

THE INFLUENCE OF "COCA-COLA" COMPANY OVER THE QUALITY OF THE ENVIRONMENT OF ZEMUN

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Abstract: Food industry can be a significant source of environmental pollution, which depends on the type of food industry. In the industrial area "Gornji Zemun" there are at least ten larger factories. Among these Coca-Cola HBC Serbia, as a representative of the industry of non-alcoholic beverages, is the most active and has the biggest influence on the environment. The success in business is based on the sustainable development and the lesser influence over the environment, which will be proven by this article.

Key words: pollution, environment, Coca-Cola HBC, sustainable development

Introduction

The antagonism between the economics and the technological development on one side and the preservation of the environment on the other, must be limited to suit the people and the society, and all with the aim of a better life, both in the present and the future. This can be achieved through the most rational use of natural resources, with the least degradation and with as little waste as possible (Lješević, 2002a).

Coca-Cola HBC Serbia has been present in Serbia since 1997. and is one of the largest filling stations of Coca-Cola Hellenic products in the world and is the largest in Europe. Considering the fact that it is one of the largest companies in the world, which deals with the production of non-alcoholic beverages, and this industrial branch is among the most present in the structure of the industrial production of Serbia, the subject of research in this paper is the exact influence that this company has on the quality of the environment in Zemun, where it is located.

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The facilities of the company are in the industrial area of Zemun, which is located in a terrain of plains, basically without relief, where the half steppe climate conditions are predominant within the mid-continental climate, which is characteristic of the whole region (Grčić, 1990). These conditions manifest through severe winters with lower temperatures and warmer summers, with a high degree of insolation and with strong and relatively linear movement of air masses, which has two predominant directions, from the north-east and from the west, depending on the season (Marković, 2004).

These meteorological facts are important for the appearance of air pollution, which can be expected from the facilities of the company, considering the products of the technological and the accompanying processes. On the north-east of this industrial area there is the river Danube, which, in this case, is an important natural watercourse with a great power of self purification, and therefore it is a natural recipient of waste waters. Noise, vibrations and heat can be other possible influents on the environment.

Based on the above-mentioned physical and geographical facts about the location itself where the factory is situated, the aim of the research is to point out the possibility of and the efforts to reduce the negative influence of a company, which has a very progressive production politics, on the quality of the environment of its location.

The term high quality environment is tied closely to the term healthy and unpolluted environment, by which it is implied the environment where people did not degrade the location with their social activities, which is reflected harmfully, in most cases, on the health and is manifested through different diseases (Topalović, 2006)

The methodological frame of this paper is directed to the analysis of the present state of the production process and the facilities of Coca-Cola HBC Serbia company, as well as the development plans of the company. By combining the collected data, activities have been formulated, which the company has already started to realize or will be realizing in the near future, and all with the aim of the sustainable development and the reduction of the harmful influence on the quality of the environment of Zemun. From all this it can be concluded that „ the analysis is the means and the synthesis is the result of the research“ (Lješević, 2002b)

The influence on the air quality of Zemun

Climate changes represent the biggest and the most alarming challenge for our planet to face. Having that in mind, it is necessary to take fast and effective measures to improve the situation, especially concerning the emission of carbon oxides (Cifrić, 1989).

Until 2004. hardly anything had been done about the sustainable development and the preservation of the environment within Coca-Cola HBC Serbia. The main emitters of air polluting substances within the facilities of the company itself and its surroundings were the boiler-house, internal patrol station and the containers of liquid CO₂ (Coca-Cola HBC Serbia, 2010).

Fuel oil was used as a necessary fuel for the boiler-house. The main products of its combustion were the oxides of carbon, sulfur and nitrogen, as well as the particles of soot. The same pollutants appeared on the internal patrol station, together with the emission of steam, originating from the petrol, which appeared during the petrol pouring in the phase of storing it (Coca-Cola HBC Serbia, 2010).

The containers of liquid CO₂, which were used in the technological process of preparation of non-alcoholic beverages for their sparging, presented a potential hazard for causing accidents (Coca-Cola HBC Serbia, 2010). However, the internal measuring showed that the saturation of the air in Zemun with these pollutants was within the allowed limits (table 1).

Since 2004., in order to meet the demands of modern economy, and these are the clean technological process and low emission of carbon oxide, the company has started to develop a strategy of improving its business management. The emphasis has been put on the filling stations, motor pool and cooling equipment (Coca-Cola HBC Serbia, 2009).

Table 1. The saturation of Zemun air by the products of combustion from the boiler-houses of Coca Cola HBC Serbia

Emitter/ measuring place	Boiler (I)	Boiler (II)	The limits of emission
	(mg/m ³)	(mg/m ³)	
Carbon monoxide (CO)	23.9	17.4	250
Nitrogen oxides (NO ₂)	in traces	in traces	450
Sulfur oxides (SO ₂)	517.5	143.7	3200
Solid particles	in traces	in traces	

Source: Coca-Cola HBC Serbia (2010) Social Responsibility Report.

The most decrease in the emission of CO₂ from the company filling stations will be achieved through the transformation of the facilities which combine electrical and heat energy (SNR). A project for building these facilities is still being prepared. The advantage of these cleaner and more energy-wise effective facilities over the conventional ones is that these combined units, located within the factory, can provide the filler stations with electricity, heating and cooling simultaneously. When this project is realized, the emission of CO₂ will be 40 % lesser (Coca-Cola HBC Serbia, 2010).

Such facilities have been built and already operate in the company branches in Hungary, Romania, Northern Ireland and Italy, and their building is planned to be finished by 2015 (Coca-Cola HBC Serbia, 2010). Instead of fuel oil, which is still being used, gradually natural gas is being used more in the technological process, although it is still considered fossil fuel with harmful products of combustion. In 2010. solar panels were set in the facilities of Coca-Cola in Italy, covering the surface of 150.000 m², with the capacity of 5,2 MW, by which the emission of CO₂ was lessened by 66 %. The setting of these panels in Zemun is expected to happen in 2013 (Coca-Cola HBC Serbia, 2010).

How important it is to use the cleaner and more reusable sources of energy, with the aim of reducing the concentration of CO₂, it is seen through the fact that PepsiCo company (the second largest in the world in producing non-alcoholic beverages) has started using reusable sources of energy, like the wind or rice shells in its facilities in India. In the facility in Kolkata, by using the rice shells, the consumption of natural gas has been reduced for 1000 tonnes yearly, and the emission of CO₂ for 2700 tonnes yearly, whereas in Mamandur, by building three windmills, the consumption of electricity is reduced for 45 %, and the emission of CO₂ for 3000 tonnes a year (PepsiCo, 2011).

In the Coca-Cola HBC Serbia filling stations in Zemun there has been an ongoing application of a programme of energy saving, which has resulted in decrease of the emission of CO₂ per 1 litre of produced beverage (figure 1). For instance, in the factory for syrup production the pressure of CO₂ was lessened in the beginning and at the end of the production of syrup and drinks on track, which has lessened the consumption of CO₂ by 8 %.

With the aim of decreasing the direct emission of the above-mentioned polluter, certain measures are being taken in the offices and other premises as well. The programme called "Green IT", which deals with the replacement of the existing IT equipment, has already been put to work, by which the emission of CO₂ has been decreased by 11% since 2007., when the programme started, until 2011.

The influence of „Coca Cola” company over the quality of the environment of Zemun

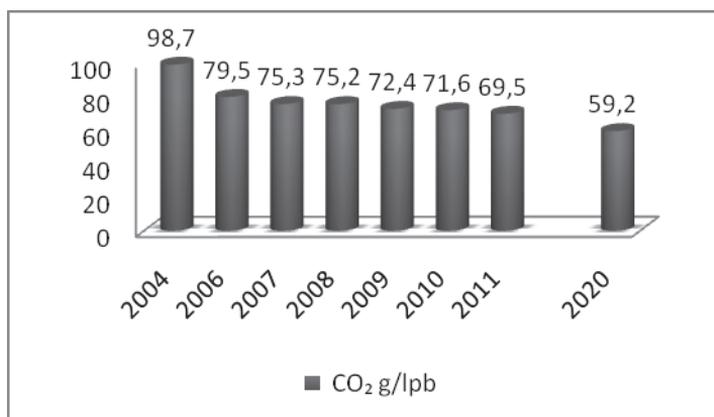


Figure 1. Decrease of the emission of CO₂ per 1 litre of produced beverage (Report of social responsibility (2010) of Coca-Cola HBC Serbia company)

The motor pool, the significant emitter of CO₂, has been largely improved. The test driving of the hybrid lorries of the company is being done throughout Europe, but in Serbia this is still to be expected. The improvement of the conventional motor pool has been done by building in the engines with smaller cubic capacity, and with the regular tracking of fuel consumption. Gas equipment has been built in 40 % of company vehicles, and the forklift lorries are powered by electricity, which has also reduced the emission of CO₂.

Another important link in the chain of the more effective usage of energy and the reduction of the emission of carbon oxide are the cooling devices, which are more effective energetically. In these devices, instead of hydro-fluorine-carbon compounds (HFCs), which are the gases with the effect of greenhouse used for cooling, the test usage of alternative cooling gases is being done (ammonia and hydrocarbons).

In comparison to Coca Cola Hellenic company, which aims at the elimination of CO₂, as much as possible, the operators of PepsiCo company in Turkey have applied throughout the facilities the cooling devices based on CO₂ and hydrocarbones up until the end of 2009. Until the end of 2010 this company had a total of 61.419 cooling devices based on hydrocarbons and 277 devices based on CO₂ in the countries where it had its representatives, by which it saved 45% of energy (PepsiCo, 2010.).

From 2004 until 2011 the concentration of carbon oxides ranged from 42,8 mg/m³ to 14,5 mg/m³, sulfur oxides ranged from 525,8 mg/m³ to 112,9 mg/m³,

whereas the particles of soot and nitrogen oxides appeared in traces (City Council for Public Health, 2011). All these parameters are far below the allowed and have a tendency to decrease even more, so it can be concluded that the air quality in Zemun is on a satisfactory level.

The influence on the quality of water and soil in Zemun

The hydrological characteristics of Zemun are quite favourable. Zemun lies on a loess plateau, underneath which there are clay sediments and gravel, and they represent reservoirs of underground water.

Considering the location of the complex of Coca-Cola HBC Serbia, and that being on the right bank of the river Danube, it can be concluded that this company has a direct impact on polluting the surface and running waters, to be more exact, the river Danube.

The underground reservoir of the company and the surrounding roads have the biggest influence on the quality of the surface and underground waters and the soil of Zemun. The pollution is a result of the regular usage of these resources, and it originates from:

- tearing of tyres and the surface
- load spilling
- throwing rubbish
- sedimentation of the particles of soot (originating from exhaust gases) from the atmosphere
- washing off the deposit with precipitation which can reach into the soil together with the harmful matter and into the underground waters.

There is a special group of harmful matter which originates from the engines and is the product of incomplete combustion (Coca-Cola HBC Serbia, 2010). It is well known that petroleum and its products are insoluble or a little soluble in water. The most harmful products of their combustion are aromatic hydrocarbons (benzene, toluene...) which can reach the soil and bind to the clay in the process of adsorption and practically become immobile. However, with the souring the soil with acid rain, they can be released and dissolved, and they can migrate, so the underground waters can be endangered. The water from the precipitation, which washes off the pollutants from the manipulative surfaces and roads, has the maximal concentration of the polluting matters in the first couple of minutes when the precipitation occurs, and then it radically decreases (Marković, Đarmati, Gržetić & Veselinović, 1996). Testing the quality of the soil in Zemun, on the location of Coca-Cola HBC Serbia, traces of polycyclic

aromatic hydrocarbons and heavy metals were not found, and it was established that waste water has the biggest influence on the soil quality (Coca-Cola HBC Serbia, 2010).

In order to reduce the harmful effect on the quality of the water and the soil, the company has built a collector for atmospheric and waste waters, which are transported from there to the facility for processing waste waters. The processed water is drained into the Danube, and it is suitable to be used in agriculture and it is safe for plants and aquatic life. The contents of pollutants in the waste water from Coca-Cola HBC Serbia Company is under the limit values (table 2).

The capacity to develop the business management of Coca-Cola HBC Serbia Company is directly linked to the availability and the quality of water resources, therefore the management of the company does a lot of work to improve the quality of managing the water resources.

Table 2. The concentration of the pollutants in the waste water from Coca Cola HBC Serbia

Parameter	The unit of measure	The limit value of emission
Temperature	26°C	30
pH	7.1	6.5 – 8.5
Suspended matter	30 mg/l	35
Biochemical consumption of oxygen (BCO ₅)	18 mgO ₂ /l	25
Chemical consumption of oxygen (CCO)	95 mgO ₂ /l	110
Total nitrogen	8.3 mg/l	10
The concentration of detergent	0.2 mg/l	1

Source: Coca-Cola HBC Serbia (2010) Social Responsibility Report.

With the aim of the sustainable development, the production technologies for saving water on factory lines have been introduced in the company's filling stations. In comparison to 2004., when 2,86 litres of water was used for the production of 1 litre of a final product, in 2011. the quantity of water necessary for the production reduced to 2,3 litres (figure 2). To conclude, from 2004. to 2011. the usage of water in the production process was reduced by 19% (Coca-Cola HBC Serbia, 2010).

Water is used rationally and effectively. The systems for washing which work by means of high pressure have been installed, which is used as a method to reduce the water consumption in PepsiCo company, by which the consumption of water has been reduced considerably. The water used for washing on the PET line is collected and used in the toilets. In the facility for the production of syrup

the programme has been made by which the last washed off water from the sanitation is collected and used as the first step in the next sanitation. In the facility for processing water the equipment for measuring the water consumption on each factory line has been installed, which has largely improved the tracking of the water consumption in the production process (Hoekstra, Chapagain, Aldaya, & Mekonnen, 2011).

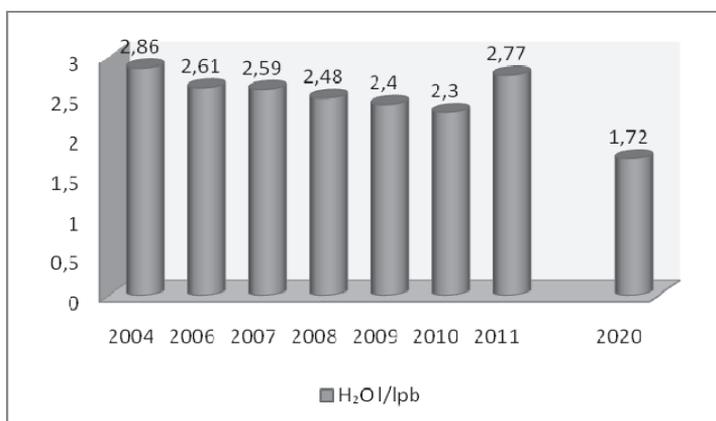


Figure 2. Decrease of water consumption in manufacturing processes per 1 litre of produced beverage (Report of social responsibility (2010) of Coca- Cola HBC Serbia company)

Since the primary aim of the company is the increase of production, the increase of the water used is also inevitable. With the aim of the effective usage of water, the company constantly invests into new and more modern production technologies and, in that way, shows great interest in the quality of waters in its surroundings (table 3).

Table 3. The water quality of the river Danube in Zemun

Parametre	The unit of measure	The limit values of emission
pH	7.9-8.4	6.5 – 8.5
Suspended matter	2-21 mg/l	35
Biochemical consumption of oxygen (BCO ₅)	9.5-13.8 mgO ₂ /l	25
Total nitrogen	1.8-3.5 mg/l	1
Total oil hydrocarbons	<0.005 mg/l	

Source: Republic Hydrometeorological Service of Serbia, 2005

Doing the work in preserving the quality of surface and underground waters, the company also works on the preservation of the quality and on the decrease of negative effects on the surrounding soil. Beside the waste water, the main

influents on the soil are the production waste from the filling stations and used oils that are damped into a dug-in tank and then transported to the petrol refinery in Belgrade.

The reduction of the production waste is based on the reduction of the quantity of the packaging and the increase in the usage of recycled materials in the structure of new packaging. With the aim of closing the recycling circle, in 2010., with the help of Coca -Cola Hellenic Company, a “Bottle-for-bottle”, a recycling factory, was opened in Austria, which provides the company with high quality and fair price recycled materials for the production of new bottles.

The packaging in the filling stations of the company, around the world and in Serbia, is composed of recycled material (PET, aluminium, steel and glass). The influence on the quality of soil and, the environment in general, is reduced with the increase of recycled materials in the packaging and with the weight reduction of the packaging, which reduces the needed material for its production. Using the recycled aluminium for tins, up to 95% of energy is saved, which is otherwise needed when the non-recycled aluminium is used. The company uses up to 60% of recycled material in its aluminium tins and glass bottles, and up to 15% of recycled PET material (Coca-Cola HBC Serbia, 2010).

In 2009, as the first company in the USA, PepsiCo company produced natural juice in a plastic bottle, the size of 32 ounces (90 g), from 100 % recycled plastic, and during 2010., it continued the production of bottles (of 10 ounces (283g), 15.2 ounces (430g) and 64 ounces (1811g)) from 100 % recycled PET material (PepsiCo, 2011).

It can be concluded that the quality of water resources and soil in Zemun is not under a lot of pressure by Coca-Cola HBC Serbia Company, considering all the measures the company does in order to preserve and improve the above mentioned quality.

Noise, vibration and heat

The noise on the location of Coca-Cola HBC Serbia complex comes from the work of devices in the facilities, the traffic on the internal roads and the traffic on Batajnicki Road, which is located 200 m from the complex. In the range of about 20m from this road the noise level is approximately 65dB by day and 55dB by night (City Council for Public Health, 2011). Adding the noise that comes from the company itself, the total level of noise can occasionally exceed the allowed level. However, considering that the company is located in an

industrial zone and about several kilometers far from the nearest suburb (Nova Galenika), the level of noise it creates is of local importance only and does not have any significant influence upon the environment and the human health.

There is not any significant source of vibration on the location of the complex, except for the minimal vibrations from certain machines, the influence on the quality of the environment is insignificant.

Heat is not used in the technological process of the production of non-alcoholic beverages, and in the accompanying activities, it is present only in boiler house, so it is of local importance and does not have any significant effect on the surrounding environment.

Conclusion

Considering the state of the environment, the conditions of the location, the types and the quantity of polluting matter and waste, which appear on the location of the company, as well as the means of dealing with them and the measures of protection that are applied, it can be concluded that Coca-Cola Company does not have any significant threatening effect on the quality of the environment of Zemun.

The fact that the company invests a lot in the sustainable development and the preservation and improvement of the quality of the environment also contributes to all this. It has signed the Global Agreement of the UN (CEO Water Mandate), whose main aim is dealing with the problems of sustaining water resources in operations, delivery systems and communities (Hoekstra & Chapagain,2008).To ensure better understanding of water usage in our system of delivery, the company also cooperates with Water Footprint Network.

For a prolonged period of time the company has cooperated with the International Commission for the Protection of the River Danube. The company strives to raise people's awareness of the necessity of the preservation, restoration and importance of this river with manifold activities, such as celebrating the Day of the river Danube. The company was the sponsor of the First Conference about the underground waters and it has started a project for the preservation of the river Vlasina, which is being realized as we speak.

The company invests a lot in setting the infrastructure necessary for the recycling and encourages its consumers to recycle the packaging. It is one of the founders of Secopac organization, which pleads for passing the laws in

connection to the packaging and its waste, following the example of and in accordance with the regulations that already exist in the European Union. The principle of “the responsibility of the generator of the waste” is incorporated in the Serbian Law of managing waste and the Law of the packaging and packaging waste, which were passed by the Serbian Parliament in May, 2009. This principle is based on the obligation of all subjects in the chain to the final consumer (producers, fillers, exporters, distributors and sellers) to use again and to recycle, which puts them in the position to use again the packaging that they have placed on the market in the percentage determined by the state.

The reports about the cooperative social responsibility, which the company has been doing every year since 2004, serve as a testimony of the company’s work ethics and all with the aim of improving the production politics and reducing the harmful effects on the environment of Zemun.

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