



CP Assessment Report

Company: Vizba Valandovo DOOEL

Contact: Mr. Stevo Kotevski, oenologist
Tel. and fax: + 389 34 38 38 81
E-mail: contact@vizbavalandovo.com.mk
Internet: www.vizbavalandovo.com.mk

Location: Valandovo

Assessment conducted by:
Margarita Ginovska, Snezana Cundeva (NCPC-MK)

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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

Vizba Valandovo DOOEL – Valandovo is a private enterprise since 2004, established on the basis of the winery and wine plantations from ANSKA REKA AD – Valandovo. The winery was built and started operations in 1953, was expanded in 1963 and renovated in 2004 with a new facade, changed roof (asbestos removed) and new filter press and bottling line.

Location of the company is in south-eastern Macedonia, in a light industrial zone of town of Valandovo, nearby the regional road to Strumica and Dojran. The facility is about 1 km north of river Anska Reka. The production of grapes is carried out on 900 hectares of vine plantations in use, which are mostly planted with wine grapes - about 65%, and 35% are planted with table grapes. Total winery production area is approximately 2 ha.

The company has 42 full-time employees, and uses about 100 seasonal workers for a high season (September and October), on average within the total number of 10 to 280 workers per month.

- Activities, Main production, Products

The company's main activities are wine production, table grapes growing and trading. Raw materials include wine grapes and table grapes. Vizba Valandovo generally is growing two types of wine grape variety - Smederevka and Vranec. More than 70 - 80 percent comes from their own vineyards on 750 ha concession land in neighboring villages. Also, there are permanent suppliers, vine grape growers, who additionally supply Vizba Valandovo with certain types of vine grapes. The grape is harvested from mid-September and often continues into October. Seasonal workers are contracted to do grape harvesting and grape is usually transported to the winery by tractors.

Total installed wine production capacity of the company is 12,500,000 liters. Currently it works with capacity of 10,000,000 liters, or total capacity for processing the grapes is about 12,5t.

Vizba Valandovo Ltd sells wine in bulk, bottled wine, table grapes and pomegranates. The sale of the wine and the table grapes is exclusive to the foreign market. Almost all of the wine production is for export to the following regional markets: Serbia, Croatia, Bosnia and Montenegro.

- Plans for production expansion, investments, new equipment

Plans for production expansion and improvement of the company are precisely defined in their project plan supported by the AgBiz program, which was mainly committed to the following activities:

1. Purchasing and installing a new chiller and heat exchanger,
2. Buying 100 oak barrels and 3 oak casks,
3. Transfer of technologies for production of quality and high quality wine.

The chiller is already purchased, but not installed yet. It will serve to cool the grape temperature before processing. Chiller and heat exchanger will be installed next to crusher. The cooling capacity of the equipment will be 25 – 30t/h for red wine grape only. The expert team of the faculty of Agricultural Science and Food has been included in the training of the personnel, who is going to run the system of production of quality wine.

Red wines and some white wines will be matured in oak barrels called 'hogsheads'. The use of oak is important because not only does the oak add its own flavors to the wine, but oak has just the right structure to allow the wine to 'breathe'. The wine which evaporates out leaves behind a partial vacuum in a space called the 'ullage' and the wine may have to be topped up from time to time. The winemaker can choose the time and temperature of maturation. Typical values are 12-18 months for red wines and 2-6 months for white at temperatures of between 15°C and 20°C.

- Implemented standards, awards, certificates, permissions

Currently Vizba Valandovo reported that they have the following current permits;

- HACCP
- EurepGAP
- ISO 9001 2000
- A construction permit
- A fire safety permit
- An inspection certificate for the proper storage (Health and safety certificate).

The company is currently in the process of application for - IPPC permit.

- Vizba Valandovo got several awards last few years at the regional fairs:
- two silver and one gold award in Zagreb, Croatia,
 - tree gold awards in Novi Sad, Serbia, for Vranec.

Before processing is complete, wines are often cloudy due to the presence of suspended solid materials such as yeast cells, particles of skin and so on. Removal of the suspended material is called 'clarification' and involves a number of different techniques.

After filtration and stabilization most of the wine is pumped in the storage tanks and other is bottled in new Italian bottling line with capacity of 2000 bottles per hour.

After each of previous phased the tanks and equipment is frequently washed and hosed. No chemical use during washing / hosing is reported because the tanks are made of stainless steel.

While most wine is transported very soon after storage (as bulk wine), some of the wine is kept in a 'cellar' in which wines – particularly red wines – are stored for many years. Some wines are made to 'drink now', while others are made for long term storage.

- **Materials handling**

The raw materials are visually tested for quality before being accepted from suppliers. Vine grapes are tested for sugar concentration at the company's laboratory, and the quality control of a final product is laboratory tested also. 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) is inspected for damage before being accepted.

Separate storage areas for raw materials and final products are organized, primary because of the way of packaging the final product. The main quantity of wine production in Vizba Valandovo is sold as a bulk wine, so the necessity of existing huge storage area for final products is diminishing. There is a new packaging line for wine in bottles, settled in separated clean and fresh air storage room, and this line is going to be used more frequently when the new production of high quality table wines will started.

There is a storage area for fresh grapes and vegetables in refrigerator, with capacity of 2000 t, cooled by Freon. Currently the main problem with increasing the capacity of this process in the company is no defined legal property of cooling department.

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

Wine production belongs to the type of industries with low level of environmental impact. However, some activities for raw and waste materials management have to be settled.

The raw materials in wine production are performed only by several types of grapes, water and some yeast, used in fermentation process of the wine. Vizba Valandovo takes care for storage of raw materials according to the special procedures. The responsible person from the company claims that non toxic materials are used in the production process, utilities or indirectly in some other processes connected with the company. Disinfection detergents are not used in the cleaning process, only clean water for cleaning the tanks and other facilities. There is a storage area for raw materials, and a smaller part has been refrigerated. Also, 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.

Management of waste materials is organized partially in the wine production process as follows: almost 40 to 50 % of grape marc (skins, stalks and seeds) and from filtration is recycled or reused. The reported quantity for composted green waste is 200 – 300t, and the rest (150 t/year) is sent to landfill. The grape waste is not reused for value-added processing (e.g. alcohol, tannin, red color and anti-oxidant extraction).

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

Vizba Valandovo, like the other wineries, is a relatively big water consumer. The water source is from company's ground wells and mostly used for washing, rinsing tanks, washing floors and watering garden. The secondary water source is from municipal water supply system. This water is metered and used for wine production and as sanitary water.

Waste water is collected from the floor drains at fermentation tanks, and street catchments and also from the drains from each building. While wastewater is generated from equipment cleanup during the year, larger amounts of wastewater with organic loadings are generated during the grape crushing period in September. City of Valandovo does not have WWTP and is discharging untreated waste water directly to river Anska Reka.

Energy Management

Vizba Valandovo is continuously concerned for decreasing the energy consumption, mainly the electrical energy. Around 110 000 kWh per year is electricity consumption of the company for wine production. Total electricity costs for cooling and processing is around 12,000 Euros/year or electricity consumption of 150 000 kWh. The company uses electrical and diesel powered forklifts and trucks.

Continuously maintenance of energy power supplying system and technical department is a regular practice in the winery. Compressed air system is used for cooling the tanks with cold water during the fermentation process. The capacity of compressor system is 20 kW. The condensate treatment is not installed in place.

Introducing a new equipment in the production process (new heat exchanger, wine pumps for distribution of wine and new fermenters), could be a reason for certain increase of electrical energy consumption. Management of the company realize that good operating practice and especially the measures for good housekeeping could be a fruitful tool for energy savings with a small or zero investments methods.

Environmental Performance of the Company

Wine production as a type of industry belongs to the group with small impact on environment. The first impression from onsite view shows that company takes care for clean and save working area in the whole facility, starting from company's yard, production buildings, storage area, storage and fermentation tanks, etc.

Vizba Valandovo has an environmental policy that is settled on a clearly visible position on several places in the plant. Besides these there are some posters in the plant showing the differences between good and bad hygienic habits. There are very few emissions as result of the process. The area where emissions occur is appropriately ventilated.

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, is going to be prepared by environmental consultant company.

Waste materials handling

Organic solid waste including pressings is used as fertilizer in the winery's own vineyards.

Almost 40 to 50 % of grape marc (skins, stalks and seeds) and from filtration is recycled or reused (200 – 300 t/year,) the rest (150 t/year) being sent to landfill. The organic grape waste is not used for value-added processing (e.g. alcohol, tannin, red color and anti-oxidant extraction).

Wastewater is generated from cleaning the grape crusher and press. Other wastewater is generated during cleanup of fermenters and stabilization tanks after they are emptied. The amount of wastewater is limited, and it is discharged into the public sewer system for the town of Valandovo.

Packaging of the final product is mainly as a bulk wine, therefore there are no big quantities of waste packaging materials, as glass, pallets, crates, etc. No recycling of glass or carton boxes or other material is reported. PVC and other synthetic materials are sent to the regional disposal. This problem has to be solved on a regional level.

Current Operating Practices

- Good operating practices

The operators are provided with detailed operating manuals or instructions sets. All operator job functions are well defined, even for the season workers. Management is permanently on the site and supervising the process. Company have some specific goals for waste minimization, especially directed in waste water decreasing, but they are also trying to minimize every waste and they are aware of direct loss of materials. Improvement toward good operating practices is expected after the installation of the new equipment.

- Good housekeeping

Vizba Valandovo is a relatively new, medium size winery, so the maintenance of a clean, orderly work environment is implemented as much as possible. 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. The employee interest in good housekeeping is stimulated.

Good housekeeping measures in the company are implemented as a daily practice, for example: decreasing electricity consumption for lightening by decreasing the intensity of night lightening, out of production process, return/reuse of rinsing and cooling water already implemented in some steps of production process, filtration of organic waste and sewage from the wine grapes during processing, etc

- Partnership with other stakeholders

Most of the supply of raw material and production is from their own vineyards. The rest is planned ahead according to signed agreements with suppliers which are scheduled by quantity, day and hours of delivery. Organic solid waste is brought back to the vineyards. The recyclable waste is occasionally taken away by third parties.

Identification of CP Opportunities

- Technology processes improvement

Due to the nature of the production process and efficiency of the company, liability and environmental concerns for this project are reasonable. Many opportunities exist to further improve

production standards, efficiency and environmental sustainability; however, the company has already made a concerted effort to better itself in these areas.

During the cleaner production assessment some activities have been recommended to responsible person from the company, during the wine grape pressing season to identify no cost and low cost opportunities to reduce use of water usage and wastewater pollution.

The assessment should also address to energy efficiency opportunities during wine processing, precooling and grape fumigation. Vizba Valandovo actively participated during the CP assessment. Some of the recommendations and discussion during the site visit identify the cleaner production measures and the possibility for implementation in wine processing units. Some of the CP options for Vizba Valandovo are mentioned below:

- Water

As a big water consumer, the company needs to have special concern for water savings, by reducing usage of clean water and reducing the emissions of waste water. Therefore, several measures as well know CP opportunities, could be undertaken:

1. Reducing water use at vineyards, implement 'drop by drop' irrigation system at the vineyards, and monitor the water used for irrigation,
2. Reducing water use at winery: install water meters on all main water supply distribution lines; monitor water use and record water consumption; nozzles on winery hoses to minimize water use and waste; use a closed system for cleaning operations; use low-volume/high-pressure washers for cleaning, and optimize the work of compressed air system.

- Waste and emissions minimization

The waste generated from the winery usually is consider as waste water and some small amounts of solid organic waste, crapes, glass, PVC, etc. The legislation for waste management and waste water treatment is given in accordance to EU legislative, so the necessity of implementation the law in practice is a near future.

Waste water treatment plant is relatively expensive investment for Macedonian companies in general, but there must be some efforts to solve the problem with industrial waste water going directly in the rivers. The regional authorities have to prepare a feasibility study for WWTP which is going to serve the industrial facilities in a wider industrial region, so the estimated cost for building the plant will be enormously decreased.

Also, some recommendations are given for byproduct recovery: yeast (which can be collected from fermentation and storage tanks and the filter line) can be sold for animal or human consumption; grape pomace and stems, which can be used to produce acetone, butanol and fertilizer, and burned in co-generation plants – if any; fermentation gases from breweries and wineries can be collected to produce saleable carbon dioxide. This would also reduce ethanol emissions.

- Energy saving and energy efficiency measures

Reducing electricity: The winery consumes significant quantities of electricity in both production processes and operation of the facilities. However, there are several methods that can be employed to help conserve electricity at the facility including: implementation of good housekeeping measures such as turning off equipment and lights when not in use; use of fluorescent lights and/or lower wattage lamps; use of more efficient equipment when replacing old equipment (such as motors

and heating units); installation of computerized controllers to better regulate motor output; installation of timers and thermostats to control heating and cooling; preventative maintenance of operational processes and pipes so as to improve efficiency and minimize losses.

It is recommendable for such type of companies located at the south part of Republic of Macedonia, with lot of sunny days per year, to get in consideration possibility of installing photovoltaic solar systems. The PV system could be used for producing electricity as additional source of energy, to reduce the energy consumption and to improve the image of the company by usage of green energy and introducing environmental friendly measures.

Concluding Remarks and Recommendations

During the CP assessment process in Vizba Valandovo, the national experts (NE) from the National Cleaner Production Center (NCPC) explained the goals and the aims of the cleaner production. Technical director of Vizba Valandovo, in the same time the main oenologist Mr. Stevo Kotevski, participated in all the phases of the company assessment. The technical director already has some knowledge about the cleaner production principals. During the visit he showed big interest to learn more and to cooperate. An example of his awareness of the CP principals is the fact that technical director considers the possibilities of CP options, as a tool to achieve material and energy savings, to be incorporated in the short term period.

On the basis of cleaner production assessment some activities have been recommended to responsible person from the company, during the wine grape pressing season, to identify no cost and low cost opportunities:

- **to reduce water usage and wastewater pollution.**
- **to define energy efficiency opportunities during wine processing, precooling and grape fumigation.**

Vizba Valandovo actively participated during the CP assessment. Some of the recommendations and discussion during the site visit identify the cleaner production measures and the possibility for implementation in wine processing units.

At the production site the maintenance manager of the company joined the assessment and stayed until the end of the visit. Vizba Valandovo is a company of medium size, and getting in consideration the short time visit there was no possibility for more that two persons to be trained (the technical director and the maintenance manager) during the visit. However, the company management is aware that training is needed also for the rest of the employees so the company organizes some training and also hires outside company/persons to conduct environmental assessment for different purposes (HACCP application, ISO application).

A detailed CP analysis, with comprehensive materials flow, energy management and environmental performance analysis, for the new production process of high quality table wine was recommended. Also further cooperation with the NCPC was recommended.

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Director of the NCPC-MK

Atanas Kocov, PhD

CP experts

1. Margarita Ginovska, PhD

2. Snezana Cundeva, PhD

Annex

Photo documentation



Fig. 1 Storage tanks for white wine



Fig. 2. Fermentation tanks



Fig. 3. Grape waste recycler



Fig. 4. New chiller and heat exchanger



Fig. 5. Wine grapes are milled, crushed and stemmed in the first step



Fig. 6. New packaging bottling line