



Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

European Union for Environment Regional Programme “Resource Efficient and Cleaner Production (RECP) Project

RECP Coaching Program in Armenia

Nune Harutyunyan

Dshkhuhi Sahakyan

Tigran Sekoyan

Yerevan 2020

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Module 10. RECP audits steps

Action implemented by:





Action funded by
the European Union

RECP audit

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

RECP Audit is a systematic analysis of material, energy and water flows for selection of more efficient practices in small and medium enterprises aimed at economic, environmental and social benefits and improvement of environmental situation.

Knowing where you are and what you have got is the essence of good management and yet it is surprising how many organizations are not aware of their environmental positioning.

Purpose of a CP audit

- Identify “low hanging fruits” to generate immediate savings and to motivate the project team
- Set priorities for the project

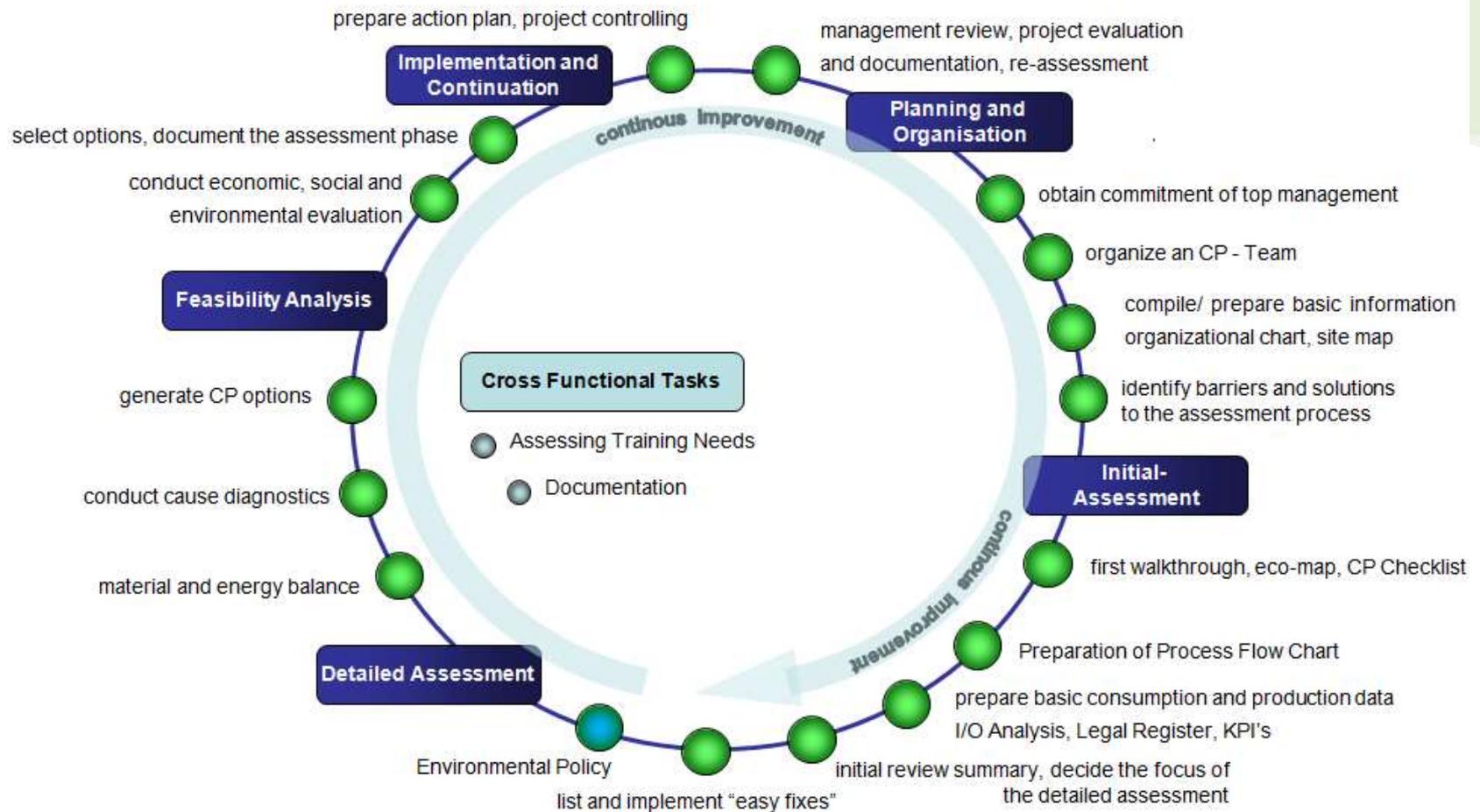
Action implemented by:





Action funded by the European Union

RECP audit cycle





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Context of a cleaner production audit

- **First company visit:**
Convince the company to participate in a project with the NCPC.
- **Start of the cleaner production project:**
Collect initial data for project planning, identify options to motivate the team.
- **EMS initial review:**
Obtain an overview of environmental impacts and the organization.
- **Within a cost reduction audit:**
Obtain an overview of the reduction potential.
- **Within continuous improvement:**
Determine benchmarks and ask for an expert opinion.

Action implemented by:





Action funded by
the European Union

Three steps

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

- **Step 1 – PREPARE**
 - Define responsibilities
 - Define the scope
 - Collect documents
 - Develop a schedule
 - Prepare checklists and inform staff

- **Step 2 – CARRY OUT**
 - Audit
 - Evaluate findings
 - Organize a wrap-up meeting

- **Step 3 – FOLLOW-UP**
 - Follow up on corrective action
 - Report to the management
 - Document and report

Action implemented by:





Action funded by
the European Union

Where to look (Options and low hanging fruits)

- Heating system
(piping, leaks, insulation,
boiler, quantities of fuel,
type, price)
- Cooling system
(insulation, compressor, etc.)
- Compressed-air system
(leaks, compressor, etc.)
- Water preparation and distribution
(dosage of chemicals, leaks, quantities, costs)



Action implemented by:



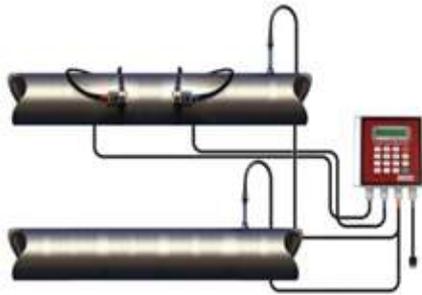


Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Laboratories and Tools On EE



Action implemented by:





Action funded by the European Union

Building insulation materials

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Mineral wool



Extruded polystyrene rigid boards



Sprayed polyurethane foam



Expanded perlite board



Perlite loose-fill



Foam glass block



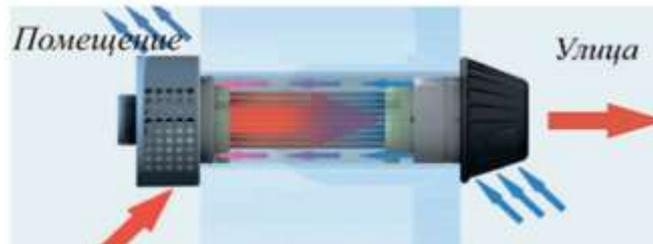


Action funded by the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Advanced technologies



Action implemented by:



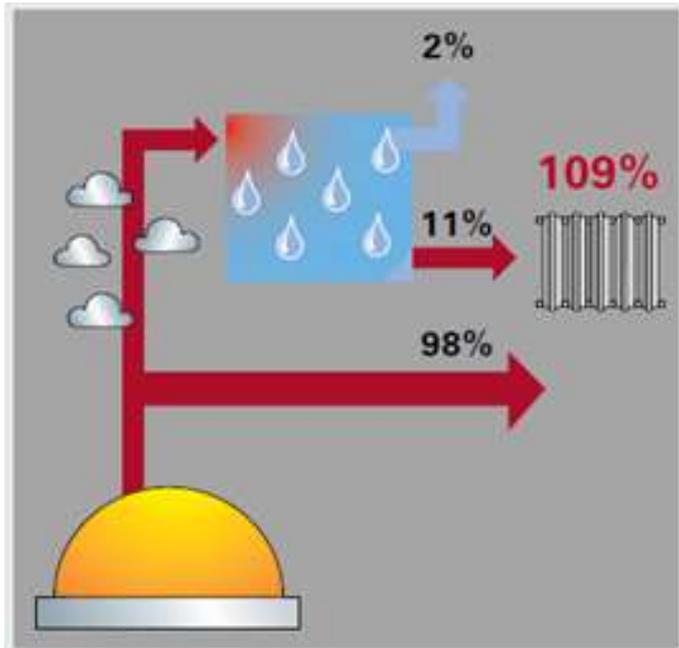


Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Condensing technologies



The recovery of the hidden heat

Condensing technology not only utilizes the heat from the combustion of gas, but also the unused heat that would escape up the chimney with a conventional heating system. Condensing boilers achieve excellent efficiency by extracting almost all of the heat contained in the flue gases and converting it into additional heating energy.



Action implemented by:





Action funded by
the European Union

RECP Audits Implemented in Armenia

EU4Environment
Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

The RECP objectives include a correct selection and efficient exploitation of materials, energy and water sources in terms of time and location for production process purposes.

The environmental benefits that are expected from RECP tools and methods implementation are minimization, neutralization, recycling, and management of waste production, wastewaters and pollution.

All business cases presented below are compiled during 2015-2016 based on "RECP audits", preliminary estimates and results conducted by the RECP experts.

The investigations aimed at improving the effectiveness of the enterprise activities are carried out in the agriculture, food, chemical and construction materials industries of the twenty-two pilot organizations.

Also the recommendations made by the "RECP Rapid assessments" for twenty eight SMEs engaged in the "Green RECP clubs" are used as well.

Action implemented by:





Action funded by
the European Union

EU4Environment

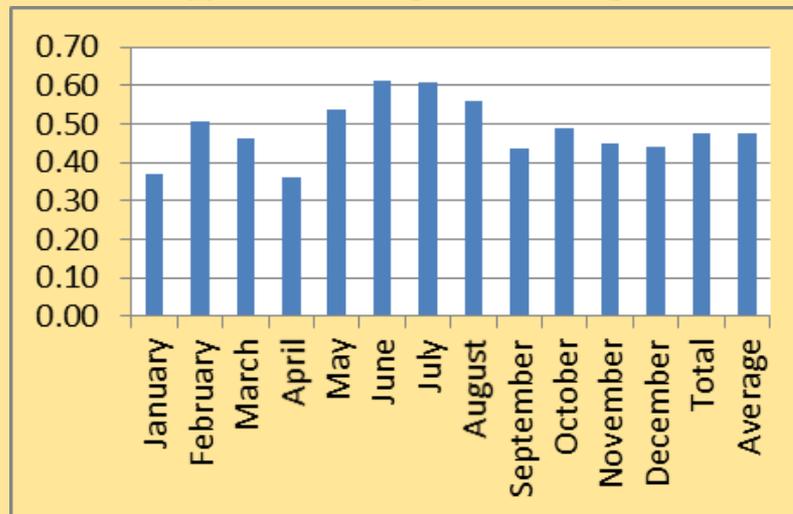
Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Ashtarak Dzu LLC

Example of Useful byproduct (Food Industry)

Armenia, Aragatsotn region, Aghdzk community

Eggs return ratio percent of output



In “Ashtarak Dzu” LLC, due to organization of: 1. Egg powder production (from rational and technical eggs, returned or overproduced useful eggs) and 2. Poultry meat powder (meat meal fodder) production (recycling of dead chicken and other wastes) the generation of waste will be annually reduced by around 25 tons.

Business benefits will simultaneously increase by several indicators.

RECP tools used: **Useful byproduct**, **Good housekeeping** and **On-site reuse and recycling**.

RECP measures business benefits: **Productivity increase** and **Licence-to-operate**, **RECP**

environmental benefits: **Reduction and utilization of waste**.



Action funded by
the European Union

EU4Environment
Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Lukashin agricultural association” cooperative company

Example of Reduction and treatment of wastewater (Food Industry)

Armenia Armavir region Lukashin village



RECP pilot project implemented several wastewater reduction measures in dry fruit producing “Lukashin agricultural association” cooperative company.

Wastewater effluent during initial cleaning of material is used for adjacent territory irrigation.

Reuse of third stage cleaning (rinsing) waters for initial cleaning process reduced the consumption of drinking water by 30%. Giving up on using caustic soda for initial processing of some fruits reduced the volumes of harmful wastewaters and decreased production costs.

RECP measures environmental benefits: **Reduction and treatment of wastewater.** **RECP** business benefits: **Cost savings, Productivity increase, Organizational efficiency.** **RECP** tools used: **Good housekeeping, Input Change, Technology change.**



Action funded by the European Union

Arminashogh Ltd

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Selection and efficient use of materials (Food Industry)

Armenia, Ararat region, Ararat village

Confectionery producing company “Arminashogh” Ltd makes the use of simultaneous production factories and stores not only in Ararat, but also in the capital – Yerevan. The most important priority is the modernization of the ventilation system in the biggest factory producing bread and confectionary. There are several other issues concerning the modernization of the equipment and the bread-pulp mixing system. The company operates in a very competitive environment and the only way to survive is through improving the quality of the products and reducing the costs¹.



“Arminashogh” Ltd successfully ensured the reception of new products thanks to refunds/buybacks (around 10% of the overall production). Following the trainings and suggestions from “RECP Green Clubs,” as well as the initial evaluation, the company started to produce rusk and returned lavash and “Matnaqash” bread types. The equipment is purchased (worth around 4,000 EUR) and rusk supply contracts are already signed. Packaged products are available in stores. As a result, payback period is about two years.

Business benefits of RECP: **Cost savings, Organizational efficiency, Licence-to-operate.**
RECP environmental benefits: **Selection and efficient use of materials and Reduction and utilization of waste, RECP tools used: Good housekeeping and Input Change.**

action implemented by:



1 The company of In terms of "Growth rate" RA commercial companies occupying first place in 2016, and won the "Leader of the Branch" title, which will be the market's reliability and long-term guarantee.



Action funded by
the European Union

Roz Fruit LLC

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Equipment Modification (Food industry)

Armenia, Lori region Vanadzor City



“Roz Fruit” cannery annually processes over 150,000 kg of vegetables and fruits and produces around 80 various types of products, including jams, conserved and frozen vegetables, compotes, natural juices, etc¹. The replacement of the old (morally and physically worn-out) steam boiler with the new one can save up to 5,600 m³ natural gas, or 53,300 kWh energy, or 1,600 Euros. The reduction of annual greenhouse gas emissions will comprise about 11 tonnes of CO₂ equivalent, the required investment is about 5,000 Euros and buyback is around 3 years. The increase of safety and reliability in the production process is also obvious.

RECP tools used: Equipment Modification, Good housekeeping and Technology change.
RECP measures business benefits: Cost savings and Organizational efficiency.
RECP environmental benefits: Selection and efficient use of energy source and Reduction and controls over emissions.

Action implemented by:



¹ The company does not use any preservatives or chemicals (artificial vitamins, preservatives, E group compounds, etc.) and food preservation purposes, the products used are products fresh water, sugar, salt and some natural spices.



Action funded by the European Union

Examples for Armenia

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Cost Savings example (Food Industry)

Armenia, Ararat region, Ararat village



In “Ararat Abricon” LLC internal and external lighting systems incandescent and metal halogen lamps¹ were replaced with energy efficient (fluorescent and LED) bulbs, resulting in about 450 thousand AMD annual reduction of electricity expenditures. At the same time the reduction in carbon dioxide emissions amounted to around 4.3 tons annually

Internal and external LED lamps



Business benefits from RECP implementation: **Cost savings**. RECP environmental benefits: **Selection and efficient use of energy source** and **Reduction and controls over emissions**, RECP tools used: **Good housekeeping** and **Technology change**.

Action implemented by:





Action funded by
the European Union

Examples of Selection and efficient use of energy source (Food Industry)

Armenia, Aragatsotn region, Aghdzk community

Several measures directed on efficient exploitation of energy resources, including changing the energy source, were applied in Astarak Dzu LLC, a company working in the egg production industry. Aviaries and secondary spaces are heated with natural gas, instead of electricity¹. Mercury lamps were replaced with energy efficient (sodium and LED) lighting fixtures in external lighting system²: At the same time, as a result of energy efficiency measures applied in the LLC, the emissions of greenhouse gases has decreased by around 24 tons of CO₂ equivalent annually.

Natural gas heating



External and internal LED lighting fixtures



RECP measures environmental benefits: **Selection and efficient use of energy source** and **Reduction and controls over emissions**. **RECP** business benefits: **Cost savings, Organizational efficiency**. **RECP** tools used: **Good housekeeping, Input Change, Equipment modification and Technology change**.

1 Annual financial savings or cost reductions of 750 thousand AMD.

2 The reduction of energy costs amounted to 330 thousand AMD.



Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Reduction and utilization of waste (Chemical Industry)

Armenia, Yerevan City



An interesting option for waste reduction was introduced in “KASHI” OJSC, with the help of RECP. The remainders of materials: salt and pieces of leather are reused in livestock farms as a fodder admixture, as well as a component in organic fertilizer extraction process (compost).

It is a typical example of a case, when waste from one production process becomes an input for another production-creating basis for bilateral successful cooperation.

RECP measures environmental benefits: **Selection and efficient use of materials** and **Reduction and utilization of waste**. **RECP** business benefits: **Cost savings, Productivity increase**. **RECP** tools used: **Good housekeeping, On site reuse/recycling**.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Selection and efficient use of water source (Production of Construction Materials) Armenia, Lori region Vanadzor City



The producer of decorative tiles “Martin Tovmasyan” PE chose rainwater as a water source for cement-sand mixture. Using the rainy climate of Vanadzor, the PE has created a water collecting system (a water tank with the capacity of 2 tonnes), through which rainwater is used in the production process. The collected water is sufficient for the whole production, thus the city’s main water system is not used.

RECP measures environmental benefit: **Selection and efficient use of water source** and **Reduction and treatment of wastewater**. **RECP** business benefits: **Productivity increase, Organizational efficiency, Licence-to-operate**. **RECP** tools used: **Good housekeeping, Input Change, Technology change**.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Productivity increase example (Food Industry)

Armenia, Kotayk region, Hrazdan City



Following the principles of RECP, “Lilit Ghukasyan” PE has doubled its productivity in a quite short period. The PE is producing pastries and confectionery in the city of Hrazdan. They plan to expand their industrial areas and implement several environmental and resource-efficient activities, especially the transition from the use of liquefied petroleum gas to environmentally friendly fossil fuel (natural gas) and renewable energy sources.

Business benefits of **RECP: Productivity increase**. **RECP** environmental benefits: **Selection and efficient use of energy source** and **Reduction and controls over emissions**. **RECP** tools used: **Good housekeeping, Input Change, Better process control**.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Product quality improvement example (Food Industry)

Armenia, Ararat region, Lusgyugh village



Air ionization equipment and air and water sterilization systems were installed in cheese and yogurt producer “Arame and Sofi” LLC - as a measure of preventing materials and products from possible perishing¹.

This non-chemical sterilization method at the same time enables to increase the cooling temperature by 1-2 degrees, which results in lower energy costs.

Business benefits of **RECP**: **Improved product quality**. **RECP** environmental benefits: **Selection and efficient use of materials and energy** and **Reduction and utilization of waste** and **Reduction and controls over emissions**, **RECP** tools used: **Good housekeeping, Input Change, Better process control, Equipment Modification**.

Action implemented by:



¹ The cost of equipment installation is 50 thousand AMD



Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Organizational efficiency improvement example (Food Industry)

Armenia, Syunik region, Kapan City



Several measures have been implemented in dairy and meat products producer “MARILA” LLC, including the following: Market research concerning issues of returning unsold goods, sales stagnation, food transportation and conditions of storing the food in sales points. Sensors were installed on production unit lamps, temperature controllers/regulators were set on heating system batteries (reduction of energy consumption by 20%):

Measures taken reduced the emission of greenhouse gases by 8.4 tons.

Business benefits of **RECP**: **Organizational efficiency, Cost savings.** **RECP** environmental benefits: **Reduction and utilization of waste** and **Reduction and controls over emissions,** **RECP** tools used: **Good housekeeping, Better process control.**

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Licence-to-operate example (Chemical industry)

Armenia, Yerevan City

Construction of treatment plant in “Kashi” OJSC created the opportunity to enter international markets and created sales opportunities for half-manufactured products and final goods. The treatment station was constructed with joint efforts from US International Development Agency “Sustainable Water Resources Management for Enhanced Environmental Quality” and “Agribusiness Small Medium Enterprise Market Development (ASME)” projects. At the same time, the possible negative impact on Hrazdan river and the surrounding area was reduced.



Business benefits of **RECP: Licence-to-operate**. **RECP** environmental benefits: **Selection and efficient use of water source** and **Reduction and treatment of wastewater**. **RECP** tools used: **Good housekeeping, Better process control, Equipment modification**.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Reduction and controls over emissions (Food Industry)

Armenia, Lori region Vanadzor City



“Meghratoun” Ltd is producing honey and non-matured wine. The company pays great attention to environmental issues: light bulbs are converted to LED lights and walls are heat-insulated with polystyrene foam tiles. The company also plans to install solar battery panels, which will result in significant savings in natural gas and electricity consumption, as well as in reduction of greenhouse gas emissions. According to calculations, yearly savings will comprise around 230,000 AMD. In addition to environmental benefits, the use of solar power and other renewable energy sources can significantly increase the company’s reputation.

RECP measures environmental benefits: **Selection and efficient use of energy source** and **Reduction and controls over emissions**. **RECP** business benefits: **Cost savings** and **Licence-to-operate**. **RECP** tools used: **Good housekeeping, Input Change, Equipment modification** and **Technology change**.

Action implemented by:





Action funded by
the European Union

Example of Good housekeeping (Production of Construction Materials) Armenia, Shirak region, Myisyan village



In “HATM” household union that produces construction materials and furniture currently used administrative spaces were optimized and matched with current production volumes¹. As a result of several taken measures² there is an annual saving of costs of about 2.7 mln AMD.

At the same time, the electricity consumption is reduced, and emissions of CO₂ decline by around 30 tons.

RECP tools used: Good housekeeping, Better process control. RECP business benefits: Cost savings, Organizational efficiency. RECP environmental benefit: Selection and efficient use of energy source and Reduction and controls over emmisions.

Action implemented by:



1 This is typical to many post-Soviet Union economies.

2 The heating surface of administrative sector decreased by 280 m², infrared heating system was installed in the manufacturing sector, unnecessary use of the transformer was reduced, and the power supply system modifications were made.



Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Input Change (Food Industry) **Armenia, Armavir region, Yervandashat village**



By combining electric and solar drying units, a technology change for dry fruit production was performed in “Ervandashat agricultural association” consumer cooperative company. As a result of using solar energy the saving of electricity amounted to around 75% or 4.7 MWh annually. Emissions reduction amounted to 2 tons of CO₂ eq. The annual saving is equal to 200 thnd AMD and the payback period is 10 months. There are evident environmental benefits.

RECP tools used: Input Change, Technology change and Equipment modification.

RECP measures business benefits: Cost savings, Improved product quality. RECP

environmental benefits: Selection and efficient use of energy source and Reduction and controls over emmissions.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of Better process control (Food Industry) Armenia, Kotayk region, Abovyan City



The production process control has been strengthened in “Sam-Har” Ltd, which produces 15 types of compotes and preserved jams, two types of jams, 10 types of natural juices and 4 types of pickles. Additionally, the storage space of the company has been optimized bringing environmental and business benefits.

RECP tools used: Better process control, Good housekeeping. RECP measures business benefits: Cost savings and Organizational efficiency. RECP environmental benefits: Selection and efficient use of materials and energy source, Reduction and utilization of waste and Reduction and treatment of waste water.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Technology change example (Food industry) Armenia, Lori region Vanadzor City



The producer of prepared and frozen foods “Lusine Baratyan” PE was provided with technology improvement suggestions, which will help them to save raw materials, energy and water.

The PE is continuously perfecting its products through improvements in the main production process.

RECP tools used: Technology change, Equipment Modification, Input Change and Better process control. RECP measures business benefits: Productivity increase, Improved product quality, RECP environmental benefits: Selection and efficient use of materials, Reduction and utilization of waste and Reduction and controls over emissions.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Example of On-site reuse and recycling (Carpets Industry)

Armenia, Kotayk region, Hrazdan City



Producer of rugs and carpets “Isahak Melqumyan” PE gave a new breath to the Armenian traditional carpet production technologies. Yet, the waste from the production of wool can be used to produce pressed thick felts. Likewise, the cotton fibres can be used for the production of candle filters. As a result of RECP approach individual entrepreneur additional annual earnings in the first year will be about 450 thousand drams.

RECP tools used: **On-site reuse and recycling, Good housekeeping and Useful byproduct.**
RECP measures business benefits: **Productivity increase and Licence-to-operate, RECP**
environmental benefits: **Reduction and utilization of waste .**

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

Product modification example (Production of Construction Materials) Armenia, Tavush Region, Dilijan City



“Levon Avagyan” PE uses plastic waste materials in addition to PE’s annual additional waste processing opportunities. Dilijan based entrepreneurs produce roof tiles (single roof materials typical to Dilijan) made of thick cement mortar and sand mixed with the waste from plastic materials. The production of suggested roof materials containing solar battery elements is one of RECP advanced measures requiring large investments.

RECP tools used: Product modification and Technology change. RECP measures business benefits: Productivity increase and Improved product quality. RECP environmental benefits: Reduction and utilization of waste.

Action implemented by:





Action funded by
the European Union

EU4Environment

Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine

THANK YOU

Nune Harutyunyan,
EU4Environment RECP project coordinator

Nune.harutyunyan@rec-caucasus.org

Dr. Dshkuhi Sahakyan – RECP Expert

Dshkhuhi.sahakyan@rec-Caucasus.am

Tigran Sekoyan - RECP Expert

tigransekoyan@yahoo.com

Action implemented by:

