



The National Cleaner Production Center - Macedonia

CP Assessment Report

Company: Vipro DOOEL, Gevgelija

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Location: Gevgelija and Prdejci village (Gevgelija Municipality)

Assessment conducted by:
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Assessment methodology

Cleaner Production (CP) is defined as the continuous application of an integrated preventive environmental strategy to process, products and services to increase the overall efficiency and to reduce risks to humans and environment. A CP project follows a certain methodology and consists of the following elements: data collection, analysis of the collected data, option generation, feasibility analysis, implementation, controlling and continuation. This report follows the UNIDO CP assessment methodology but it is based on one company visit. Therefore the report should be assumed as basic CP assessment report.

Company profile

- Brief history, Ownership, Number of employees

Vipro was established in 1993 as a private enterprise to produce beverages and mineral water. By 1998, beverage production had been replaced with processed vegetables and fruits. The plant currently is located in Gevgelija.

The number of employees in summer processing season is 75 people. In winter period the plant operates with decreased capacity and 15 employees.

- Activities, Main production, Products

The principal Vipro products are: Ajver (roast red paprika, eggplant, oil and salt), Roasted Red Paprika (red paprika, water, vinegar and salt), Lightly Roasted Red Paprika (semi roasted chilli paprika), Roasted Red/Green/Motley Paprika - in garlic marinade (paprika, water, vinegar, salt, garlic and vegetable oil), Lutenica (chopped hot peppers with added roast paprika), Summer

Vegetable Stew, Mandja Antipasto, Piquant Hot Salad “Apetitka”, and Roasted Eggplant Puree. All of these products are with similar ingredients and produced through the process of **roasting, skinning, chopping and cooking**. Besides these Vipro produces processed fruits. Processing operations are done on the bases of traditional home recipes. Currently the production is around 1 million units per year, mainly produced in summer period. 85% from the total production is exported in North America and Europe.

- Plans for production expansion, investments, new equipment

In 2007, Vipro purchased an old poultry farm close to the village of Prdejci with total area of 60,000 m² of which 10,000 m² is under 11 buildings. The reconstruction of the new site is ongoing. Vipro plans to move all of their production into 5 buildings on the new site by the mid of 2009, in three phases. In a period of the next three years Vipro plans to increase the production from 1.150.000 to 3.000.000 units, until 2010, with a possibility to enlarge the production capacity up to 5.000.000 units.

- Implemented standards, awards, certificates, permissions

In the last period Vipro implemented HACCP safety, ISO 90001 management system and IPPC/environmental permits required by Macedonian authorities. Vipro holds number of gold and silver medals awarded for the quality of their products (See Annex).

Material Flow Analysis

- Processes, process diagram

Processing operations are done on the bases of traditional home recipes. The production process is organized in several steps that include processes of **roasting, skinning, chopping and cooking**. Currently, Vipro's old facility has 3 production lines with 3 ovens (tunnel and rotational) used in the processes of roasting and pasteurization. There is a plan for installation of 10 production lines at the new facility in Prdejci plant, with new 10 ovens, which are going to satisfy the Vipro plans to increase the production in a short term period to 3.000.000 units.

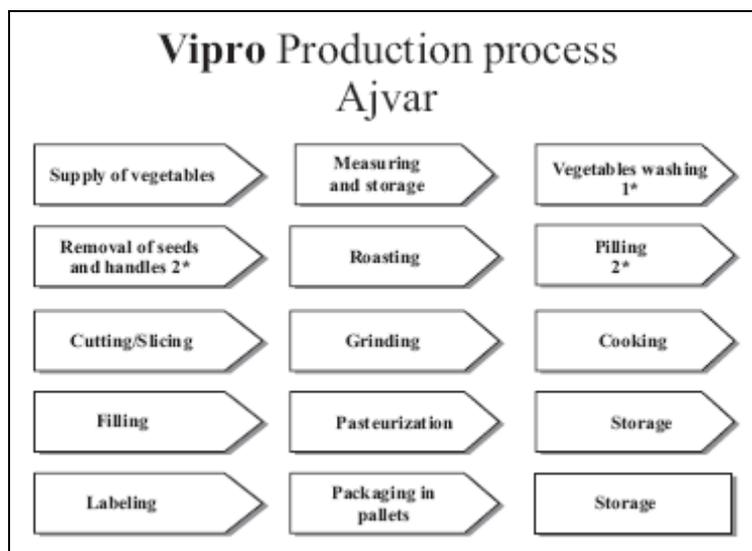


Figure - Production process in Vipro DOOEL

- **Materials handling**

All raw materials are visually tested for quality before being accepted from suppliers. The transferring activities follow proper procedure and are well documented. Practically there is no raw material with expired date since the supply of raw materials is on daily basis. Every material needed in production process (such as crates, palettes, packages, glass and containers) is inspected for damage before being accepted.

- **Raw and waste materials, management of waste materials**

There is a storage area for raw materials, and a smaller part has been refrigerated. According to the owner there are no hazardous raw materials according the requirements of HACCP and ISO standards. Disinfection detergents with biodegradable compounds are used in the cleaning process. There is a storage area for final products organized according to storage regulations (temperature, humidity, light). A responsible person is full time employed in the storage areas.

Basic raw materials (vegetables) are packed in returnable containers (boxes) and recycling bags. All other packaging is properly packed and delivered to Public Communal Utility for disposal. Vipro segregates its wastes as much as possible. Plastic packaging bags are given for recycling, and organic waste is given to the local farmers. It is estimated that about 90% of the whole waste is organic.

The new plant in Prdejci is designated for storage of final products that will be stored in separate buildings protected from damage, contamination, and exposure to weather. It will be according to regulations and standards requirements. The layout of the facility will result in minimizing traffic through material storage areas. At new plant process flow was prepared by SINTEF - Norwegian University and it is in order to reduce costs of any kind. Technical team is employed to cover all necessary and regular maintenance activities.

- **Water in the technology processes, waste water treatment/management**

The water consumption in total production process and cleaning is about 10 m³/hour, Vipro uses the water from ground wells and water distribution system of Gevgelija, and the water quality is properly tested by relevant health authorities. Water consumption in the production is mayor in the first process - cleaning the vegetables, but the quantities of water that are used in the process of skinning, chopping, cooking and pasteurization can not be neglected. Regular cleanup per shifts are conducted with water under pressure. According to the owner there are no water softeners used.

There is no water flow meters installed for different technology processes. Company has plans to evaluate and eliminate all unnecessary rinse costs and to eliminate the excessive rinses in different production processes at the new facility.

Currently there are no water conservation measures, recycling, and reuse techniques, practiced in processes that use water or generate wastewater (e.g., cleaning and rinsing operations). High pressure washing process is planned to be implemented at the new facility.

There is no appropriate facility for waste water treatment, only the fundamental segregation process of organic materials is currently undertaken in Vipro. There are regular inspections of waste water from the Ministry of Environment and their reports have been classified the quality of waste water in the third class. There will be impact on surface waters of recipient if settlement tanks are not installed. This is one of the most important issues that should be solved and the construction of facility for treatment of waste water (WWTP) has to be one of the priorities at the new plant.

Energy Management

There is an extensive energy use in the processes that are taking place in Vipro – Gevgelija. According to the estimations, depending on the type of product, energy participates with 10-20 % in the final price. Although the company belongs to the group of small and medium enterprises, due to the character of the technology processes, various forms of energy are used: steam, hot water, electricity and compressed gases. The company has its own boiler room with two steam boiler units installed, one with capacity of 1 t/h and one with 2 t/h, mostly operating at 4 bar steam pressure. The produced steam is used completely for technology purposes. The steam cycle is closed, meaning that almost 98 % of the condensate is returned to the boiler room.

The fuel used in the boilers is light oil and the max. consumption is about 1 t/day, during the most intensive seasonal works. There is an underground fuel tank of 10 m³ capacity in the vicinity of the boiler room. According to the environmental inspection measurements, as well as according to the estimations, the emissions to the air coming from the boiler room stack are in the legal limits.

A steam/hot water heat exchanger with appropriate capacity is installed in the boiler room and connected to the heating system of the company, but it is not in function. The main reason for that is the decreasing intensity of production activities in the winter period. The heating is resolved with local heating units on LPG.

The overall state of the energy equipment, including pipelines, is satisfactory. The equipment is relatively well maintained and the operation efficiency is quite well, although there are possibilities for improvement.

Between the other important energy equipment, there are a compressor of 7.5 kW, with capacity of 2500 m³/h, air dryer and cooling facility.

Other fuel used in Vipro is LPG (liquefied petrol gas). It is stored in three tanks, one with volume 10 m³ and two with 5 m³ each. LPG is used in the furnaces (two rotating and one tunnel) for roasting of vegetables.

Although the general condition of the energy equipment and installations in Vipro is quite satisfactory, there is a space for further improvement, with some measures for energy saving and better energy efficiency. CP options would generally consist of better insulation of steam and condensate pipelines, regular maintenance of the system, replacement of non-functioning steam traps, valves etc. For eventual improvement of the energy efficiency of the furnaces, additional, more detailed assessment is necessary.

Environmental Performance of the Company

Vipro has an environmental policy that is settled on a clearly visible position on several places in the plant. Besides these there are posters in the plant showing the differences between good and bad hygienic habits.

The company hires an outside persons/companies to conduct environmental assessment for different purposes (HACCP application, ISO application, grant application etc). The application for IPPC permit for adjustment with operational plan was prepared till this summer, but Environmental Impact Assessment is not prepared yet.

Vipro was several times inspected by the Environmental Inspector and there were no violation of current Legal Requirements and there are no fines or penalties given to the company.

Waste materials handling

Basic raw material (vegetables) are packed in returnable containers (boxes) and recycling bags, all other packaging is properly packed and delivered to Public Communal Utility for disposal. The containers are emptied thoroughly before cleaning or disposal. The facility segregates its wastes as much as possible, mainly solid wastes from aqueous wastes. Plastic packaging bags are recycled, and organic waste is given to the local farmers. It is estimated that 90% of the whole waste is organic. All of the solvents and lubricants used in Vipro are specially selected for use in food production process. All of cleaning techniques according to the owner are in line with HACCP requirements which are going to be introduced at the new plant. The facility does not use loading systems that minimize spills and fugitive losses such as dust or mists. The storm water runoff is not controlled from the land disposal site. On the other side, the industrial waste management and outside manufacturing areas are often checked for spills and leaks.

Current Operating Practices

- Good operating practices

The owner claims that there are formal personnel training programs on raw material handling, spill prevention, proper storage techniques, and waste handling procedures. Records are kept for each waste, documenting sources of origin and eventual disposal. The operators are provided with detailed operating manuals or instructions sets. All operator job functions are well defined, except for the season workers who have wide job descriptions. Management is permanently on the site and supervising the process. Company doesn't have specific goals for waste minimization but they are trying to minimize every waste and they are aware of direct loss of materials. Improvement toward good operating practices is expected after the movement of the plant at the new site in Prdejci. Having in mind that currently the whole production process is performed on 500m² the impression is that quite enough has been made towards good operating practices.

- Good housekeeping

The work environment is almost clean. Spillage is moved occasionally. The floors are cleaned by brooms and water under pressure. The walkways are free of containers as much as it could be done in the available space. Proper walkways with no containers protruding into walkways are planned for the new plant. The owner claims that the employee interest in good housekeeping is stimulated.

- Partnership with other stakeholders

All of the supply of raw material and production is planned ahead according to signed agreements with suppliers which are scheduled by quantity, day and hours of delivery. The recyclable waste is taken away by the responsible enterprises. Pepper and vegetable organic solid waste is given to farmers for animal feed.

Identification of CP Opportunities

- Technology processes improvement

Technology process improvement is currently done by investing in a completely new plant. The new plant that is being built in Prdejci will partly use the current production lines but also new investments are planned. The new production lines and the new technology will be made in USA. It is expected that the new technology will be energy efficient. The layout of the facility will result in minimizing traffic through material storage areas. At new plant process flow was prepared by SINTEF – Norwegian University and it is in order to reduce costs of any kind.

- Water

Water is used in different stages of the production process (vegetable washing, vegetable peeling before and after roasting, floors washing, CIP...). Based on observations of vegetable processing plants during September, water usage seems to be large. The company uses ground wells as an alternative to the municipal water supply system. The region of Gevgelija is rich in good drinking water so generally not much concern is made toward water consumption decrease.

Water savings have to be one of the main issues get in consideration, because there are many possibilities in different production processes in Vipro for return, reuse of water, or to eliminate the water leakages and spills.

At Vipro, wastewaters are currently discharged to the municipality (Gevgelija) but the new production facility does not have any wastewater treatment. This is one of the most important issues that should be solved and the construction of facility for treatment of waste water (WWTP) has to be one of the priorities at the new plant.

- Waste and emissions minimization

Currently Vipro uses oil and LPG for the production processes. To reduce the air emissions Vipro should consider the use of natural gas instead or renewable energies for isolated systems. It is estimated that glass breakages are around 0,1-0,2% which corresponds to 1t/year glass. Vipro should take responsibility to enable recycling with other stakeholders.

- Health and safety

The traditional recipes for vegetable processing are undergoing several heating processes (roasting, cooking and pasteurization). However, the vegetables in the sub-processes should be covered and protected from insects.

- Energy saving and energy efficiency measures

The overall condition of the energy equipment and installations in the company is quite well. However, there are possibilities for certain improvement, by implementation of some measures for energy saving and better energy efficiency. CP options would generally consist of regular monitoring and maintenance of the steam and condensate system; replacement of non-functioning steam traps, valves and other devices and equipment; better insulation of the pipelines etc. For eventual improvement of the energy efficiency of the furnaces, additional, more detailed assessment is necessary.

Most of the measures for improvement of the energy efficiency and energy saving for Vipro belong to the common steam system maintenance activities. The cost of such measures is not high and the approximate pay-back period is usually less than two years.

Concluding Remarks and Recommendations

The owner of the company has a clear vision about the concept of Cleaner Production. He is committed to implement more CP principles in the new plant that is being built in Prdejci. He plans to improve the good house keeping practices, to improve the waste logistics, as well as to minimize water and energy consumption in the new plant.

The owner of Vipro participated in all the phases of the company assessment. At the production site the quality manager of the company joined the assessment and stayed until the end of the visit. Vipro is a company of relatively small size so it was considered that during the visit 2 persons to be trained (the owner and the quality manager) is appropriate. However the company management is aware that training is needed also for the rest of the employees, so the company organizes trainings and also hires outside company/persons to conduct environmental assessment for different purposes (HACCP application, ISO application).

The national experts from the National Cleaner Production Center (NCPC-MK) explained the goals and the aims of the cleaner production. During the audit the owner showed big interest to learn more and to cooperate in the future. An example of his awareness of the CP principals is the fact that the owner of Vipro considers renewable energy sources (solar and wind energy) in the new plant in Prdejci, since the region, besides good drinking water, is rich in wind and solar energy.

A detailed CP analysis, with comprehensive materials flow, energy management and environmental performance analysis, for the new plant in Prdejci was recommended to the owner. Also, further cooperation with the NCPC-MK was recommended.

Skopje, 12.09.2008

Director of the NCPC-MK

Atanas Kocov, PhD

CP experts

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Annex

Photo documentation



Figure 1. Awards

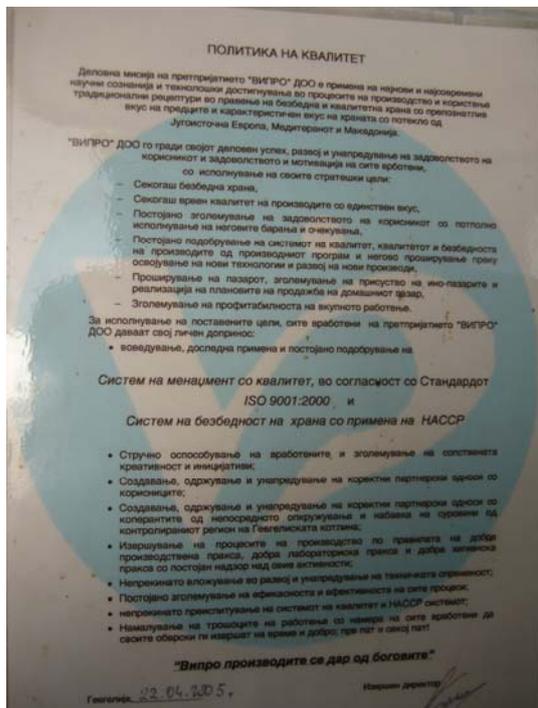


Figure 2. Quality policy



Figure 3. Equipment in the boiler room



Figure 4. Production line



Figure 5. Packing



Figure 6. Company yard