production (RECP) is a globally proven approach to improve productivity and reduce environmental impacts of enterprises. RECP is the continuous application of an integrated preventive environmental strategy to processes, products and services to increase efficiency and reduce risks to humans and the environment.

Cleaner production was first launched in the early 1990's to foster a preventative approach to reduce and where possible, eliminate the generation of waste and emissions from enterprises. United Nations Industrial Development Organisation (UNIDO) and United Nations Environmental Programme (UN Environment) introduced the enlarged approach of Resource Efficient and Cleaner Production in 2008. RECP employs preventive environmental techniques and total productivity management practices to achieve¹:

- ▶ Productive use of natural resources – reduction of the use of materials, water and energy;
- ▶ Minimization of environmental impacts through reduction of generation of greenhouse gases and other emissions and wastes; and
- ▶ Promotion and protection of human health through improvements in occupational health and safety.

Industrial enterprises can apply a number of complementary RECP techniques or practices ranging from low or even no cost solutions to high investment, advanced clean technologies, including: good housekeeping; input material change; better process control; equipment modification; technology change; on-site recovery/reuse; production of useful by-products; product modification.

Application of RECP is good for business, the environment and climate, and indeed economy and society at large. Businesses and other organizations that implement RECP methods, practices and technologies will achieve triple benefit:

- Reduced consumption of natural resources and related costs;
- Reduced environmental pollution;
- Reduced risks to human health related to the use of hazardous chemical substances and their disposal in the environment.

RECP Demonstration Project in Georgia

The "Greening Economies in the European Union's Eastern Neighbourhood" (EaP GREEN) programme assists six countries of the European Union Eastern Partnership in progressing faster towards a green economy framework. Decoupling economic growth from environmental degradation should result in higher productivity and competitiveness, better natural capital management, enhanced environmental quality of life, and more resilient economies.

EaP GREEN responds to commitments made by countries, the European Union and other partners in major international forums including the Rio+20 Earth Summit. Programme beneficiary countries include Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine. EaP GREEN is being implemented by a consortium of international partner organizations including Organization for Economic Co-operation and Development (OECD), the United Nations Economic Commission for Europe (UNECE), the United Nations Environment Programme (UN Environment) and the United Nations Industrial Development Organization (UNIDO). Financial support of the EaP GREEN is mainly provided by the European Union (EU)².

¹ Source: www.unido.org/cp

² See <http://www.green-economies-eap.org> for more information about the programme implementation.

Since the beginning of 2014, within the framework of the EaP GREEN Program UNIDO implements the Resource Efficient and Cleaner Production (RECP) Demonstration Project in Georgia. The project is additionally co-funded by the Government of Slovenia, the Development Bank of Austria, and UNIDO. Objective of the project is to improve resource productivity and environmental performance of Georgian enterprises in order to put sustainable industrial development into practice.

To harness the potential for economic, environmental and social benefits through widespread RECP implementation, UNIDO Demonstration Project supports the mainstreaming and scaling-up of RECP in Georgia, through:

- ▶ The creation of human and institutional capacities for RECP;
- ▶ Demonstration, dissemination and replication of RECP in priority sectors (chemicals, food and construction materials); and
- ▶ Transfer of and investments in RECP technologies.

RECP Benefits in Georgia

A set of RECP demonstrations was conducted in 18 companies from food, construction materials and chemicals production sectors in Georgia in the period 2014-2016. In addition, advanced techno-economic assessments were carried out for selected RECP options in 7 demonstration companies. On the basis of these assessments investment projects have been prepared, and the companies are striving to implement the projects using their own as well as external financial resources.

Application of RECP methodology revealed a considerable potential for improving the materials and energy use efficiency, environment and economic performance in the companies. The RECP assessment teams involving national experts, management and technical staff of the demonstration companies identified opportunities to save through the implementation of RECP measures totally about 22.5 GWh energy, 103 000 m³ water and 1 446 t materials annually. Total cost of the RECP measures in all demonstration companies has been estimated to 766 155 EUR with average payback period less than 2 years. The environmental results of these measures are also impressive and include reduction of greenhouse gas emissions by 800 t CO_{2eq}, reduction of waste water discharges by 5 680 m³ and preventing the solid waste generation by 7 t per year.

Some results and achievements of RECP demonstrations in selected Georgian companies are provided further in this publication.

FOOD PROCESSING SECTOR



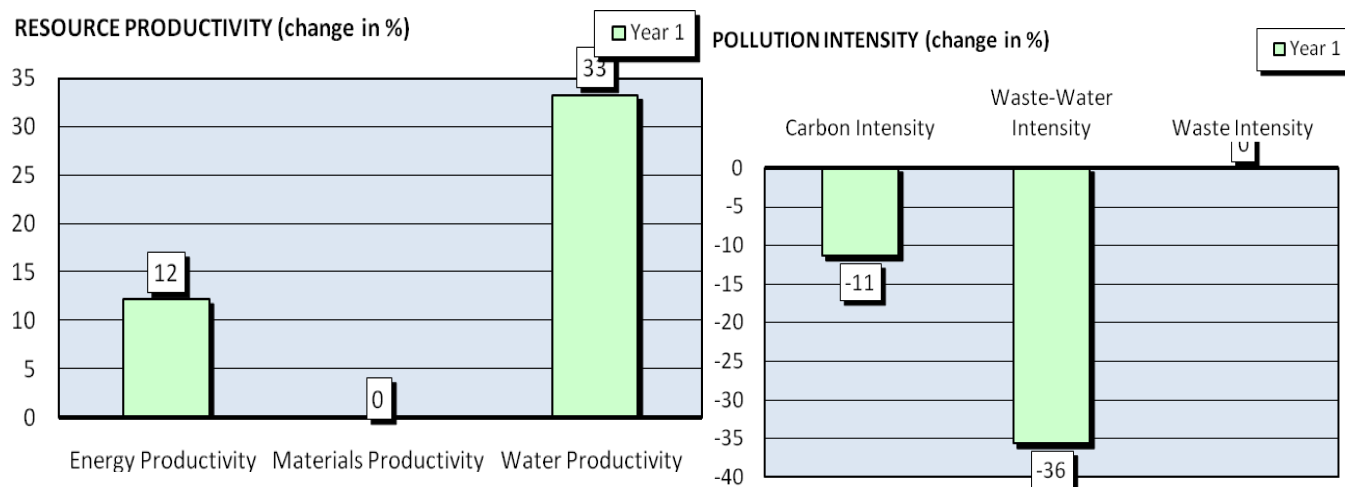
KULA Joint Stock Company was established in 2009 on the basis of a well-known Soviet cannery located in Gori. It is one of the leading companies in Georgia producing natural juice, canned fruits and vegetables. The company produces more than 200 types of products including fruit juices, jams, sauces, marinades, pickled vegetables, etc.



RECP assessment undertaken in the company with active engagement of the company's staff identified opportunities to increase energy and water use efficiency, reduce the impact on the environment and achieve economic benefits. Through the implementation of the RECP measures, the company will reduce its annual water consumption by 9365 m³ and decrease natural gas consumption by 98800m³ per year. Respectively, wastewater will decrease by 35% and air emissions will reduce by 11%. It has been estimated that just insulation of the steam pipes will annually save about 70 000 m³ natural gas or about 6 000 EUR. Total investment in RECP measures is estimated to amount 126 000 EUR with 3 years payback period. Total annual savings is expected to exceed 41 000 EUR. The company has a good potential to compost organic waste generated in the production process. This measure will help to further reduce the organic waste. RECP profile below provides a visual overview of resource productivity and pollution intensity change in the company after the implementation of the RECP measures, as compared to the baseline values.

The management of the company showed a great interest towards the RECP assessment and its outcomes. The management is committed to implement the RECP actions, continuously monitor its resource use efficiency and move forward to improving the environmental performance of the company without decreasing the product quality and productivity.

JSC Kula- RECP Profile³



³RECP profile provides a visual overview of resource productivity (use of resources per unit of product) and pollution intensity (generation of waste and emissions per unit of product) shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases



KINDZMARAUULI CORPORATION is a winery located in Kvareli city in the Kakheti region which is known for its vineyards and high quality wines. The company produces up to 15 brands of wine and brandy spirits with 3 to 23 years ageing.



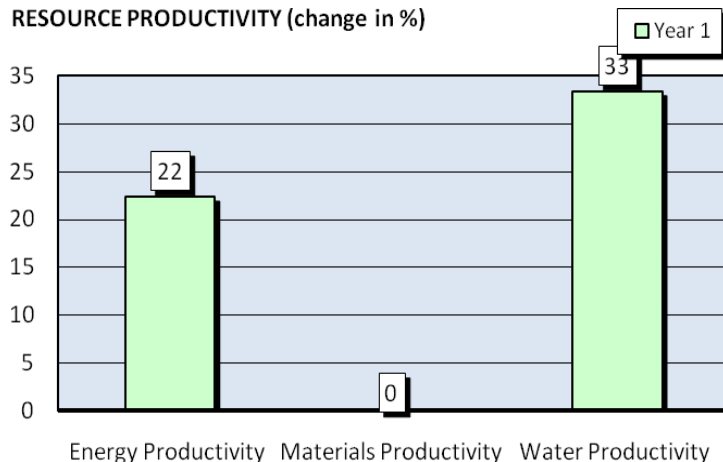
National RECP experts, in cooperation with the company's management and technical personnel, identified a number of measures to improve the energy and materials use efficiency, reduce the environmental impact, and increase the economic profit of the company. These measures include: Improvement of wine storage management through the installation of portable partitions in the wine cellar to reduce the cooling area as appropriate; Improvement of insulation of ceilings and walls in the wine cellar; Installation of cooling units closer to the wine storage reservoirs; Moving the wine reservoirs from the open space to the wine storage compartments; Reduction of water use through improved water management practices e.g. application of high pressure cleaning tools; Composting of the bio-waste generated in the grapes pressing process to produce valuable fertilizer which can be used in vineyards.

It has been estimated that by implementing the RECP measures the company will improve energy productivity by 22% and water productivity by 33%. Implementation of these measures will entail 25% reduction of the wastewater generation.

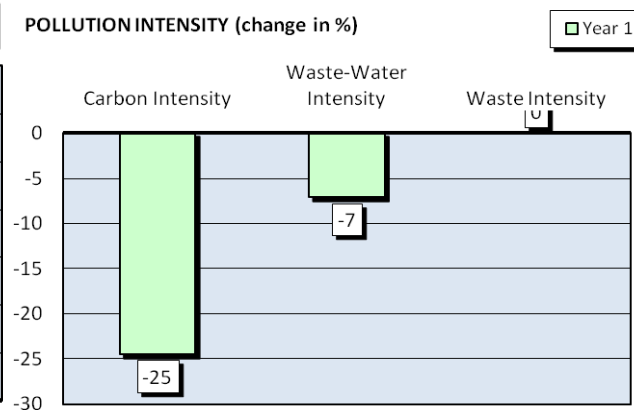
The management of the company actively participated in the RECP exercise. The RECP assessment prompted the company to improve its wine storage management: the management moved the wine reservoirs from the open space to the wine storage compartments, significantly improved the insulation of cold storage area in the cellar. The company's management has committed to implement other RECP measures step by step. The company has also committed to continuously monitor its materials and energy use, identify and implement actions which can help to further increase the resource and energy productivity.

Kindzmarauli Corporation-RECP Profile

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)





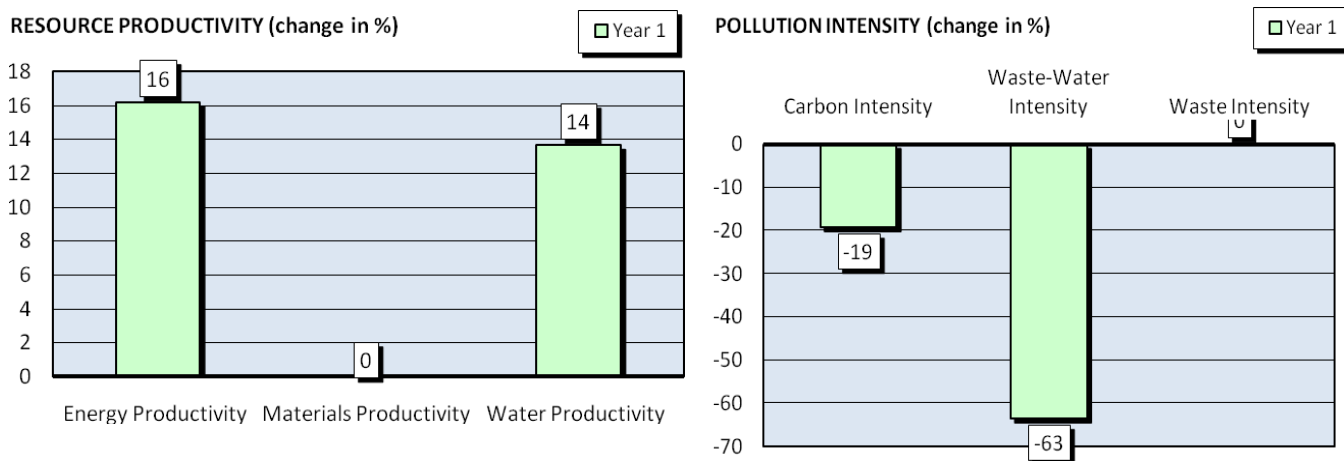
AROMAPRODUCT Ltd is one of the largest producers of juices, processed fruit and vegetable products in Georgia. The company exports the products to the USA, various European and Asian countries.

RECP assessment undertaken in Aromaproduct Ltd focused on energy efficiency increase, reduction of water consumption and improvement of waste management. The company's management and engineers were actively involved in the assessment.



A number of RECP measures were identified in the plant to reduce energy and water use, curtail wastewater discharges. The RECP measures include low cost measures, such as better housekeeping, insulation of the steam pipes, as well as measures requiring investments in the range 2 000-10 000 EUR. Higher cost measures include: Installation of a steam recovery tank: Introduction of automated system of pasteurization; Introduction of a fruit stones recycling technology; Repair and upgrade of the boiler: Installation of water saving and recycling technologies in the bottles washing line. Implementation of the above measures will help the company to save about 14260 m³ natural gas (23.5% reduction against current consumption) and 1206 m³ water (12% reduction against current consumption) per year. Total investments required for implementation of the RECP measures has been estimated to 36500 EUR. Annual saving achieved will amount to 6185 EUR. The energy and water productivity in the plant will increase by 16% and 14%, respectively; CO₂ emissions intensity will decrease by 19%.

Aromaproduct Ltd -RECP Profile



The company has started the implementation of the RECP measures with the insulation of steam pipes, which already brought to company annual savings up to 1000 EUR.



TMT Ltd is located in Kaspi town. The enterprise was established in 2006 on the base of Kaspi cannery which has been in operation since 1960. The company employs 30 people and produces 26 types of products, including canned fruit and vegetables, jams and fruit puree, juices, tomato paste, ketchups and other sauces. The company exports most of its products to Ukraine, Kazakhstan, Russia, Germany and the US. It also sells its product in Georgian markets.



RECP assessment undertaken in the company found that just insulation of the steam pipes would result in 4 451 m³/year of natural gas saving amounting to 6.7% of total energy consumption. Replacement of the outdated boiler with a modern steam generator would save 17 100 m³/year natural gas - 25.6% total energy cost saving.

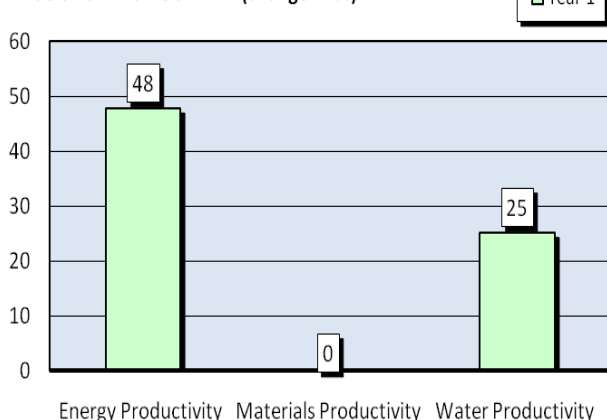
The company started implementation of the RECP measures with installation of energy efficient lighting system and achieved 1 500 EUR financial saving. Furthermore, with the UNIDO RECP project support the company undertook an in-depth techno-economic analysis of the proposed energy efficiency investments. Cost of introduction of a new steam generator was estimated to 10 300 EUR. Implementation of this energy efficiency measure will save about 6900 EUR annually. Payback period of these investments is 1.5 years. The company is planning to replace the boiler. The management of the company is striving to obtain financial resources for this investment.

The company uses a significant amount of water for washing and rinsing the fruits and vegetables before their processing. The raw materials are placed in the stainless steel pools and washed with running tap water. The wastewater is discharged into the sewage system without treatment or recycling.

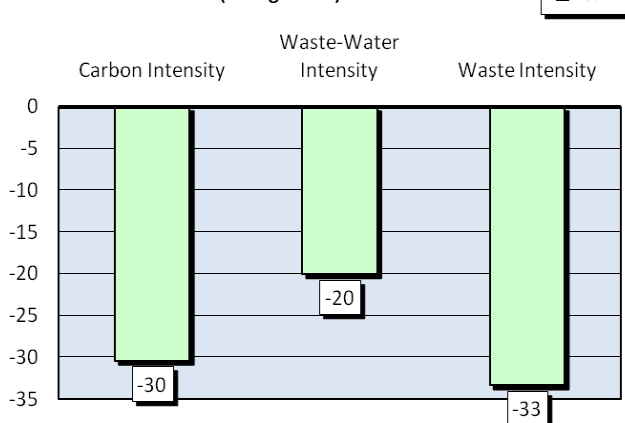
There is an opportunity to significantly reduce water use and wastewater discharges at the enterprise. This will be achieved by introducing a simple water recycling technology including a water pump, water reservoir, sedimentation basin and filters. The recycled water can be used for initial washing and rinsing of fresh fruits and vegetables. Installation of the water recycling technology will cost about 1 000 EUR and it will annually save 1 700 EUR to the company.

TMT Ltd – RECP Profile

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)





LAGI Ltd is soft drinks producing company located in Tbilisi. The company was established in 2001. At present, the enterprise employs 22 persons. The company produces up to 1.5 million bottles of different kinds of lemonades per year. Lagi Ltd sells its products in Russia, USA, Canada, Israel, Singapore, Kazakhstan, Azerbaijan, Armenia, Latvia, Lithuania, Estonia.

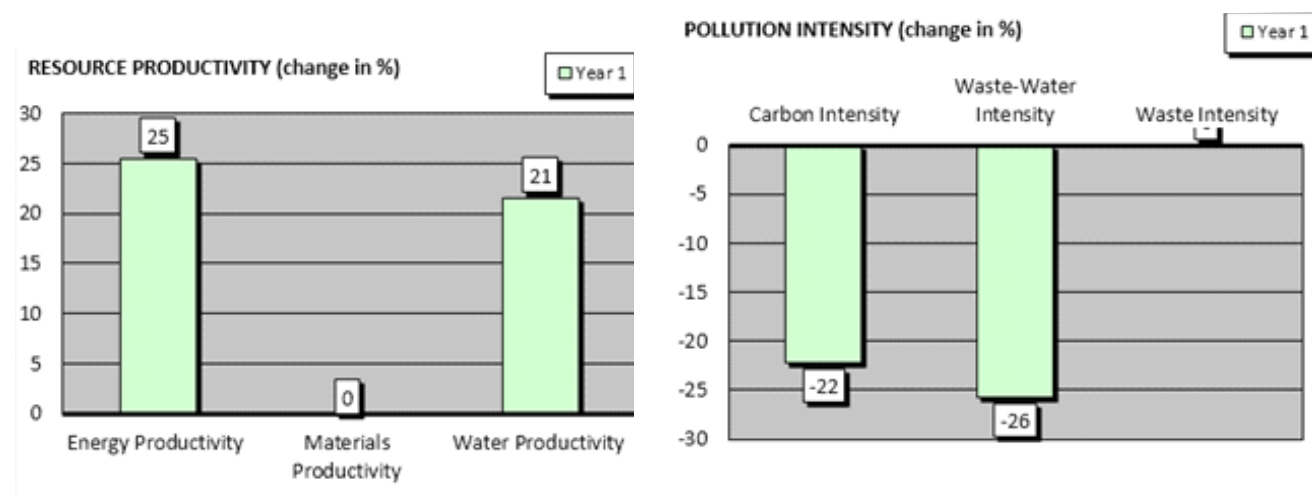
RECP assessment undertaken in the company found the bottlenecks in the energy and water productivity in the plant: Boiler used in the company for steam generation is outdated, poorly maintained and its capacity does not fit to the production requirements; Steam and condensate pipes are not insulated resulting in additional heat losses; Cooling water is not circulated in a closed system.

It was estimated that the replacement of existing boiler with a modern steam generator, thermal insulation of steam and condensate pipes, and installation of steam traps on the digester could annually save up to 3 530 m³ natural gas or about 27% of currently consumed natural gas. With the UNIDO's RECP project support the company undertook an in-depth technological and economic analysis of the energy and water efficiency options.

The analysis focused on two energy efficiency options: a) to replace existing outdated boiler with a modern steam generator; b) to undertake a repair of existing boiler and ensure its regular maintenance in medium term. The assessment found that both of these options could reduce natural gas consumption in the plant significantly. However, economic profitability of these options varies: In short term, the production volume in the company remaining at current levels, repairing the existing boiler is a cost efficient solution. However, in a longer term, if the company increases its production, replacement of the boiler with a modern steam generator will be a profitable investment. The analysis also found that installation of a cooling water circulation system will annually save 500 m³ water. This measure will reduce the company's total water consumption by about 18%, and wastewater discharges will be curtailed by 26%. Payback period of this investment is estimated to 2.5 years.

The company's management has a plan to increase its production in the coming years. With UNIDO project support the company is mobilizing funds from a local financial institution to implement the plan. Energy and water efficiency measures will be included in the investments the company is going to undertake. After one year of implementation of the investments energy productivity of the company will increase by 25% and CO₂ emissions intensity will reduce by 22%.

LAGI Ltd-RECP Profile



RECP demonstration at Lagi Ltd was implemented in close cooperation with the company's management and personnel. RECP experts together with the company's employees identified problems and their root causes. They together found practical solutions to the problems. The company management promoted RECP methodology among the personnel. The management has committed to continuously apply RECP in the enterprise.

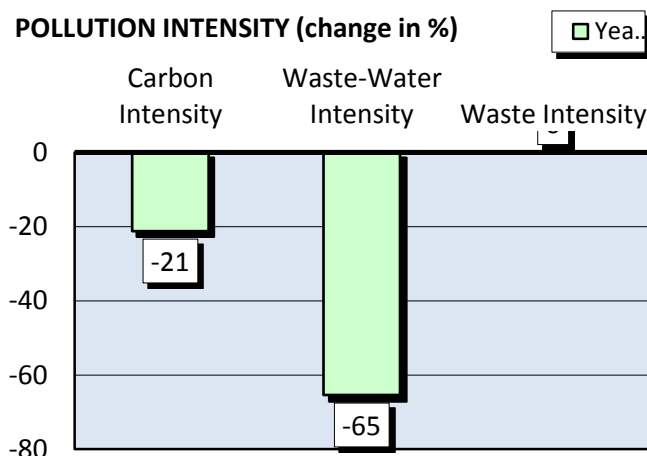
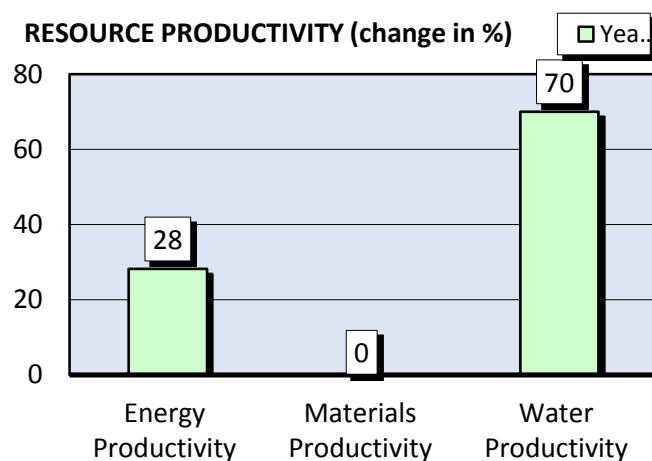
"GEORGIAN FARM" LTD is a small dairy located in Tbilisi. The company employs 11 people and it produces three types of products: cottage cheese, sour cream and yogurt. In 2015, the company produced 52.6 t cottage cheese, 56.4 t sour cream and 25.7t yoghurt. The company uses natural gas for steam generation; Electricity is mainly used for washing water heating; Tap water is used for cooling the pasteurized feedstock.



RECP demonstration and advanced techno-economic assessment undertaken in the company with the UNIDO project support helped the company to significantly reduce energy and water consumption, reduce waste water discharges and generate economic benefits through the savings. The RECP experts found that application of a heat exchanger could recover energy of warm water generated in the cooling process. The recovered energy could be used for washing water heating, replacing the electric heater. Part of the energy recovered could be used for preheating the feed water in the boiler. Installation of a tank and a pump could help to circulate the cooling water, preventing the wastewater discharges.

Total cost of implementation of the RECP measures was estimated to 1 100 EUR with payback period less than one year. The company has started implementation of the RECP measures with its own resources. This will help the company to save about 2 550 EUR annually.

Georgian Farm -RECP Profile



CHEMICALS PRODUCTION SECTOR



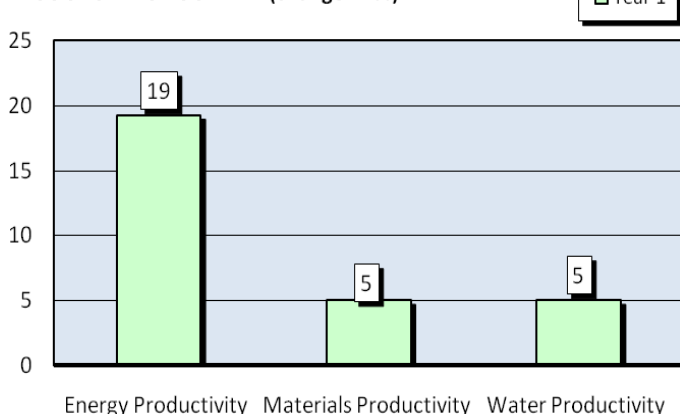
MnCHEMICAL GEORGIA Ltd is located in the industrial zone of Rustavi city. The company produces manganese dioxide (MnO_2) and feed grade manganese oxide (MnO) which are sold mostly in the EU countries. Powder of manganese oxide is used as an additive in animal feed; Manganese dioxide is used as a dye in the dry cell batteries production.

RECP assessment helped the company to find out that energy efficiency at the plant could substantially increase through recovering the waste heat contained in the flue gases emitted into the atmosphere. The waste heat could be used for preheating the raw manganese before entering the technological process.

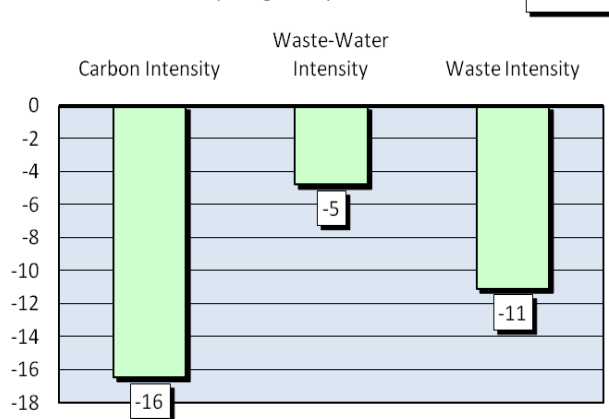
With the RECP project support the company undertook in-depth technological and economic analysis of the energy efficiency measures identified in the RECP assessment. The analysis found that investment of 10 000 EUR in the energy recovery technology will save 233 000 m^3 natural gas per year resulting in 74 600 EUR annual saving to the company.

MnChemical Georgia LLC- RECP Profile

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



RECP experts proposed alternative option for energy efficiency increase – utilization of the waste heat for heating a greenhouse which could be built close to the enterprise. The company needs about 50 000 EUR to construct the greenhouse (1 100 m^2) and install a heat exchanger "flue gas - water". Green products in the greenhouse can be produced three times per year. Average amount of green products per one yield has been estimated to 20-22 t with average value 26 000 EUR. Annual income from selling the green products is estimated to 78 000 EUR. Payback period of this investment is less than one year.

The company's management is considering the alternative RECP options to increase the energy productivity in the plant and generate extra economic benefit. The company also plans to mobilize funds to undertake the RECP investments.

The success achieved by the company is largely due to the engagement of the company's staff in the RECP assessment. The management's commitment to take actions to move forward to improving the production efficiency and environmental performance of the enterprise was of a decisive importance.



“ECOIL” Ltd produces engine oil M14B-2 and various lubricants through processing the base oil. The company employs 10 persons and its production rate is 440 tons of oil products per year. Technological process used by the company includes dosing and mixing various chemicals and base oil at 80-100°C. The plant uses natural gas for heating up the base oil. Electricity is mostly used by the oil mixing machine, compressors and other equipment.

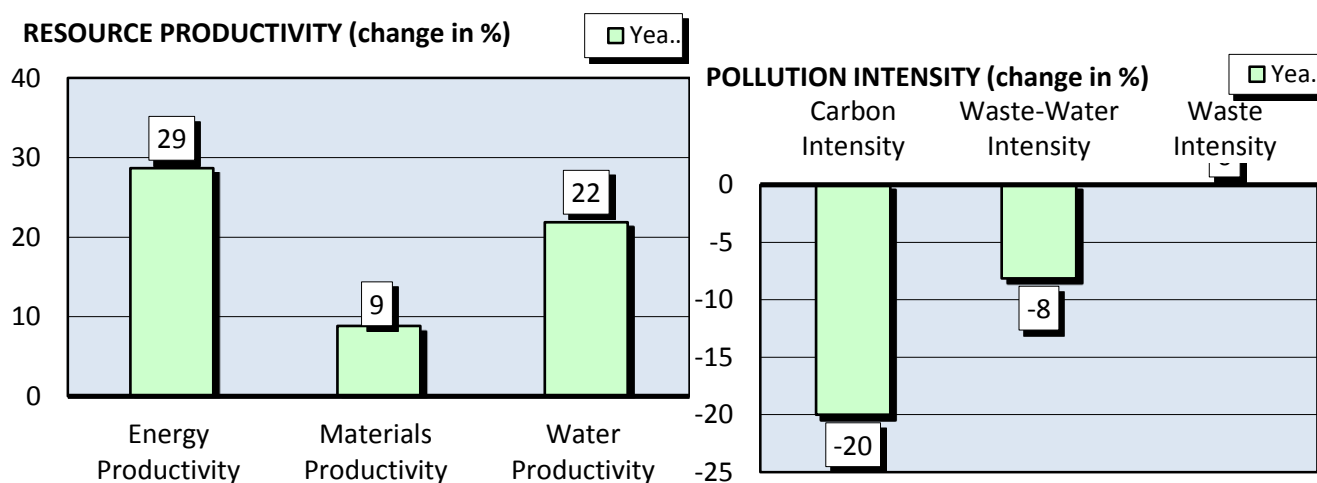


RECP assessment undertaken in the company in 2014 helped the company to identify measures to save energy, water and materials. Energy efficiency measures included replacing the old artisanal boiler with a modern steam generator and insulating the hot oil transportation pipes from the boiler to the mixer.

In 2015, the company undertook in-depth techno-economic analysis of the energy efficiency measures identified through the RECP assessment. The analysis proved that investment in energy efficiency in the amount of 11 790 EUR will save 9 860 m³ natural gas per year resulting in 3 500 EUR annual saving. Payback period of this investment has been estimated to 3.5 years.

Management of the company has applied to a local bank for a loan in order to modernize its technology and increase the production. The company will use the financial resources for introducing modern energy efficient equipment and materials saving technologies identified through the RECP assessment. Figures below illustrate the resource saving and pollution reduction potential of the RECP measures in ECOIL Ltd after the RECP investments are implemented.

ECOIL- RECP Profile



The key for the success of the RECP demonstration in ECOIL Ltd was active involvement of the company staff in the assessment process. They collected and provided full information related to materials and energy usage to the RECP team. The company management participated in the discussions with the experts on RECP opportunities and alternatives.

RUSTAVI AZOT - LIQUID OXYGEN PRODUCTION LINE. Rustavi Azot Ltd is a chemical company producing mineral fertilizers. The company also produces ammonia, cyanic sodium, nitric acid, liquefied nitrogen and other chemicals. Rustavi Azot exports its products to the Black Sea and Mediterranean countries. The company is the major supplier of nitric fertilizers to Armenia, Azerbaijan and Georgia. The plant is located in Rustavi. The company employs more than 2000 workers.



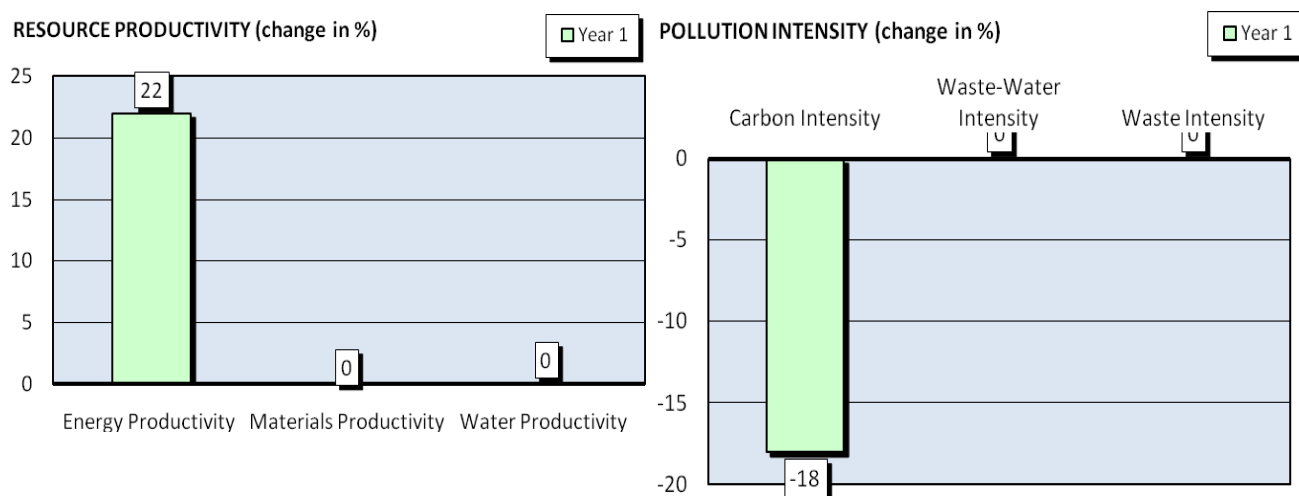
Liquid oxygen is one of the products produced in the company. A certain quantity of the product is used for technological processes within the company and the rest is sold out to the customers. Oxygen is used in metallurgy, medicine, food industry, metal welding and cutting processes. In 2014, the company produced 6125 t liquefied oxygen and for the production it used 13094294 kWh electricity and 30960 m³ water for the production.

National RECP experts, in cooperation with the company's technical personnel, identified RECP measures to reduce the energy consumption in the liquefied oxygen production line:

- Thermal insulation of the surface of the rectifying column, pipes and liquefied oxygen reservoir;
- Replacement of the sealing rings in the compressors and expander.

Implementation of the above measures will annually save 2 356 976 kWh electricity implying 18% reduction of energy use in the liquefied oxygen production process. Implementation of the RECP measures will also result in 330 t CO_{2eq} emission reductions annually. Energy productivity in the oxygen production will increase by 22%, and CO₂ emissions intensity will reduce by 18%.

Rustavi Azot liquid oxygen production line - RECP profile



Investment cost of the RECP measures is 25 000 EUR. Annual saving which potentially can be achieved through these investments has been estimated to 94 000 EUR.

RUSTAVI AZOT - WATER TREATMENT PLANT. Chemical company Rustavi Azot abstracts water from the Mtkvari River. The company treats the abstracted water mechanically and chemically for its further use in the technological processes. The water treatment system represents a complex of various installations, devices and pipelines. Energy use in the water treatment facility is high amounting to about 28 125 MWh.



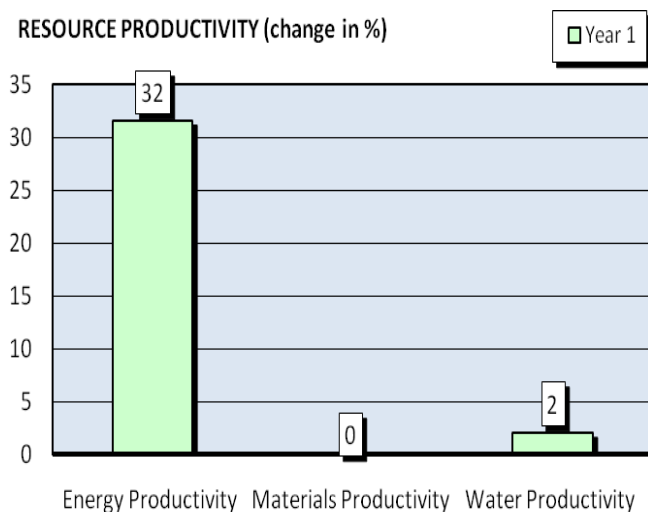
RECP measures identified through the assessment to reduce energy use in the water treatment and supply system include: Application of variable frequency drives to adjust speed of electric motors in the pumps and ventilators to the required power; Installation of new sprays in the water coolers with optimal inclination angle.

It has been estimated that implementation of the RECP measures will save about 6 750 000 kWh electricity and 86 400 m³ water annually. The decrease in energy use will result in 945 t CO₂ emissions reduction annually. Implementation of the above measures in Rustavi Azot company's water treatment and supply system will result in energy efficiency increase by 24% and water efficiency increase by 2%. Energy productivity of the water treatment plant will increase by 32% and carbon intensity will reduce by 24%.

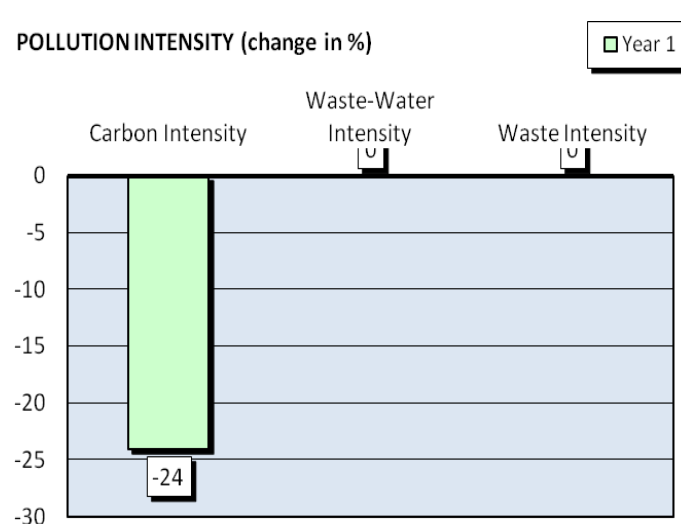
Implementation of the proposed measures will not only decrease the consumption of energy and water resources but will also bring economic benefits to the plant in the amount of 270 000 EUR annually. Investment cost of the proposed measures has been estimated to 297 000 EUR.

Rustavi Azot-water treatment plant- RECP profile

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



NEO-PRINT Ltd is one of the largest paper recycling companies in Georgia. The plant is located in the Mtskheta municipality. The Company recycles waste paper to manufacture corrugated carton. The company sells its products in Georgia and Azerbaijan. In 2015 the company processed about 1168 t waste paper to produce 1052 t products, and for the production it used 11 910 m³ water, 264486 m³ natural gas and 774 600 kWh electricity.

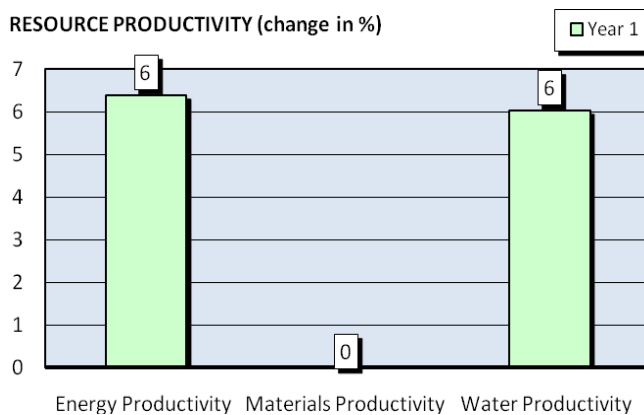


As identified through the RECP assessment, replacement of existing outdated paper slitting and winding machine with a modern equipment will help the company to save 34000kWh electricity annually; Reusing the waste water will decrease annual water consumption by 5 000 m³ - 42% of current water consumption. Waste water discharges will reduce by about 75 % and this will significantly minimize the environmental pollution.

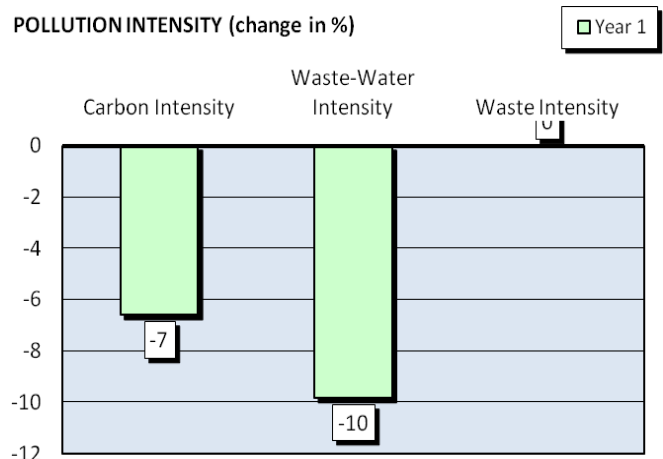
With the UNIDO RECP project support the company undertook in-depth technological-economic analysis of the energy and water efficiency measures. Total investment cost of the RECP measures has been estimated to 13 750 EUR. Payback period of these investments is 3.3 years. The energy and water efficiency measures will save up to 4 140 EUR to the company annually. The company is planning to implement the investments.

Neo-print - RECP profile

RESOURCE PRODUCTIVITY (change in %)



POLLUTION INTENSITY (change in %)



CONSTRUCTION MATERIALS PRODUCTION SECTOR

ROAD COMPANY "TBILISI" ASPHALT PLANT № 1 produces two types of asphalt concrete - hard-grained and fine-grained asphalt concrete. The company uses gravel, sand and bitumen in the production process. It also uses diesel fuel and natural gas for heating up the bitumen. Electricity is used for operating a number of engines.

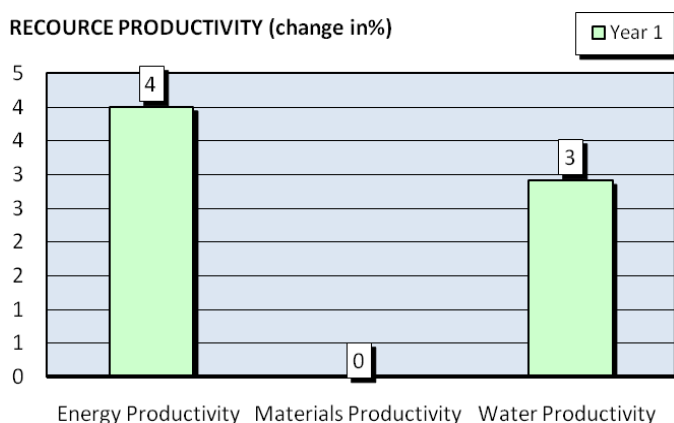


Assessment undertaken in the company by the RECP team found a significant potential for energy saving in the process of drying and heating the gravel and sand before they are mixed with bitumen for asphalt production. The inert materials are stored in the open air on the territory of the plant. Significant amount of energy is consumed for heating up the inert material and evaporating water from it because the piles of gravel and sand are not covered or protected from the precipitation during snowy or rainy days. Construction to cover the stocks of inert material with a waterproof film during the rains will cost to the company about 2 900 EUR. This measure will save 32 300 m³ natural gas or about 10 530 EUR per year. Energy will be also saved through thermal insulation of metal pipes used in the plant for bitumen transportation, and by application of variable speed controllers to the electric motors.

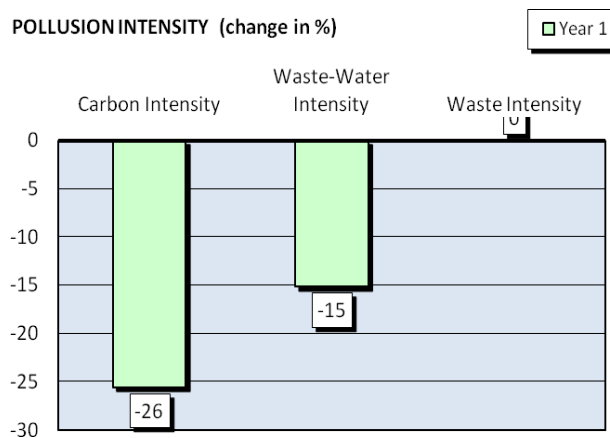
By implementing the RECP measures the company will annually save 51 700 m³ natural gas and 54 300 kWh electricity. This will save about 20 950 EUR per year to the company. Payback period of the RECP investment is eight months. Apart from the savings, implementation of the RECP measures will reduce CO₂ emissions by 26%, and wastewater generation will decrease by 15%.

ROAD COMPANY "TBILISI" ASPHALT PLANT №1V- RECP profile

RESOURCE PRODUCTIVITY (change in%)



POLLUTION INTENSITY (change in %)



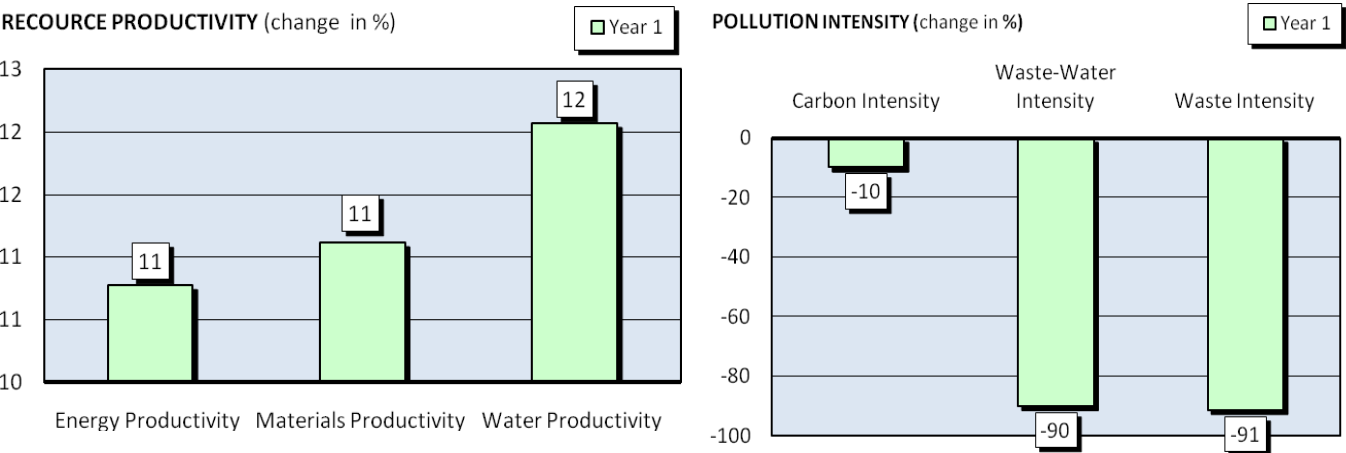
“QB CONSTRUCTION” Ltd is a small company producing foam-concrete blocks. The company started production of cellular blocks in 2014. Annual output of “QB Construction” amounts to 320 000 pieces of concrete blocks which are sold in local markets.



RECP has been a useful cost-saving tool for the company and the measures implemented have led to reduced waste of materials, environmental pollution and risks to workers health and safety. Implementation of the RECP measures helped the plant to improve the operating efficiency and improve the product quality.

Before the RECP assessment, the company used yellow sand for producing the foam-concrete blocks. Yellow sand contains clay which could cause foam concrete cracking during moulding and slicing. Yellow sand was replaced with black sand. This led to significant reduction of cracking in the plant. This substitution saved money to the company - black sand is cheaper than yellow sand. Moreover, the company saved energy, reduced water and material use as long as fewer of these resources is needed for the production of the same amount of a higher quality products. It has been estimated that substitution of the raw material resulted in saving 12600 EUR per year. There is a potential in the company to further improve materials use efficiency by reusing the cracked foam-concrete blocks, dust and debris generated in the workshop. This RECP measure, which will cost about 10 000 EUR, can save additionally 8 000 EUR per year. This will also improve health and safety of workers and make the company friendlier to the environment. Implementation of this measure will improve the company’s energy productivity by 11% and water productivity by 12%. These will result in 10% reduction of air emissions and decrease of wastewater generation by 90%.

“QB CONSTRUCTION”- RECP profile



SARINI Ltd

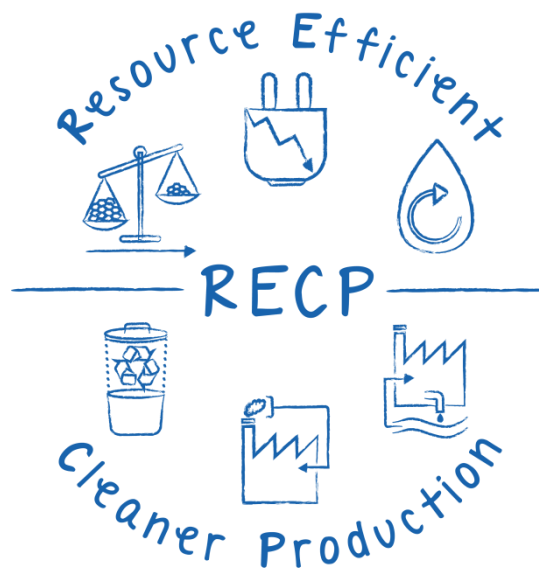


Rustavi based company Sarini Ltd is engaged in the production, maintenance and repair of various metal constructions. Resources used for the production include: electricity, natural gas, liquefied natural gas, gaseous and liquid oxygen, electrodes and paints.



RECP assessment undertaken at **Sarini Ltd** aimed at reducing the power and fuel consumption, reduction of harmful emissions into the air, safe storage of hazardous materials such as waste oil products and solvents. The RECP measures identified for improvements in the enterprise include improved management of truck fleet, efficient operation of electric engines and introduction of energy efficient lighting, replacement of old inefficient metal cutting and welding equipment with modern computer-controlled devices, organization of a safe storage of hazardous materials and waste, substitution of oil based highly toxic (VOC containing solvents) with less toxic or nontoxic paints.

The plant started implementation of the low cost RECP measures. The company purchased an automated device to replace the outdated method of manual cutting and welding. This investment helped the company to save 10 902 kWh electricity and about 0.7 t materials. Most importantly, productivity of the welding and cutting process increased substantially and emissions of toxic substances reduced. Furthermore, the company management plans to purchase new metal degreasing and cleaning equipment which will further reduce air emissions and improve quality of finished metal products of the company.



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