JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

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Implementation of complex technical and technological modernization of enterprise to reduce energy consumption and implementation of recycling organic waste fom beer production at DE PJSC "Obolon" "Zibert's Brewery"

№3: Energy demand

№13: Waste handling and disposal

Version 02

Date: 22/09/2011

A.2. Description of the project:

The aim of this document creation is its submission to State Environmental Investment Agency of Ukraine to obtain a Letter of Approval and subsequent registration of the project as a JI project.

The main purpose of the Joint Implementation project «Implementation of a complex technical and technological modernization of enterprises to reduce power consumption and implementation of recycling organic waste from beer production at "DE PJSC "Obolon" "Zibert's Brewery" is the implementation of the integrated program of technical and technological modernization of the company, adoption of the disposal system for organic waste of brewing, which includes both technical and organizational measures**.**

The adoption of actions provided for by the Project will allow to improve energy efficiency of the brewing process, reduce the amount of and assure environmentally-friendly disposal of organic waste produced during the process. At the same time this will lead to the reduction of power consumed in beer production, will allow to give up removal of organic waste to landfills and, as a result, reduce the emission of greenhouse gasses emitted in the process.

The situation at the moment of the project initiation

Considering that the plant is located in a residential district of Fastiv town, the company has always paid close attention to factors that could have negative effect on the environment. To reduce the amount of pollution that is emitted into the atmosphere as a result of the plant's work, the management of "DE PJSC "Obolon" "Zibert's Brewery"has started the installation of the new economic and energy-efficient equipment, high technologies in brewing, bottling and delivering beer to consumers.

However, the implementation of such large-scale program as presented in this project was impossible due to its lack of financial attractiveness (pay-back period on investment over 10 years, while costs for some investments will have never been recovered), risks associated to its implementation (the general effect from the implementation of the technological processes could be negated in case of partial implementation or if mistakes were made during the process), unstable economic and political situation in Ukraine.

Taking into consideration the above factors, the management of the company has come to the conclusion that it is necessary to implement a program aimed at reducing energy consumption and the amount of residual sparging during the production of beer and implement the utilization of sparging only in 2004, after the ratification of the Kyoto Protocol has allowed recovering a portion of the costs through the mechanisms of the Kyoto Protocol

Project scenario

The Joint Implementation Project is based on the implementation comprehensive technical and technological modernization of the DE PJSC "Obolon" “Zibert’s Brewery”that received financing and was launched in 2004.

Actions taken within the framework of this program (see section A.4.2 below) allowed the DE PJSC "Obolon" “Zibert’s Brewery”to reduce the specific energy consumption in the brewing process and assure environmental friendliness of the process through the utilization of all organic waste produced.

Baseline scenario

The baseline scenario envisages the further use of the installed equipment with ongoing renovation and restoration works without significant capital expenditures and maintaining the current power consumption and waste production as well as maintaining the practice, commonly used at the time, of removing waste to landfills. The grounds for the baseline scenario are described in section B.

Project history

30/03/2004 – Order #56 established at the DE PJSC "Obolon" “Zibert’s Brewery” a workgroup for reducing power consumption and waste production in the process of brewing and other production activities. The responsibilities of this group include consideration of possibility and ensure that additional investment from the mechanisms of the Kyoto Protocol. This date is the date of this project considered as a JI project.
December 2000 – start of the implementation of measures stipulated by the Project
10/08/2011 – signing of the agreement with “Company MT-Invest” LTD (Agreement #158).
19/08/2011 – preparation and submission of PIN to the State Agency for Ecological Investments.

The tentative plan and the list of measures stipulated by the Project are listed below (see section A.4.2)

Project benefits

Besides reducing the emission of greenhouse gasses the project of the implementation of the Project has the following benefits:

- Creation of additional employment opportunities related to the installation of new equipment, technological lines and cycles;
- Reduction of the emission of harmful substances.

The implementation of the Joint Implementation project will have positive effect on the environmental and socio-economic conditions in the town of Fastiv and the region at large.

A.3. Project participants:

Party involved	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ukraine (Host party)	“Obolon” PJSC	No
United Kingdom	Ohana LLP	No

"Obolon" — national corporation engaged in the production of beer, non-alcoholic beverages and beverages with low concentration of alcohol, and mineral water. Besides, the company has licenses for the wholesale and retail distribution of drinks, provision of cargo agent services (codes KVED 51.34.0, 52.25.0, 63.40.0). [1] The company consists of the main production plant in Kyiv with remote facilities in Oleksandria and Tcheremivtsi in the Khmelnitskiy oblast, two affiliate companies – Zibert's Brewery (Fastiv, Kyiv oblast) and Krasylivske (Krasyliv, Khmelnitskiy oblast), as well as companies with corporate rights in Bershad, Kolomyia, Okhtyrka, Rokytne, Sevastopol and Chemerivtsi.

The company history begins in 1974 with the start of building the *Kyiv brewery #3*. The chosen building lace was Obolon area in Kyiv. This choice was based on huge reserves of soft and crystal clear water. By 2010 a main enterprise uses water at least from 13 artesian mining holes, 4 first of which were opened in 1977, 3 more — in 1978, 1 — in 1979, 2 — in 1999, 2 — in 2003, 1 — in 2005. Now this water from the depths of Jurassic horizon (290 m) provides high quality products. The Czech specialists were invited as the experts. It was them who defined the place of building of new brewery. Opening of production was dated for the summer Olympic games of 1980. First 330 dals of beer was poured on May, 8 in 1980, and the official opening of the factory took place on November, 12. In 1981 the brewery malt-house produced the first malt, within 1985—1997 the production capacities of the malt-house were increased three times. Since 1983 the factory carries the name of "Obolon". In 1986, on the basis of Kyiv brewery #3, Beer-and-nonalcoholic Company "Obolon" was established. The company also included Kyiv brewery#1, Kyiv brewery #2 (now "Podol Brewery" JSC), and Fastiv brewery (now subsidiary of "Obolon" PJSC "Zibert's Brewery"). In 1989 Oleksandr Slobodyan was chosen for the position of the Director-general of the Beer-and-nonalcoholic company "Obolon". Export activity of enterprise begins.

DE PJSC "Obolon" "Zibert's Brewery"

The brewery in Fastiv was built in 1906. Its founders were the bourgeois Yulius Zibert and the Prussian national Herman Saalman. By then the brewery produced about 50 thousand dals of beer a year. Fastiv beer was spilled in barrels and sent to pubs all over the Kyiv province. Afterwards, in 50th the factory was reequipped for production of beer in bottles, and during 60-80th the brewery had the number of reconstructions. The last allowed to improve quality of products, to increase the production volumes and

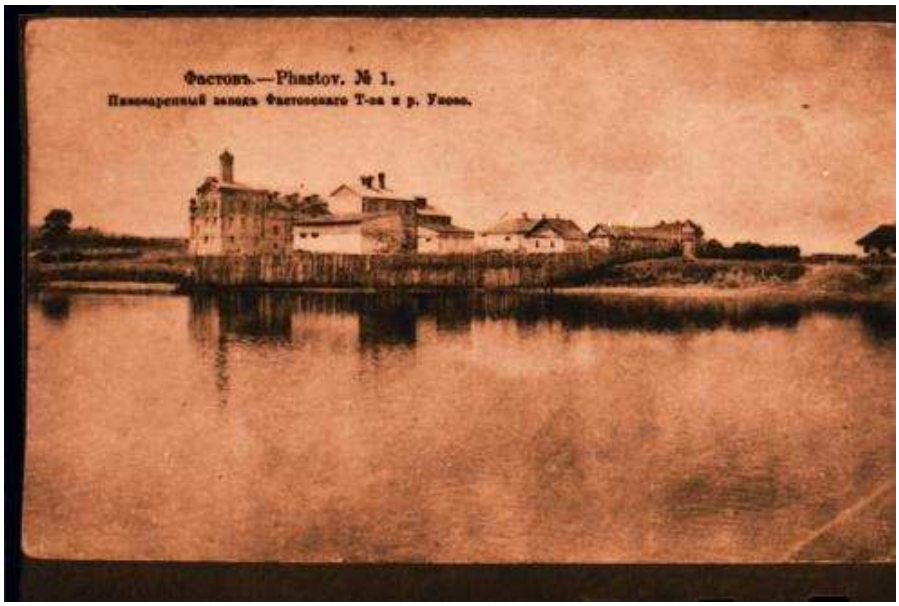
to extend the assortment. Year 1986 became critical in brewery history – the factory entered the Beer-and-nonalcoholic company “Obolon”. During this time the brewery takes reconstruction, modernization of technological equipment. In 2003 the opening of new butlery took place on Fastiv brewery.

In 2008-2009 during a huge investment project of over 40 million euro the modern German equipment for the production of beer was set: new CCTs added, a modern brewing order was built. As a result the production capacities of enterprise were increased 12 times and now make 12 million deciliters of beer in a year.

Today “Zibert’s Brewery” is an enterprise of the European standard. The quality of products produced by the brewery is confirmed by the international certification in accordance with the standards of ISO 9001:2001. From 2006 till 2008 160 workplaces were created in “Zibert’s Brewery”, nowadays 376 people work for the enterprise. The products of factory are exported to the markets of 13 countries in the world, which are Russia, Poland, Lithuania, Latvia, Estonia, Great Britain, Germany, and USA.

“Zibert’s Brewery” history

At the beginning of XX century, namely in 1906, the brewery building began in Fastiv. The founders of the brewery were the bourgeois Yulius Zibert and the Prussian national Herman Saal'man. The place for the factory was chosen the picturesque riverbank of the Unava, near the church of Pokrova Bogorodici. German masters arranged the brewery work very quickly, and in Decembers, 24, 1906 the first Fastiv beer was put into production.



By then the brewery produced about 50 thousand dals of beer a year. Fastiv beer was spilled in barrels and sent to pubs all over the Kyiv province.

The brewery did not halt the work even during military operations which took place in history. Neither the First and the Second World Wars, nor the revolution prevented the Fastiv brewers.

Afterwards, in 50th the factory was reequipped for production of beer in bottles, and during 60-80th the brewery had the number of reconstructions. The last allowed improving quality of products, to increase the production volumes and to extend the assortment.

Year 1986 became critical in brewery history. The Fastiv factory entered the Beer-and-nonalcoholic company "Obolon". During this time the brewery has some reconstructions. Technological equipment was changes and modernized.

During the century the little private brewery grew into the large factory being the part of the national corporation and met a new millennium already as a modern highly technological enterprise. The beginning of 2008 was significant for the brewery. During a huge investment project of over 40 million euro the modern German equipment for the production of beer was set: new CCTs added, a modern brewing order was built. As a result the production capacities of enterprise were increased 12 times and now make 12 million deciliters of beer in a year. That is near 2,6 liters of beer for each habitant of Ukraine.

Today 500 people work for the enterprise. The products of factory are exported to the markets of 22 countries of the world, in particular Russia, Georgia, Poland, Byelorussia, Moldova, Abhazia, Greece, Lithuania, Latvia, Estonia, Portugal, Spain, Italy, Israel, France, Great Britain, Germany, USA, Canada, Cyprus and to Australia. In 2011 the enterprise will celebrate the 105th anniversary of its foundation.

"MT-Invest" is the first specialized operator on the Ukrainian M&A (mergers and acquisitions) market. The company provides the following services: purchase and disposal of businesses/assets, search for investors or strategic partners, investment consulting and financial consulting, execution of investment projects and agreements. Making the M&A market more transparent, civilized and comprehensible to investors, the company effectively meets its main goals – increasing market capitalization of the clients of "MT-Invest".

A.4. Technical description of the project:

A.4.1. Location of the project:

The project is implemented on the equipment and at the properties of the plant of "DE PJSC "Obolon" "Zibert's Brewery",which is a part of "Obolon" PJSC.

A.4.1.1. Host Party(ies):

Ukraine

A.4.1.2. Region/State/Province etc.:

Kyiv oblast

A.4.1.3. City/Town/Community etc.:

Fastiv

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

Picture 1.1 Town Fastiv on the map of Ukraine

“Brewery Zibert’ is located in the town Fastiv of Kyiv region (main office coordinates 50°4′27.81″ northern latitude 29°54′27.64″ eastern longitude.)

Town Fastiv is first mentioned in 1390 , from the end of XIII century Hvastiv is a town. In. 1601 town received Magdeburg Rights. Since the mid 1680's pp. to the beginning of XVIII century it is Polish county and regimental city. In 1702 Hvastiv was the center of anti-Polish uprising S. Paliy. In 1793 it was annexed by the Russian Empire, 1797 - Vasylkivsky County town of Kyiv province. From 1923 - District Center, since 1938 - the city.

Nowadays, town Fastiv occupies the territory of 4, 3 hectares, and is inhabited by over 50 thousand people.

A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:

The production facilities of DE PJSC "Obolon" “Zibert’s Brewery”” are supplied with two kinds of energy that is/was purchased from
Outside suppliers:

- Electric power
- Natural gas

The main reasons for project implementation are greenhouse gas emissions caused:

- Excess energy consumption as a result of: imperfections in the technological processes, use of working but outdated.
- Emissions due to the disintegration of sparging at dumps and storage grounds.

Brief description of actions within the project frameworks:

- Implementation of recycling programs of sparging waste by pressing and transfer it into the farms with its further use as feed for animals.
- Replacement of piston air compressors into screw ones.
- Replacement of old refrigerators with modern automatic controlled ones.
- Reconstruction of brew house with the installation of energy-efficient technology of cooking wort.
- Installation of new steam boiler LOOS ZFR-23000.
- Changing steam drying of work clothing with electric heating vans.
- Replacement of glow lamps with energy-saving ones.
- Installation of equipment for preparation of liquid carbon dioxide «Haffmans B.V. Netherlands.
- Installation of heat exchanger for disposal of evaporation of boiler deaerator to heat nourishing water.
- Use continuous blowdown of steam boiler for the primary heating of feedwater from CWC.

Chronology of the implementation:

2004

- Implementation of recycling programs of sparging waste by pressing and transfer it into the farms with its further use as feed for animals.

2007

- Replacement of glow lamps with energy-saving ones.

2008

- Reconstruction of Brewing House with the installation of energy saving technologies of cooking wort. Output of wort 440 Gl for 1brewing, 78 brewings per week. Before the reconstruction wort output was 80 Gl/brewing. Specific direct thermal energy consumption before the reconstruction was 31,25 kg/Gl, after the reconstruction 16,8 kg/Gl, 2950 brewing a year.

Figure 2 Brew houses

Figure 3 Brew houses

- Installation of new steam boiler LOOS int ZFR-23000 with the capacity 22tons of steam per hour. Gas consumption for 1ton of steam 72,1 m^3.

Figure 4 Boiler LOOS int ZFR-23000

- Changing steam drying of work clothing with electric heating vans.
- Installation of new air compressors Comp Air L132-7, 5 – 3 units.

Figure 5 Air compressors Comp Air L132-7,5 – 3 units.

- Installation of new refrigerators Climaveneta complete with cooling towers.

Figure 6 Refrigerator Climaveneta

- Implementation of recycling programs of sparging waste by pressing and transfer it into the farms with its further use as feed for animals.

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Figure 7 Storage of sparging

- Replacement of 2 refrigerators 1-МКТ-110 (Russia) with the new one Climaveneta (Italy) complete with compressor and automatic control.

Figure 8 Refrigerator Climaveneta

2010

- Installation of equipment for preparation of liquid carbon dioxide «Haffmans B.V., Netherlands, with the capacity 500kg/year.

Figure 9 Equipment for preparation of liquid carbon dioxide “Haffmans B.V.”, Netherlands

2011

- Installation of heat exchanger for disposal of evaporation of boiler deaerator to heat nourishing water. Fully implemented. Heat saving only for 2011 year 126 Gcal, expected savings 240 Gcal.

Рис.10 Heat exchanger for disposal of evaporation of boiler deaerator

- Use continuous blowdown of steam boiler for the primary heating of feed water from CWC. Planned for 2011 year. Fully implemented. Thermal energy saving only for 2011 year is 168 Gcal, expected saving is 320 Gcal.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

GHG emissions at the DE PJSC "Obolon" "Zibert's Brewery" take (took) place as a result of:

- consumption of electric energy by the technological equipment and the plant's lighting equipment;
- consumption of natural gas by the power-generating equipment of the plant;
- methane emissions caused by the utilization of organic waste from peer production (sparging) at landfills and silos.

The implementation of this project provides for the reduction of the consumption of electric power by the plant and utilization of sparging through pressing (drying) it and further sale (transfer) to agricultural companies and fisheries as animal and fish feed.
Reducing the consumption of electric and thermal power will lead to the reduction of CO2 gasses emitted during generation. Reducing the consumption of natural gas will reduce the emission of GHG associated with its burning by technological and generating equipment. Using sparging as animal and fish feed will allow avoiding emissions of methane (CH4), which is a greenhouse gas that would have been emitted if sparging were disposed at landfills or silos.

Measures taken to achieve the set goals are listed in section A.4.2 above.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

Emission reduction calculations provided in the Excel file «Zibert_v.2».

Table 1. Emission reductions for the crediting period 2008-2012.

	Years
Length of the crediting period	5
year	Estimate of annual emission reductions in tones of CO2
2008	9965
2009	60787
2010	85916
2011	85954
2012	85954
Total estimated emission reductions over the crediting period 2008-2012 (tones of CO_2 equivalent)	328576
Annual average of estimated emission reductions over the crediting period 2008-2012 (tones of CO_2 equivalent)	65715

Table 2. Emission reductions for post-Kyoto period 2013-2025.

	Years
Length of the crediting period	13
Year	**Estimate of annual emission reductions in tones of CO2 equivalent**
2013	85954
2014	85954
2015	85954
2016	85954
2017	85954
2018	85954
2019	85954
2020	85954
2021	85954
2022	85954
2023	85954
2024	85954
2025	85954
Total estimated emission reductions over the crediting period 2013-2025 (tones of CO_2 equivalent)	1117402
Annual average of estimated emission reductions over the crediting period 2013-2025 (tones of CO_2 equivalent)	85954

A.5. Project approval by the Parties involved:

Approval by the investor country and approval by the Ukrainian authorities (State Environmental Investment Agency of Ukraine) will be received after the successful passage of determination.

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

For determining the baseline and demonstrating additionality a JI Specific Approach developed on the basis of a Methodological Tool 'Combined tool to identify the baseline scenario and demonstrate additionality' (Version 03.0.0) and the guidance 'Guidance on Criteria for Baseline Setting and Monitoring' (Version 02).

The baseline scenario is determined in accordance to the following four Steps:
STEP 1: Determining alternative scenarios;
STEP 2. Barrier analysis;
STEP 3. Investment analysis (if permissible);
STEP 4. Analysis of general practice.

Step 1: Determining alternative scenarios
Sub-Step 1a: Determining alternative scenarios to the project activity suggested by the JI
Only two alternatives are the most credible to the suggested project activity.
Alternative A: Continuation of the existing situation.
Alternative B: Implementation of the proposed project activity without registering it as a JI project.

Partial implementation of the complex technical and technological modernization of the plant in order to save power consumption and implementation of the system utilization of organic waste of beer production at DE PJSC "Obolon" "Zibert's Brewery" would significantly reduce the effect from its implementation. Therefore this scenario is not considered as an alternative to the suggested project activity

Resolution from Sub-Step 1a: Two most likely alternatives were determined. See the list of alternatives above.

Sub-Step 1b: Meeting the demands of the corresponding laws and norms
At the inception of the project (2004) there were a number of legal acts (Law on energy conservation), that aimed to stimulate producers and suppliers to act in the field of energy conservation. However, the acts were mostly formalities and were not very effective. An example of it is the continuous increase of amounts of energy consumption by DE PJSC "Obolon" "Zibert's Brewery"before the implementation of the project.

***Resolution from Sub-Step 1b*:** All the suggested alternatives meet the existing legal rules and regulations.

Step 2: Barrier analysis.
Sub-Step 2a: Determining barriers that will prevent the implementation of alternative scenarios
Alternative A: Continuation of the existing situation.
There are no barriers to this alternative scenario.

Alternative B: Implementation of the suggested project activity without registering it as a JU project

Investment barriers: Project activities under the proposed project is a gradual process and requires annual significant capital investments and attracting human resources.

Access to financial resources on international markets for the suggested project is greatly limited. Investment climate in Ukraine is considered unattractive, especially in comparison with neighbor states.

As confirmation of that is the sovereign rating of Ukraine by Fitch compared to some other neighbor states from Easter Europe.

- Ukraine B-
- Poland A-
- Hungary BBB
- Slovakia A+

Taking into consideration significant amount of capital investments necessary for implementing the suggested project, it may be very difficult to receive financing from international institutions. Financing on the local market is also limited. Local banks currently provide project financing at approximately 30% annual interest in the national currency for up to three years. As an example the largest Ukrainian banks can be taken: Raiffeisen Bank Aval (www.aval.ua), Privatbank (www.privatbank.com.ua), Praveks Bank (www.pravex.com.ua).
Taking the above into consideration, continuous financing in Ukraine is only achievable provided the project's attractiveness. However, a simple analysis of expenses shows that, at the required level of project financing the payback period exceeds 15 years.

The registration of the project as a JI project will allow partial reimbursement of funds with the use of funds from the sale of emission reduction units and will give the project the status of environmentally oriented and will make obtaining loans easier. . The above benefits have become a critical factor in deciding on project

Other barriers: The complexity of the production process and the suggested measures, some of which had not had analogues in Ukraine at the beginning of the project, constant fluctuations of the cost of energy sources in Ukraine do not allow for exact forecasting of energy and economic results from the implementation of measures within the framework of this project. The vagueness of results leads to additional risks by the project owner.
The registration of this project as a JI project improves the financial attractiveness of the project as well as its status were important arguments for the project owners in favor of the project implementation.

Conclusion from Sub-Step 2a: List of barriers listed above

Sub-Step 2b: Removal of alternative scenarios that are excluded by the determined barriers.

Only *Alternative A* does not contradict any of the barriers.

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Step 3:Investment analysis.
For providing foundation for the baseline and demonstrating additional barrier analysis was used.

Conclusion from Step 3: Not applied.

Step 4: Analysis on generally accepted practice.
Most similar projects have been implemented with the aid of grants and other non-profit financing means, for example through Joint Implementation projects. At the time of the project initiation the general practice in Ukraine was to carry out exploitation works in the amount necessary for preserving output; there have been no reconstructions similar to the suggested ones and of similar scope at other breweries.
Conclusion: Taking the above mentioned into the account, Alternative A is the most fitting baseline scenario, which does not have any barriers and fits the general practices of the host country.

Project implementation was carried out in 3 phases:

1. A complex of measures for the utilization of organic wastes that were implemented since late 2004, direct transfer of organic waste to farms took place in early 2005. Therefore, 2004 was accepted as the base year for calculation of GHG emissions related to the disposal of organic waste.
2. A complex of measures to reduce plant natural gas consumption. Implementation of this phase began with the reconstruction of cooking workshop with the installation of energy saving technology of mash cooking implementation of which started in 2006 (start of preparatory work) and which was completed in 2008. Taken the mentioned above in account, as the base year for calculation of GHG emissions related to the consumption of natural gas the year preceding the beginning of reconstruction – 2005 – has been accepted.
3. A complex of measures to reduce consumption of electricity now. Implementation of this phase began with the replacement of energy-saving light lamps. This process began in late 2007. Therefore as the base year for calculation of GHG emissions related to the consumption of electricity 2007 was adopted.
4.

The measures mentioned above are described in Section A.4.2 of this document.

Key parameters used in determining the baseline.

Data/Parameter:	EC_{BL}
Measure:	MWh
Description:	Consumption of electric power by Obolon PJSC “Brewery Zibert” in a base year
Frequency of determination/ monitoring	Once
Source of data	Measured with measuring equipment. Annual reports 11-МТП
Values used during previous computation	According to statistic data of the enterprise for the year 2007 3459 MWh
Foundation for the choice or description of the measuring methods	Objectively reflects the amount of used electricity energy by brewery in a base year. Value based on measures done with working and calibrated measuring equipment.
Description of the control procedures and quality guarantee	This value is included in the general energy balance of the enterprise, based on measures done with working and calibrated measuring equipment and crosschecked by electricity supplier and state authorities.
Commentary:	

Data/Parameter:	$FC_{BL,NG}$
Measure:	ths м^3
Description:	Natural gas consumption by DE PJSC "Obolon" “Zibert’s Brewery” in base year
Frequency of determination/ monitoring	Once
Source of data	Measured with measuring equipment. Commercial metering gas plant (on the entire production). Acts of Kyivoblgas.
Values used during previous computation	According to statistical data of the enterprise for 2006 year FC_{BL}= 1649 ths m^3
Foundation for the choice or description of the measuring	Objectively reflects the amount of used thermal by brewery in a base year. Value based on measures done with working and

methods	calibrated measuring equipment and based on calculations used actual norms.
Description of the control procedures and quality guarantee	This value is included in the general energy balance of the enterprise, based on measures done with working and calibrated measuring equipment and based on calculations used actual norms and crosschecked by heat supplier and state authorities
Commentary:	

Data/Parameter:	P_{BL}
Measure:	t.dal
Description:	Amount of beer production in base year
Frequency of determination/ monitoring	Once
Source of data	Production planning department reports
Values used during previous computation	To calculate the emission reductions resulting from recycling organic waste (2004): P_{BL}= 916,4 t.dal. To calculate the emission reductions resulting from the consumption of natural gas (2006): P_{BL}= 1242,35 t.dal. To calculate the emission reductions caused by electric energy consumption (2007): P_{BL}= 1427,287 t.dal.
Foundation for the choice or description of the measuring methods	Objectively reflects the amount of beer produced in a base year. Is amount based on measures done with working and calibrated measuring equipment.
Description of the control procedures and quality guarantee	This data is subject to cross checking by government authorities.
Commentary:	

Data/Parameter:	P_y
Measure:	t.dal
Description:	Amount of production a year
Frequency of determination/ monitoring	monthly
Source of data	Production planning department reports
Values used during previous computation	For the period of 2008-2010 actual data were used For the period after 2010 were used the data of the year 2010: P_y= 13012,613 t.dal
Foundation for the choice or description of the measuring methods	Objectively reflects the amount of beer produced in a base year. Is amount based on measures done with working and calibrated measuring equipment.
Description of the control procedures and quality guarantee	This data is subject to cross checking by government authorities.
Commentary:	

Data/Parameter:	$NCV_{NG,BL}$

Measure:	Gcal/ths m^3
Description:	Caloricity of natural gas in base year
Frequency of determination/ monitoring	Once
Source of data	According to statistical data of enterprise
Values used during previous computation	$NCV_{NG,BL}$ = 8.1 Gcal/ths m^3
Foundation for the choice or description of the measuring methods	According to statistic data Net calorific value is variable and variables in period 8100-8300 ccal/m_3 (8.1-8.3 Gcal/ths m^3). Therefore in calculations was used $NCV_{NG,BL}$ = 8.1 Gcal/ths m^3.
Description of the control procedures and quality guarantee	Estimation of this value based on statistic data of enterprise and common practice of Ukraine.
Commentary:	When volume of gas is expressed in m_3, this means that this is standard m^3.

Data/Parameter:	$MSW_{T,BL}$
Measure:	t
Description:	Total amount of organic waste generated in a base year
Frequency of determination/ monitoring	Once
Source of data	Measured with measuring equipment and determined by normative calculations. Ecological reports to state authorities.
Values used during previous computation	According to statistic data of enterprise for year 2004 $MSW_{T,BL}$ = 2401,1 t
Foundation for the choice or description of the measuring methods	Objectively reflects the amount of beer produced in a base year. Is amount based on measures done with working and tested measuring equipment as well as accounting verification and verification through the closing of energy balances of the enterprise. Subject to accounting cross verification.
Description of the control procedures and quality guarantee	This data is subject to cross checking by government authorities.
Commentary:	

Data/Parameter:	$MSW_{F,BL}$
Measure:	
Description:	Share of organic waste from brewing disposed at landfills according to the base scenario
Frequency of determination/ monitoring	Once
Source of data	According to the generally accepted practice at the DE PJSC "Obolon" “Zibert’s Brewery”and at Ukrainian breweries at the start of the Project
Values used during previous computation	1 (100%)
Foundation for the choice or description of the measuring methods	According to generally accepted practice in year 2004 100% of organic waste was disposed at landfills and silos.
Description of the control procedures and quality	This data is based on generally accepted practice.

guarantee	
Commentary:	

Parameters that are subject to monitoring are listed in tables D.1.1.1 and D.1.1.3 Section D.

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

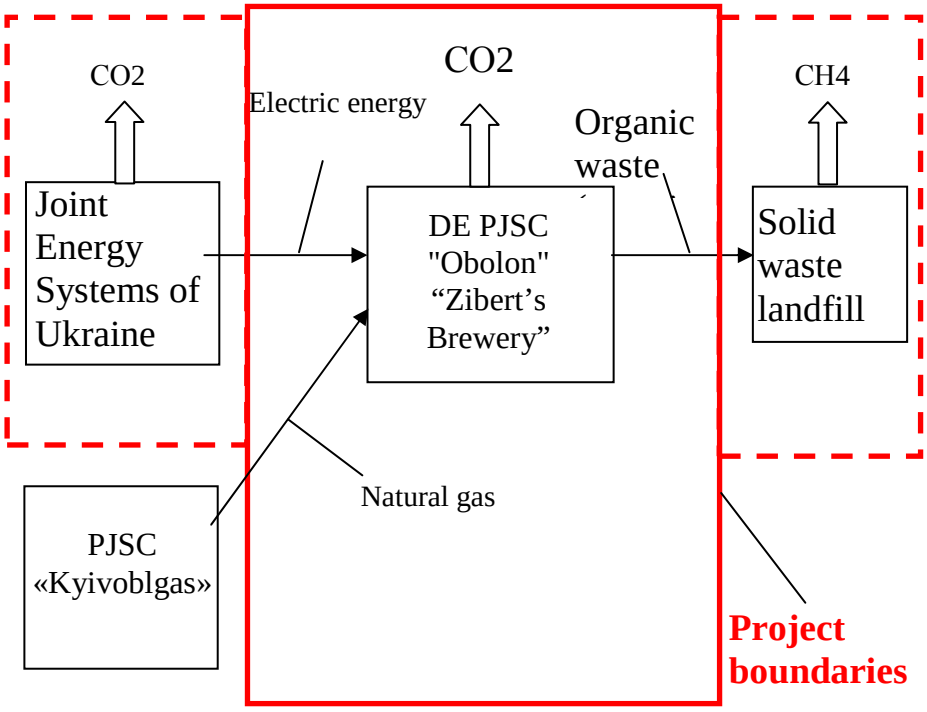
To determine the baseline, demonstrate additionality and feasibility of implementing the proposed JI project "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 03.0.0) was used. Application of this tool is common practice in the development of JI projects. According to this tool for demonstrating additionality of the proposed project was used barrier analysis and analysis of common practice. As a result of the analysis showed that the most plausible baseline scenario is the continuation of the current situation at the start of the project (2004).

More detailed the use of "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 03.0.0) and demonstration of additionality is described in Section B.1 above.

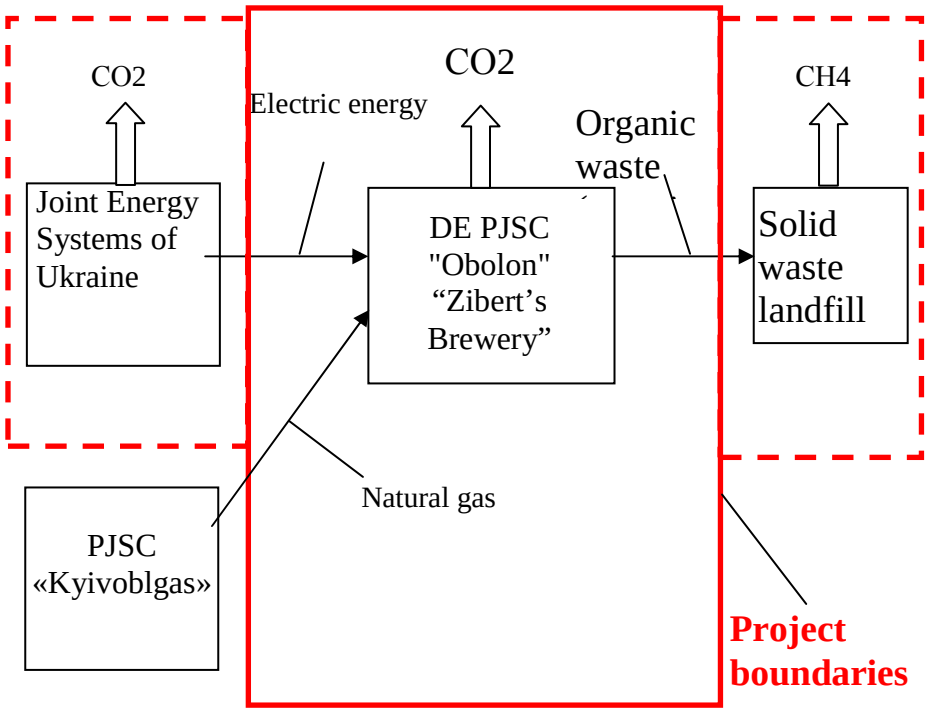
B.3. Description of how the definition of the project boundary is applied to the project:

Project boundary

The approach takes into account when assessing the carbon emissions of CO_2, which are formed as a result of generation of electric and thermal energy needed for beer production and CH4 emissions caused by disposal of organic waste of beer production. The figures 3.1 and 3.2 shows the boundaries of the project scenario and baseline scenario respectively (outlined with red solid line).



Picture 3.1. Boundaries of the project scenario



Picture 3.2. Boundaries of the baseline scenario

The list of sources of emissions and GHG that are encompassed by the project boundary is presented in Table3.

Table 3. Sources of emissions and GHG that are included or excluded in the project boundaries

	Source	Gas	Included?	Justification / Explanation
Baseline scenario	United Energy Systems of Ukraine stations which consume fossil fuels	CO_2	Yes	Emissions caused by burning fossil fuels by United Energy Systems of Ukraine stations for electric energy generation, needed for beer production scenario
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Generating equipment of DE PJSC "Obolon" “Zibert’s Brewery”	CO_2	Yes	Emissions caused by natural gas burning by generating equipment of DE PJSC "Obolon" “Zibert’s Brewery” for heat generation
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Organic waste of beer production	CO_2	No	Excluded for simplification
		CH_4	Yes	At the start of the project generally accepted practice of organic beer production (sparging) was the removal of waste to the landfills, where some gas was stood out (including methane concentration) as a result
		N_2O	No	Excluded for simplification
Project scenario	United Energy Systems of Ukraine stations which consume fossil fuels	CO_2	Yes	Emissions caused by burning fossil fuels by United Energy Systems of Ukraine stations for electric energy generation, needed for beer production scenario
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Generating equipment of DE PJSC "Obolon" “Zibert’s Brewery”	CO_2	Yes	Emissions caused by natural gas burning by generating equipment of DE PJSC "Obolon" “Zibert’s Brewery” for heat generation
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Organic waste of beer production	CO_2	No	Excluded for simplification
		CH_4	Yes	It is planned in the project scenario to complete disposal of organic waste from beer production. But, however, if the part of the waste is transported to the landfills, greenhouse gas emissions will be considered in the calculations.
		N_2O	No	Excluded for simplification

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Date of completion of baseline studies - 01/09/2011.

The research of baseline was conducted by the company “MT-Invest”LTD which is not a participant of the project.

Project developer-personal information.

Organization	Company “MT-Invest”LTD
Street/P.O. Box	Kikvidze str.
Building	11
City	Kyiv
State/Region:	Kyiv
Post Code:	01103
Country:	Ukraine
Phone:	+38(044) 227-66-86, 253-50-69
Fax:	
E-mail:	zhuravlev@mtinvest.com.ua
Position:	Director for environmental projects
Last name:	Zhuravlev
Middle nsme:	Volodymyrovych
First name:	Eugene
Phone (direct)	
Fax (direct)	
Mobile:	(050)0186821

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

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30/03/2004 – Order #56 established at the DE PJSC "Obolon" "Zibert's Brewery" a workgroup for reducing power consumption and waste production in the process of brewing and other production activities.

C.2. Expected operational lifetime of the project:

25 years (300 months) or more – the program includes continuous implementation of measures aimed at reducing the consumption of power resources and utilization of organic waste, which envisages continuous modernization of equipment and its repair or replacement in case of discovering defects or breakdowns.

C.3. Length of the crediting period:

Total crediting period is 18 years (216 months):

- 2008-2012 – crediting period (the period of commitment);
- 2013-2025 – post commitment period (period of credit extension beyond 2012 requires approval by the project Host Party).

Period ERU generation will begin only on 01.01.2008 and will not exceed the lifetime of the project..

Date of the start of the crediting period January 1, 2008 . End date December 31, 2025.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The monitoring plan has been developed with the use of own JI approach based on the criteria of the heads of JISC Guidance on criteria for baseline setting and monitoring. Version 02.

During the development of own JI approach elements of the following instruments and normative documents were used:

- Tool to calculate baseline, project and/or leakage emissions from electricity consumption[1], Version 01;
- Tool to calculate project or leakage emissions from electricity consumption[2], version 02;
- 1996 IPCC[34] Guidelines for National Greenhouse Gas Inventories);
- 2006 IPCC[567] Guidelines for National Greenhouse Gas Inventories;
- Tool to determine the baseline efficiency of thermal or electric energy generation systems[8], Version 1.

All formulas that have been identified for monitoring process were made according to the approaches used in the documents mentioned above and taking into account current monitoring system used by the enterprise and the special features of the project. The formulas are listed in the section below.

Choice of base period described in section B.1 above.

Consumption of energy by “Brewery Zibert” is in the following directions:

- Production of beer;

[1] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

[3] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

[4] http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm

[5] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[6] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

[7] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

[8] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-09-v1.pdf

- Production of soft drinks;
- Other production consumption.

Other production consumption in turn divided into:

- Heating;
- Gasified carbon plant;
- Factory hot water;
- Drying work clothes.

All pages of consumption of energy resources that belong to other production consumption directly or indirectly related to beer production, but due to the peculiarities of the balance sheet brewery it was made a separate paragraph.

The analysis revealed the structure of energy consumption by DE PJSC "Obolon" “Zibert’s Brewery” (form #11-MPT for 2010 year) the following distribution to consumers;

Type of consumer	Share in the total thermal energy consumed,%	Share in total electricity consumed,% %
Beer production	99.5	99.2
Other production consumption	0.5	0.8

As seen from the presented above beer production is the main areas of energy consumption of the brewery(more than 99% of heat consumption and of electricity consumption). Taking into account that other production consumption directly or indirectly related to beer production, with the aim of simplifying the calculations were made relative to the value of beer produced.

There is no energy supply to third consumers.

Natural gas is consumed by the enterprise only for heat producing by plant boiler house

Data collected for monitoring should be kept in electronic and/or paper form. All the key data to be monitored and are necessary for the determination of the project will be kept for two years after the last transfer of ERUs the project.

The main parameters that are monitored during the crediting period and parameters to be defined once for the entire crediting period and not subject to monitoring are presented below. Other parameters not included in the monitoring are derivatives and should be calculated using the initial parameters.

The following parameters of emissions are subject to monitoring under the project scenario:

$EC_{PJ,y}$ = amount of electric power consumed in the project scenario by DE PJSC "Obolon" "Zibert's Brewery" in a year *y*, MWh;
$FC_{PJ,NG,y}$ = amount of natural gas consumed by DE PJSC "Obolon" "Zibert's Brewery" according to the project scenario in a year *y*, ths m3;
$NCV_{NG,y}$ = caloricity of natural gas consumed by DE PJSC "Obolon" "Zibert's Brewery" a year *y*, Gcal/ths m^3;
$MSW_{T,PJ,y}$ = total sparging generated under the project scenario in year *y*, tons;
$MSW_{F,PJ,y}$ = fraction of sparging disposed to solid waste disposal sites under the project scenario in year *y*.

All of the above parameters objectively and clearly reflect the parameters of beer production at the DE PJSC "Obolon" "Zibert's Brewery", such as: the amount of used electric power, the amount and the movement of organic waste. All parameters are determined using working and calibrated measuring equipment, using the current methods and technological norms, based on passport data provided by the suppliers of equipment and energy resources.

$EF_{CO2,ELEC,y}$ = indirect emissions of GHG during the consumption of electric power by consumers of electric power in Ukraine, tCO2e/MWh.

This ratio reflects the amount of specific emissions of greenhouse gases linked to the consumption of electricity in Ukraine. Using these factors is common practice in the calculation of joint implementation projects related to electricity consumption. In the calculations used only deterministic and / or approved rates.

The following parameters are determined only once for the entire crediting period for the project scenario emissions:

$NCV_{NG,y}$ = caloricity of natural gas by DE PJSC "Obolon" "Zibert's Brewery" in year *y*, Gcal/ths m^3;
$EF_{CO2,NG}$ = emission factor of natural gas, tCO_2e/GJ;
4.1868 = coefficient of translation of Gcal into GJ;
MCF = coefficient of correction of the methane flow;
DOC_F = portion of *DOC* that actually decomposes;
F = portion of CH4 in gasses generated at landfills (typical value 0.5);
$\frac{16}{12}$ = coefficient of conversion of carbon into methane;
R_y = recovered CH4 in year *y*, tCH4;
OX = oxidation factor, (0 as stated in 1996 IPCC);
GWP_{CH4} = global warming potential of methane, tCO2e/tCH4.

These factors are formally approved and widely used in relevant calculations in JI projects.

The following parameters are subject to monitoring under the baseline scenario:

P_y = amounts of beer production in year *y*, t.dal.

This parameter reflects the amount of the beer produced by DE PJSC "Obolon" “Zibert’s Brewery”. Determined using the appropriate procedures and are subject to commercial account.

$EF_{CO2,ELEC,y}$ = indirect emissions of GHG during the consumption of electric power by the consumers of electric power in Ukraine, tons CO2e/MWh.

This ratio reflects the amount of specific emissions of greenhouse gases linked to the consumption of electricity in Ukraine. Using these factors is common practice in the calculation of joint implementation projects related to electricity consumption. Only determinate and / or officially approved rates are used in the calculations.

The following parameters are determined only once for the entire crediting period for the baseline emissions:

$EF_{CO2,NG}$ = emission factor of natural gas, tCO2e/GJ;

4.1868 = coefficient of conversion of Gcal into GJ;

MCF = methane correction factor (fraction);

DOC = degradable organic carbon (fraction);

DOC_F = fraction organic waste dissimilated;

F = fraction of CH4 in landfill gas (default value 0.5);

$\frac{16}{12}$ = coefficient of conversion of carbon into methane;

R_{BL} = recovered CH4 in year *y*, tCH4;

OX = oxidation factor, (0 as stated in 1996 IPCC);

GWP_{CH4} = potential of global warming of methane, tCO2e/tCH4.

These factors are formally approved and widely used in relevant calculations in JI projects.

$NCV_{NG,BL}$ = caloricity of natural gas consumed by DE PJSC «Obolon» “Zibert’s Brewery” in base year, Gcal/ths m^3;

P_{BL} = volumes of beer production in base year, t.dal;

EC_{BL} = amount of electric power consumed by DE PJSC «Obolon» "Zibert's Brewery" in base year, MWh;
$FC_{BL,NG}$ = amount of natural gas consumed by DE PJSC «Obolon» "Zibert's Brewery" in base year, ths m^3;
$MSW_{T,BL}$ = total sparging generated in base year, tons.

The above parameters represent an objective and transparent parameters of beer production at PJSC Obolon "Brewery Zibert" in base year. Determined using working and properly calibrated measuring equipment and the valid methodologies and technological standards and based on passport data provided by suppliers of equipment and energy.

Calorific value of natural gas consumed by DE PJSC "Obolon" "Zibert's Brewery" is a variable data. Value changes every 1-2 weeks within 8.1-8.3 Gcal/ths m3 (8100-8300 kcal/m3). To simplify the calculations and with conservative considerations calorific value of natural gas was taken equal to 8.1 Gcal/ths m3.

The calculation formulas used during project monitoring, data description and sources listed in the following sections of this document.

Scheme of data collection and data management is given in section D.3.

Verification of emissions reduction units is conducted based on annual data. Responsible for the preparation of documentation and submissioin of documents.to Accredited Independent Entities (AIEs) is the company "MT-Invest"

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario:

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. PE_y	Project GHG emissions	Monitoring of GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	
2. $PE_{ELEC,y}$	Project GHG emissions related to the consumption of electric	Monitoring of GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	

		power							
3	$PE_{NG,y}$	Project GHG emissions related to the consumption of natural gas	Monitoring of GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	
4	$PE_{CH4,y}$	Project GHG emissions related to the disposal of organic waste at landfills	Monitoring of GHG emissions	tCO2e	c	anually	100 %	Electronic/ Paper	
5.	$EC_{PJ,y}$	Consumption of electric power according to project scenario in year y	Measured with metering equipment. Annual reports	MWh	m	monthly	100 %	Electronic/ Paper	
6.	$EF_{CO2,ELEC,y}$	Coefficient of CO_2 equivalent in JES of Ukraine for projects aimed at reducing electric power consumption in year y	Default value	tCO_2e/MWh	e	anually	100 %	Electronic/ Paper	For 2008 – 1,219[9] tCO_2e/MWh For 2009 – 1.237[10] tCO_2e/MWh For 2010 – 1.225[11] tCO_2e/MWh For 2011-2025 – 1.227[12] tCO_2e/MWh

[9] http://www.neia.gov.ua/nature/doccatalog/document?id=127171

[10] http://www.neia.gov.ua/nature/doccatalog/document?id=127172

[11] http://www.neia.gov.ua/nature/doccatalog/document?id=126006

[12] http://www.neia.gov.ua/nature/doccatalog/document?id=127498

7.	$EF_{CO2,NG}$	Emission factor for natural gas	Default value 1996 IPCC[13]	tCO_2e/GJ	e	once	100 %	Electronic/ Paper	0.0561 tCO2e/GJ
8.	$FC_{PJ,NG,y}$	Consumption of natural gas according to project scenario in year y	Measured by measuring equipment. Commercial accounting of natural gas for the plant (entire production). Acts with Kyivgas	ths m^3	m	monthly	100 %	Electronic/ Paper	
9.	$NCV_{NG,y}$	Caloricity of natural gas	Default value	Gcal/ths m^3	e	annually	100%	Electronic/ Paper	To simplify the calculations and taking into account the statistics of the enterprise in the calculations used $NCV_{NG,y}$ = 8.1 Gcal/ths m^3, which objectively reflects the lower calorific value of natural gas consumed by the DE PJSC «Obolon» "Zibert's Brewery".
10.	$MSW_{T,PJ,y}$	Total sparging generated according to project scenario in year *y*	Measured by measuring equipment and determined by normative calculations. Annual reports	tons	m, c	monthly	100%	Electronic/ Paper	

[13] http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm

11.	$MSW_{F,PJ,y}$	Fraction of sparging disposed to solid waste disposal sites according to project scenario	Company statistical data.		m,c,e	annually	100%	Electronic/ Paper	For preliminary calculations 0 is used as no waste is expected to be taken to landfills upon the beginning of the project.
12.	*MCF*	Methane correction factor (fraction)	Default value. 2006 IPCC [14]		e	once	100%	Electronic/ Paper	
13.	*DOC*	Degradable organic carbon	Default value. 2006 IPCC [15]		e	once	100%	Electronic/ Paper	
14.	DOC_F	Fraction organic waste dissimilated	Default value. 2006 IPCC [16]		e	once	100%	Electronic/ Paper	0.5
15.	R_y	Recovered CH4 in year y	Default value.	tCH4	e	once	100%	Electronic/ Paper	Utilization of GHG is beyond the responsibility of project owners and beyond the boundaries of the project. Therefore, this value for conservative measures, was set at 0.
16.	*F*	Fraction of CH4 in landfill gas	Default value. 1996 IPCC [17]		e	once	100%	Electronic/ Paper	

[14] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[15] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

[16] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

17. *OX*	Oxidation factor	Default value. 1996 IPCC [18]		e	once	100%	Electronic/ Paper	
18. GWP_{CH4}	Potential of global warming of methane	According to the decision of the UNFCCC and the Kyoto protocol	$tCO_2e/tCH4$	e	once	100 %	Electronic/ Paper	21 $tCO_2e/tCH4$

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

Emissions of the project scenario:

$$PE_y = PE_{ELEC,y} + PE_{NG,y} + PE_{CH4,y}, \quad (1)$$

where

PE_y = greenhouse gas emissions in the project scenario in year *y*, tCO_2e;

$PE_{ELEC,y}$ = greenhouse gas emissions in the project scenario related to the consumption of electric energy in year *y*, tCO_2e;

$PE_{NG,y}$ = greenhouse gas emissions in the project scenario related to the consumption of natural gas in year *y*, tCO_2e;

$PE_{CH4,y}$ = greenhouse gas emissions in the project scenario related to the utilization of organic waste (sparging) during the production of beer through depositing it at landfills, tCO_2e;

y = year for which calculations are carried out.

GHG emissions in the project scenario related to the consumption of electricity are calculated according to the approach described in the Tool to calculate baseline, project and/or leakage emissions from electricity consumption[19], Version 01.

$$PE_{ELEC,y} = EC_{PJ,y} \cdot EF_{CO2,ELEC,y}, \quad (2)$$

Where

$PE_{ELEC,y}$ = greenhouse gas emissions in the project scenario associated with the consumption of electric energy in year *y*, tCO_2e;

[17] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

[18] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

[19] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

$EC_{PJ,y}$ = amount of electricity consumed in the project scenario by DE PJSC «Obolon» "Zibert's Brewery" in year *y*, MWh;
$EF_{CO2,ELEC,y}$ = indirect emissions of electricity consumption of electric energy consumers from the Joint Energy systems of Ukraine, tCO_2e/MWh;
y = year for which calculations are carried out.

GHG emissions related to natural gas consumption are calculated according to the approach described in the Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion[20], version 02.

$$PE_{NG,y} = FC_{PJ,NG,y} \cdot NCV_{NG,y} \cdot EF_{CO2,NG} \cdot 4.1868, \quad (3)$$

Where
$PE_{NG,y}$ = gas emissions in the project scenario related to the consumption of natural gas in year *y*, tCO_2e;
$FC_{PJ,NG,y}$ = volume of natural gas consumed by the DE PJSC "Obolon" "Zibert's Brewery" according to project scenario in year *y*, ths m^3;
$NCV_{NG,y}$ = caloricity of natural gas used in year *y*, Gcal/ths m^3;
$EF_{CO2,NG}$ = natural gas emission coefficient, tCO_2e/GJ;
4.1868 = conversion coefficient of Gcal into GJ, Gcal/GJ;
y = year for which calculations are carried out.

For calculating GHG emissions according to project scenario related to the utilization of organic waste from the production of beer by depositing it at landfills a typical approached described in1996[21] IPCC Guidelines for National Greenhouse Gas Inventories was used.

$$PE_{CH4,y} = (MSW_{T,PJ,y} \cdot MSW_{F,PJ,y} \cdot MCF \cdot DOC \cdot DOC_F \cdot F \cdot \frac{16}{12} - R_y) \cdot (1 - OX) \cdot GWP_{CH4} \quad (4)$$

Where
$PE_{CH4,y}$ = greenhouse gas emissions in the project scenario related to the disposal of organic waste (sparging) from beer production by depositing it at landfills in year *y*, tCO_2e;
$MSW_{T,PJ,y}$ = total sparging generated according to project scenario in year *y*, tons;
$MSW_{F,PJ,y}$ = fraction of sparging disposed to solid waste disposal sites according to project scenario in year *y*;
MCF = methane correction factor (fraction) (2006 IPCC) [22];
DOC = degradable organic carbon (fraction) (2006 IPCC) [23];

[20] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

[21] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

[22] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[23] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

DOC_F = fraction organic waste dissimilated (2006 IPCC) [24];
F = fraction of CH4 in landfill gas (default value 0.5) (1996[25] IPCC);
$\frac{16}{12}$ = coefficient of conversion of carbon into methane;
R_y = recovered CH4 in year y, tCH4;
OX = oxidation factor, (0 as stated in 1996 IPCC);
GWP_{CH4} = potential of methane global warming, tCO2e/tCH4; (According to the UNFCCC solution and the Kyoto protocol)
y = year for which calculations are carried out.

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
19. BE_y	Baseline GHG emissions	Monitoring GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	

[24] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

[25] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

20.	$BE_{ELEC,y}$	Baseline GHG emissions related to electric power consumption	Monitoring GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	
21.	$BE_{NG,y}$	Baseline GHG emissions related to consumption of natural gas	Monitoring GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	
22.	$BE_{CH4,y}$	Baseline GHG emissions related to disposal of waste at landfills	Monitoring GHG emissions	tCO2e	c	annually	100 %	Electronic/ Paper	
23.	$EC_{BL,y}$	Consumption of electric power related to baseline scenario in year *y*	Calculated by project developers based on the statistical data of the company and parameters of base year	MWh	c	annually	100 %	Electronic/ Paper	
24.	EC_{BL}	Consumption of electric power in base year	Measured with measuring equipment and determined by normative calculations. Annual report.	MWh	в	once	100 %	Electronic/ Paper	
25.	P_y	Beer production in year *y*	Production reports	t.dal	m, c	monthly	100 %	Electronic/ Paper	
26.	P_{BL}	Beer production in base year	Production reports	t.dal	m, c	once	100 %	Electronic/ Paper	

27.	$FC_{BL,NG,y}$	Consumption of natural gas in base scenario in year y	Calculated by project developers based on the statistical data of the company and parameters of base year	ths m^3	c	annually	100 %	Electronic/ Paper	
28.	$FC_{BL,NG}$	Natural gas consumption in base year	Measured with measuring equipment. Commercial accounting of gas on the plant (entire production). Act with Kyivgas	ths m^3	m	once	100 %	Electronic/ Paper	

29.	$NCV_{NG,BL}$	Caloricity of natural gas in base year	Company statistics, data from natural gas supplier	Gcal/ths m^3	e	once	100%	Electronic/ Paper	To simplify the calculations and taking into account the statistics of the enterprise in the calculations used $NCV_{NG,y}$ = 8.1 Gcal/ths m^3, which objectively reflects the lower calorific value of natural gas consumed by the DE PJSC "Obolon" "Zibert's Brewery".
30.	$MSW_{T,BL,y}$	Total sparging generated according to base scenario in year y	Calculated by project developers based on statistical data and plant parameters of the base year	tons	c	annually	100%	Electronic/ Paper	

31.	$MSW_{T,BL}$	Total sparging generated in base year	Measured with measuring equipment and determined by normative calculations. Environmental reports of government agencies.	tons	m, c	once	100%	Electronic/ Paper	
32.	$MSW_{F,BL}$	Fraction of sparging disposed to solid waste disposal sites according to base scenario	According to general practice at the DE PJSC "Obolon" "Zibert's Brewery" and other Ukrainian breweries at the time of Project inception		c, e	once	100%	Electronic/ Paper	According to general practice in year 2004, 100% of organic waste was buried in silos.
33.	R_{BL}	Recovered CH4 in base year	Default value.	tCH4	e	once	100%	Electronic/ Paper	At project inception (year 2004) there were no projects aimed at utilizing landfill gasses in Ukraine. Moreover, utilization of landfill gasses lies outside the control of project owners and outside the project boundaries. Therefore this value was set equal to 0.

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

Baseline emissions:

$$BE_y = BE_{ELEC,y} + BE_{NG,y} + BE_{CH4,y}, \quad (5)$$

where

BE_y = GHG emissions according to baseline scenario in year *y*, tCO_2e;
$BE_{ELEC,y}$ = baseline GHG emissions related to electric power consumption in year *y*, tCO_2e;
$BE_{NG,y}$ = baseline GHG emissions related to the consumption of natural gas in year *y*, tCO_2e;
$BE_{CH4,y}$ = baseline GHG emissions related to utilization of organic waste from beer production by disposing them at landfills in year *y*, tCO_2e;
y = year for which calculations are carried out.

GHG emissions in baseline scenario related to the consumption of electricity are calculated according to the approach described in the Tool to calculate baseline, project and/or leakage emissions from electricity consumption[26], Version 01.

$$BE_{ELEC,y} = EC_{BL,y} \cdot EF_{CO2,ELEC,y}, \quad (6)$$

Where

$BE_{ELEC,y}$ = GHG emissions according to baseline scenario related to consumption of electric power in year *y*, tCO_2e;
$EC_{BL,y}$ == amount of electric power consumed according to baseline scenario by DE PJSC "Obolon" “Zibert’s Brewery”in year *y*, MWh;
$EF_{CO2,ELEC,y}$ = indirect GHG emissions from consumption of electric power by consumers of electric power in Ukraine, tCO_2e/MWh;
(See the formula 2 above)
y = year for which calculations are carried out.

$$EC_{BL,y} = P_y \cdot \frac{EC_{BL}}{P_{BL}}, \quad (7)$$

Where

$EC_{BL,y}$ =amount of electric power consumed by DE PJSC "Obolon" “Zibert’s Brewery”in the baseline scenario in a year *y*, MWh;
P_y = volumes of beer production in year *y*, t.dal;
P_{BL} = baseline year volumes of beer production, t.dal

[26] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

EC_{BL} = amount of electric power consumed by DE PJSC "Obolon" “Zibert’s Brewery”in base year, MWh;
y = year for which calculations are carried out.

GHG emissions in project scenario related to the consumption for natural gas are calculated in accordance with approach described in Tool to calculate baseline, project and / or leakage emissions from electricity consumption[27], Version 02.

$$BE_{NG,y} = FC_{BL,NG,y} \cdot NCV_{NG,BL} \cdot EF_{CO2,NG} \cdot 4.1868, \quad (8)$$

Where
$BE_{NG,y}$ = GHG emissions according to baseline scenario related to consumption of natural gas in year y, tCO_2e;
$FC_{BL,NG,y}$ = amount of natural gas consumed by DE PJSC "Obolon" “Zibert’s Brewery”according to baseline scenario in year y, ths m^3;
$NCV_{BL,NG}$ = caloricity of natural gas used in beer production in base year, Gcal/ths m^3;
$EF_{CO2,NG}$ = natural gas emissions ratio, tCO_2e/GJ;
4.1868 = conversion of Gcal into GJ coefficient;
y = year for which calculations are carried out.

$$FC_{BL,NG,y} = P_y \cdot \frac{FC_{BL,NG}}{P_{BL}}, \quad (9)$$

Where
$FC_{BL,NG,y}$ = volume of natural gas used by DE PJSC "Obolon" “Zibert’s Brewery” in baseline scenario year y, Gcal;
P_y = volumes of beer production in year y, t.dal;
P_{BL} = baseline year volumes of beer production, t.dal;
$FC_{BL,NG}$ = volume of natural gas used by DE PJSC "Obolon" “Zibert’s Brewery” in base year, Gcal;
y = year for which calculations are carried out.

For calculating baseline scenario GHG emissions related to utilization of organic waste (sparging) through disposal at landfills was used typical approach described in 1996 IPCC[28] Guidelines for National Greenhouse Gas Inventories was used.

[27] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

[28] http://www.ipcc-nggip.iges.or.jp/public/gl/invs6e.html

$$BE_{CH4,BL,y} = (MSW_{T,BL,y} \cdot MSW_{F,BL,y} \cdot MCF \cdot DOC \cdot DOC_F \cdot F \cdot \frac{16}{12} - R_{BL}) \cdot (1 - OX) \cdot GWP_{CH4} \quad (10)$$

Where

$BE_{CH4,BL,y}$ = baseline GHG emissions related to utilization of organic waste (sparging) from beer production through disposal at landfills in year *y*, tCO_2e;
$MSW_{T,BL,y}$ = total sparging generated according to baseline scenario in year *y*, tons;
$MSW_{F,BL,y}$ = fraction of sparging disposed to solid waste disposal sites according to baseline scenario in year *y*;
MCF = methane correction factor (fraction); (2006 IPCC) [29];
DOC = degradable organic carbon (fraction); (2006 IPCC) [30];
DOC_F = fraction organic waste dissimilated; (2006 IPCC) [31];
F = fraction of CH4 in landfill gas (default value 0.5); (1996[32] IPCC)
$\frac{16}{12}$ = coefficient for converting carbon into methane;
R = recovered CH4 in year *y*, tCH4;
OX = oxidation factor (0 as stated in 1996 IPCC);
GWP_{CH4} = potential of global warming of methane, tCO2e/tCH4; (According to the UNFCCC and the Kyoto Protocol)
y = year for which calculations are carried out.

$$MSW_{T,BL,y} = P_y \cdot \frac{MSW_{T,BL}}{P_{BL}}, \quad (11)$$

Where

$MSW_{T,BL,y}$ = total sparging generated according to baseline scenario in year *y*, tons;
$MSW_{T,BL}$ = total sparging generated in base year, tons;
P_y = volumes of beer production in year *y*, t.dal;
P_{BL} = volumes of beer production in base year, t.dal;

[29] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[30] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[31] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

[32] http://www.ipcc-nggip.iges.or.jp/public/gl/wastrusn.html

y = year for which calculations are carried out.

D. 1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

Not applicable

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

>>

Not applicable

D.1.3. Treatment of leakage in the monitoring plan:

An increase in GHG emissions outside the project boundaries in result of the project implementation is not expected.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

Leakage not expected.

The project does not envisage any activities that may lead to leakage.

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

>>

Emission reduction is calculated according to the formula:

$$ER_y = BE_y - PE_y - LE_y, \quad (12)$$

Where
ER_y = emission reduction in year *y*, tCO_2e;
BE_y = baseline GHG emissions in year *y*, tCO_2e;
PE_y = GHG emissions from the project activity in year *y*, tCO_2e;
LE_y = emissions from leakage in year *y*, tCO_2e;
y = year for which calculations are carried out.

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

>>
Collection, handling, transfer and utilization of waste at the company is carried out in accordance with the Law of Ukraine "On waste".
Applicable laws and regulations on environmental safety are the legal basis for waste management.
More in-depth description of waste management can be found in below in the section of Annex 3 of this document.
The project implementation does not require gathering of information on the influence on the environment in excess of information collected at the pant prior to the project inception.

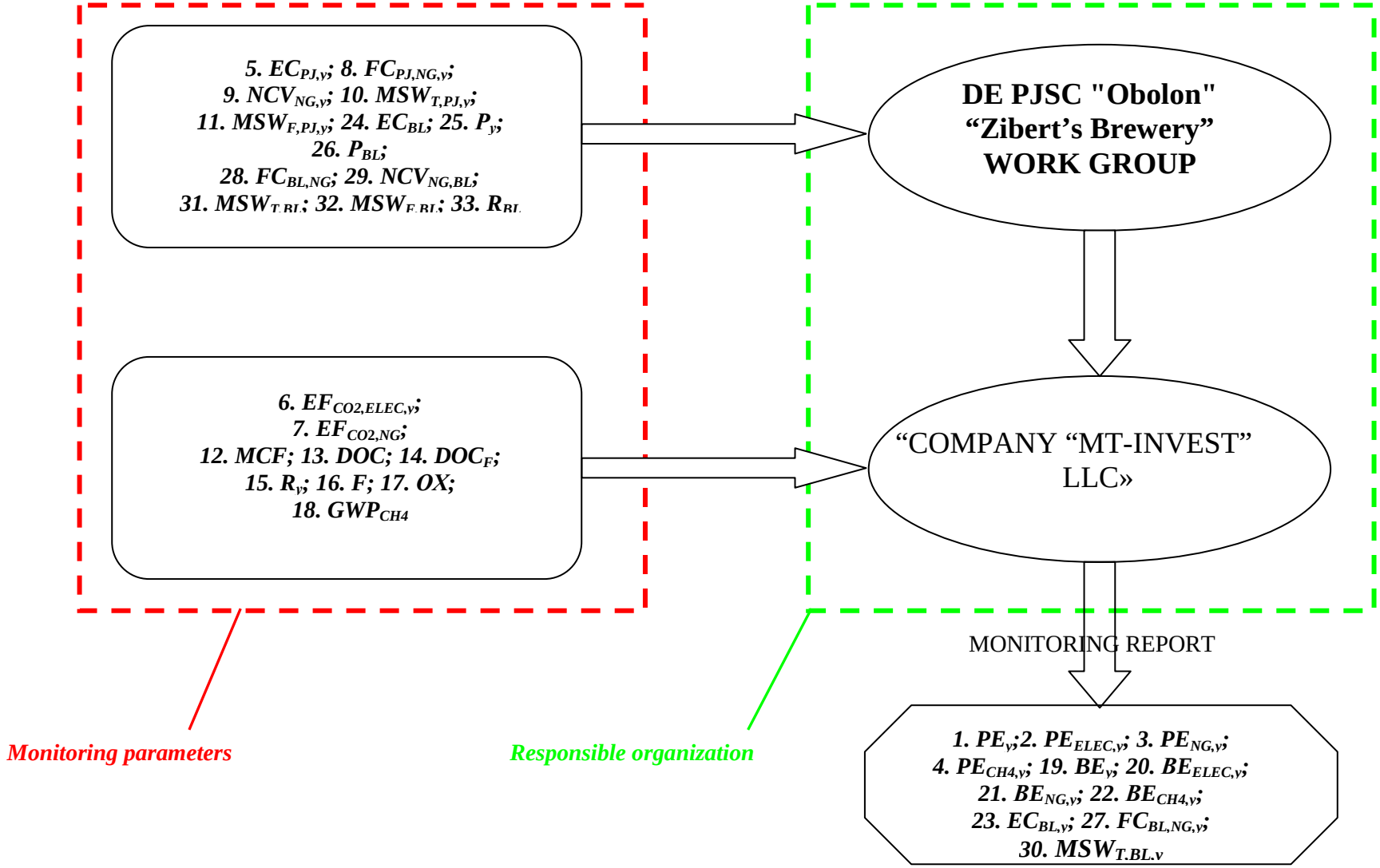
D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Table D.1.1.1. 6. $EC_{PJ,y}$ *Table D.1.1.3.* 28. EC_{BL}	Low	Quantity of electricity consumed by DE PJSC "Obolon" "Zibert's Brewery"determined using equipment in good condition, verified and calibrated in accordance with the applicable requirements of Ukraine of equipment. In addition, the amount of consumed electricity is tested cross-check by the supplier of electric power and state authorities.

Table D.1.1.1. *11. $FC_{PJ,NG,y}$* *Table D.1.1.3.* *35. $FC_{BL,NG}$*	low	Quantity of natural gas consumed by DE PJSC "Obolon" "Zibert's Brewery"is determined using working, calibrated and tested in accordance with the current demand in Ukraine equipment. This value is cross-checked with the supplier of natural gas and state authorities.
Table D.1.1.1. *12. $NCV_{NG,y}$* *Table D.1.1.3.* *36. $NCV_{NG,BL}$*	low	Fuel caloricity (natural gas) is subject to measuring by the supplier. The information on the value of this parameter is provided by the supplier (Kyivgas) in accordance with procedures regulated by agreements. For simplify of calculation, based on statistics and common practice it was adopted a constant 8.2 Gcal/ths. m^3 (8200 kcal/m3).
Table D.1.1.1. *13. $MSW_{T,PJ,y}$* *Table D.1.1.3.* *38. $MSW_{T,BL}$*	low	Production and movement of organic waste is subject to close control by state agencies in the sphere of ecology and environmental protection, which is why the trustworthiness of this information is beyond doubt.
Table D.1.1.1. *14. $MSW_{F,PJ,y}$*	low	Production and movement of organic waste is subject to close control by state agencies in the sphere of ecology and environmental protection, which is why the trustworthiness of this information is beyond doubt.
Table D.1.1.1. *7. $EF_{CO2,ELEC,y}$*	low	During the monitoring of emission reductions in this project only officially-approved in Ukraine or determinate coefficient for tons of CO_2 equivalent in Joint Electric Systems of Ukraine for projects aiming to reduce electric power in a year. The project developer carries out annually the monitoring of the actuality of this coefficient and actualizes its value during the development and design of the next periodic monitoring report, which would prevent the use of outdated or incorrect coefficient.
Table D.1.1.3 *29. P_y* *30. P_{BL}*	low	The amount of output is subject to commercial reporting, which is in turn subject to periodic cross reference by state governmental agencies (Tax inspection and others). This information is subject to multiple duplications at various stages from the bottling to the sale of this beer, which excludes mistakes or incorrect information.

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan:

>>

The monitoring plan does not foresee any other additional measures, resulting in installation of new measuring equipment or collection of additional parameters in addition to those that are already implemented. A scheme of data collection is provided in Figure 6.



Picture 4.1. Collection data for monitoring the project parameters

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

>>

DE PJSC "Obolon" “Zibert’s Brewery” that is the member of the project.

Company “MT-Invest” LTD that is not the project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

>>

The calculation of project emissions is carried out in accordance with formulae listed in section D.1.1.2.

Results of calculations are presented in the table below. Calculations themselves can be found in file Zibert_v.2.xls, which is attached to the PDD.

Table 4. Emissions of the project scenario.

Year	$PE_{ELEC,y}$ тCO2e	$PE_{NG,y}$ тCO2e	$PE_{CH4,y}$ тCO2e	PE_y тCO2e
2008	5958	3655	0	9613
2009	10970	5757	0	16727
2010	15178	6197	0	21375
2011	15203	6197	0	21400
2012	15203	6197	0	21400
Total for 2008-2012:				90515
Average amount of emissions in 2008-2012:				18103
2013	15203	6197	0	21400
2014	15203	6197	0	21400
2015	15203	6197	0	21400
2016	15203	6197	0	21400
2017	15203	6197	0	21400
2018	15203	6197	0	21400
2019	15203	6197	0	21400
2020	15203	6197	0	21400
2021	15203	6197	0	21400
2022	15203	6197	0	21400
2023	15203	6197	0	21400
2024	15203	6197	0	21400
2025	15203	6197	0	21400
Total for 2013-2025:				278200
Average amount of emissions in 2013-2025:				21400
Total for 2008-2025:				368715
Average amount of emissions in 2008-2025:				20484

E.2. Estimated leakage:

>>

No leakages are expected as a result of the project

E.3. The sum of E.1. and E.2.:

>>

Since the leakage emissions LEy = 0, the sum of leakage emissions and project scenario emissions is in fact equal to the identified project scenario emissions. The resulting emissions volumes are presented below in the Table 5.

Table 5. Sum of emissions from leakages and project activity.

.

Year	PE_y тCO2екв	LE тCO2екв	PE_y+LE тCO2екв
2008	9613	0	9613
2009	16727	0	16727
2010	21375	0	21375
2011	21400	0	21400
2012	21400	0	21400
Total for 2008-2012:			90515
Average amount of emissions in 2008-2012:			18103
2013	21400	0	21400
2014	21400	0	21400
2015	21400	0	21400
2016	21400	0	21400
2017	21400	0	21400
2018	21400	0	21400
2019	21400	0	21400
2020	21400	0	21400
2021	21400	0	21400
2022	21400	0	21400
2023	21400	0	21400
2024	21400	0	21400
2025	21400	0	21400
Total for 2013-2025:			278200
Average amount of emissions in 2013-2025:			21400
Total for 2008-2025:			368715
Average amount of emissions in 2008-2025:			20484

E.4. Estimated baseline emissions:

>>

Calculation of emissions of the baseline is carried out with formulas presented in section D.1.1.4.

Results of calculations are presented in the table below. Calculations themselves can be found in file «Zibert_v.2.xls», which is attached to the PDD.
GHG emissions for baseline scenario are presented in table 6.

Table 6. Baseline emissions

Year	$BE_{ELEC,y}$ тCO2e	$BE_{NG,y}$ тCO2e	$BE_{CH4,y}$ тCO2e	BE_y тCO2e
2008	7027	6007	6544	19578
2009	28084	23657	25773	77514
2010	38631	32860	35800	107291
2011	38694	32860	35800	107354
2012	38694	32860	35800	107354
Total for 2008-2012:				419091
Average amount of emissions in 2008-2012:				83818
2013	38694	32860	35800	107354
2014	38694	32860	35800	107354
2015	38694	32860	35800	107354
2016	38694	32860	35800	107354
2017	38694	32860	35800	107354
2018	38694	32860	35800	107354
2019	38694	32860	35800	107354
2020	38694	32860	35800	107354
2021	38694	32860	35800	107354
2022	38694	32860	35800	107354
2023	38694	32860	35800	107354
2024	38694	32860	35800	107354
2025	38694	32860	35800	107354
Total for 2013-2025:				1395602
Average amount of emissions in 2013-2025:				107354
Total for 2008-2025:				1814693
Average amount of emissions in 2008-2025:				100816

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

>>
Emission reductions are calculated using formula (12) above. Results presented in table 7 below.

Table 7. Emission reduction

Year	ER_y тCO2eкв
2008	9965
2009	60787
2010	85916
2011	85954

2012	85954
Total for 2008-2012:	328576
Average amount of emissions in 2008-2012:	65715
2013	85954
2014	85954
2015	85954
2016	85954
2017	85954
2018	85954
2019	85954
2020	85954
2021	85954
2022	85954
2023	85954
2024	85954
2025	85954
Total for 2013-2025:	1117402
Average amount of emissions in 2013-2025:	85954
Total for 2008-2025:	1445978
Average amount of emissions in 2008-2025:	80332

E.6. Table providing values obtained when applying formulae above:

>>

Year	*PEy* тCO2e	*LEy* тCO2e	*BEy* тCO2e	*ERy* тCO2eв
2008	9613	0	19578	9965
2009	16727	0	77514	60787
2010	21375	0	107291	85916
2011	21400	0	107354	85954
2012	21400	0	107354	85954
Total for 2008-2012:	90515	0	419091	328576
Average reductions in2008-2012:	18103	0	83818	65715
2013	21400	0	107354	85954
2014	21400	0	107354	85954
2015	21400	0	107354	85954
2016	21400	0	107354	85954
2017	21400	0	107354	85954
2018	21400	0	107354	85954
2019	21400	0	107354	85954
2020	21400	0	107354	85954
2021	21400	0	107354	85954
2022	21400	0	107354	85954
2023	21400	0	107354	85954

2024	21400	0	107354	85954
2025	21400	0	107354	85954
Total for 2013-2025:	278200	0	1395602	1117402
Average reductions in 2013-2025:	21400	0	107354	85954
Total for 2008-2025:	368715	0	1814693	1445978
Average reductions in2008-2025:	20484	0	100816	80332

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

>>

Collection, handling and transfer of waste for utilization was carried out in accordance with the law of Ukraine “On waste”.

The legal foundation for handling waste are the current legal and normative acts on environmental safety Production waste, depending on its physical, chemical and biological characteristics is divided into four danger classes:

- I class - extremely high-risk waste;
- II class - high-risk waste;
- III class - medium-risk waste;
- IV class - low-risk waste.

Procedures for handling waste are described in Annex 3 of this document.

DE PJSC "Obolon" “Zibert’s Brewery”has the necessary Environmental Impact Assessment of its activities in accordance with Ukrainian law.
In general the project Implementation of complex technical and technological modernization of enterprise to reduce energy consumption and implementation of recycling organic waste from beer production at DE PJSC "Obolon" “Zibert’s Brewery” will have positive effect on the environment. The following points will give detailed information

1. The project implementation will reduce CO2 emissions in the city of Fastiv due to more effective energy consumption. This will be achieved by implementing modern equipment and preproduction processes.

2. Due to lower fuel consumption, electricity and ecologic technologies for the utilization of organic waste, the implementation of the project will reduce emissions of SOx, NOx, CO and CH4 solid particles (co product of combustion).

No transboundary environmental impact is expected from the implementation of this project.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Impact on the aquatic environment

Impact on the aquatic environment will be the same as in the base scenario. The existing technologies used in the production of beer by DE PJSC "Obolon" “Zibert’s Brewery” plant require the disposal of waste water through the drainage system with mandatory chemical control. All these actions are stipulated by the Water Code of Ukraine,

State Standard 28.74-82 “Rules of hygiene and quality control”, Construction rules and regulations 4630-92 that determine the maximum concentration for internal water bodies. Disposal into open water bodies will not be done.

Project implementation will have positive effect. It will allow reducing water consumption and, as a result, lead to the reduction of waste water discharge.

Impact on ambient air
Project implementation will have positive effect on air:
1) Reduce the emissions of NOx, SOx, CO and solid particles due to the use of more environmentally clean technologies and reduction of power consumption;
2) Reduced consumption of electric power will lead to lower emissions of the same pollutants into the air;
3) Will reduce the emission of CH_4 through the utilization of organic waste.

Effects on land use
There will be no effect on land/soil.
The corresponding law on land use is stated in the Land Code of Ukraine. The National technological practice/standard: State Standard 17.4.1.02-83 "Protection of nature, soil. Classification of chemicals for controlling pollution".

Impact on biodiversity
There will be no impact on biodiversity..

Generation of waste, waste discharge and handling
Generation of waste, waste discharge and handling are present. In the process of project implementation waste will be generated after the collection of physically and morally outdated equipment, burners, pipes etc. There will be construction waste as a result of dismantling of boilers and construction of boiler shops and others.

Collection, handling and transfer of waste for utilization of the enterprise's waste will be carried out in accordance with the law of Ukraine "On waste".

Handling procedures are described in Annex 3 of this document.

Conclusions concerning the most significant environmental impacts from implementation of activities under this project are presented in the Environmental Impact Assessment (EIA), obtained according to state building codes of Ukraine A.2.2-1-2003:

- Conclusion of the State Environmental Expertise on the project "Reconstruction of DE PJSC "Obolon" "Zibert's Brewery"located in Pushkin str.3, Fastiv Kyiv region # 16-12/3679 from 03.06.2009., registered in # 360 from 28.04.09.

DE PJSC "Obolon" "Zibert's Brewery" aims to certify the ISO-14001:2004 and OHSAS-18001 systems, which supports the ability and desire of the company to manage its impact on the environment.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

>>
Project activity does not include the negative impact on the environment and the negative social impact. Therefore, consultation with stakeholders is required and not conducted.

According to Ukrainian law, business owners, which implemented the project of new construction, renovation and modernization of industrial and civil objects that require EIA to inform the public through

local authorities (State Building Standards Ukraine A.2.2-1-2003 p. 1.6). Therefore, in the process of receiving the EIA in the detection of possible cases of significant environmental impacts from implementation of activities under the project was conducted to inform the public about these events through media.

Moreover, DE PJSC "Obolon" “Zibert’s Brewery” is one of the leading companies of Ukraine in the industry; therefore all of its activities including environmental projects and projects aimed at improving the efficiency of enterprise will receive wide coverage in the media regardless of the materiality of the impact of these projects on the environment.

Examples of publications related to environmental projects and projects aimed at improving the efficiency of the enterprise:

- DE PJSC "Obolon" “Zibert’s Brewery” is participant of the UN Global Agreement: http://www.yutube.com/watch?v=KsxCyDg51-A
- Social responsibility report of DE PJSC "Obolon" “Zibert’s Brewery” http://www.yutube.com/watch?v=pdrHRy9WOwU
- DE PJSC "Obolon" “Zibert’s Brewery”ecologic initiatives: http://www.yutube.com/watch?v=xxj8FoZ-BXc
- DE PJSC "Obolon" “Zibert’s Brewery”supports Earth Hour: http://www.yutube.com/watch?v=j6I10YAMNwA
- DE PJSC "Obolon" “Zibert’s Brewery”pans to increase recycling of PET bottles, UNIAN-Consumer News:http://obolon.ua/ukr/press/about-us/?news_id=34&news_next=11

There have been no negative Stakeholders’ comments.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Project owner:

Organisation:	DE PJSC "Obolon" “Zibert’s Brewery”
Street/P.O.Box:	Pushkin str.
Building:	3
City:	Fastiv
State/Region:	Kyiv
Postal code:	08500
Country:	Ukraine
Phone:	+ 38 044 412-84-10
Fax:	+ 38 044 412-84-10
URL:	http://www.zibert.ua
Represented by:	
Title:	Director of DE PJSC "Obolon" “Zibert’s Brewery », Honored Worker of Industry of Ukraine
Salutation:	
Last name:	Onishchuk
Middle name:	Lubov
First name:	Ivanivna
Department:	
Phone (direct):	
Fax (direct):	+38 044 412- 84-10
Mobile:	
Personal e-mail:	zibert@fastiv.obolon.ua

Country sponsor**:**

Organisation:	Ohana LLP
Street/P.O.Box:	Windmill Lane
Building:	35A
City:	Epsom
State/Region:	
Postal code:	KT17 3AN
Country:	United Kingdom
Phone:	+44 208 786 0751
Fax:	+44 208 786 0751
URL:	www.ohanallp.com
Represented by:	
Title:	Director
Salutation:	
Last name:	Winklehner
Middle name:	Thomas
First name:	
Department:	
Phone (direct):	
Fax (direct):	+44 208 786 0751
Mobile:	
Personal e-mail:	info@ohanallp.com

Annex 2

BASELINE INFORMATION

See Section B.

Basic information and data to determine the baseline scenario

№	Description	Variable
24.	Consumption of electric power in base year	EC_{BL}
25.	Volumes of beer production in year *y*	P_y
26.	Volumes of beer production in base year	P_{BL}
28.	Natural gas consumption in base year	$FC_{BL,NG}$
29.	Caloricity of natural gas in base year	$NCV_{NG,BL}$
31.	Total volume of organic waste from beer production in base year	$MSW_{T,BL}$
32.	Portion of organic waste from beer production deposited at landfill	$MSW_{F,BL}$

Annex 3

MONITORING PLAN

The main information on the monitoring plan can be found in Section D.

WASTE HANDLING

Collection, handling and transfer of waste for utilization were carried out in accordance with the law of Ukraine “On waste”.

The legal foundations for handling waste are the current legal and normative acts on environmental safety.

Production waste, depending on its physical, chemical and biological characteristics is divided into four danger classes:

➢ I class	-	extremely high-risk waste;
➢ II class	-	high-risk waste;
➢ III class	-	medium-risk waste;
➢ IV class	-	low-risk waste.

Total waste management algorithm is given in **block diagram number 2**.

To organize and conduct work on waste management an **order** on DE PJSC "Obolon" “Zibert’s Brewery, responsible persons were approved for waste management.

For each type of waste leading engineer of the Environment (OTOS) makes **Waste register card**. Each Register card includes: code for danger to human health hazards and the availability of this type of waste, its aggregate state and chemical composition, formation and performance of waste management. Register cards are approved by the city's sanitary-epidemiological station and approved by the State Department of Environmental Protection in Kyiv.

For all types of waste that are included in the Registre card the leading principal engineer of the Environment (OTOS) receives in the State Department of Environmental Protection in Kyiv an annual **permit and limit the generation and disposal of waste.**

The leading principal engineer of the Environment (OTOS) acquaints the departments responsible for the transfer of waste to third parties with the permit and limits the generation and disposal of: commercial department for plastics and pellets (OPK), department of capital construction (OBK), administrative-and economic department (OKA).

In utilization or disposal of waste only those companies and organizations are involved that that the necessary permit (license) from the Ukrainian Environmental Ministry for carrying out such works.

To determine the temporary storage of waste at the enterprise **"Scheme for temporary storage of waste at DE PJSC "Obolon" “Zibert’s Brewery” (Scheme # 3)** is approved.

The leading engineer of the Environment (OTOS) of DE PJSC "Obolon" “Zibert’s Brewery” carries out the control over the works for managing and handling of waste.

General order procedures for waste management.

The main objective of waste management is to prevent the formation of excessive volumes of waste in their proper collection, storage, transmission processing, utilization and disposal, as well as prevent the negative impact of waste on the environment and human health.

Waste generated by DE PJSC "Obolon" “Zibert’s Brewery” depending on their type is subject to:

- collection;
- accounting;
- timely removal from production lines;
- temporary storage in specially-designated places;
- handling (transportation – if necessary);
- recycling, utilization or removal.

At production lines waste is collected into special packaging (bags, boxes, containers etc.) based on the type of waste. Those responsible for waste storage make sure that the packaging is clearly marked in accordance with **“Table of waste generation at** DE PJSC "Obolon" “Zibert’s Brewery **” (F.17.01OTOS)** (See below).

Mixing of different waste types is not allowed.

The responsible persons for collecting and storing waste keep track of all waste generated.

Collected waste is removed from production facilities for temporary storage to specially-equipped places in accordance with the approved “Scheme for temporary waste storage at “Obolon” PJSC” (Scheme 3) and is stored in accordance with sanitary-and-hygienic and environmental norms and regulations up to removal of waste for utilization and disposal.

In accordance with signed agreements the responsible persons transfer waste to special organizations with the appropriate supporting handling documents that confirm the transfer and state the amounts of waste transferred.

Procedure for transfer of waste for disposal by outside organizations

Waste that has resource value and determined in **Section II of the Table of waste generation at** DE PJSC "Obolon" “Zibert’s Brewery**” (F.17.01.OTOS)** is transferred for utilization to outside organizations**.**

For transportation some types of waste are subject to **compressing**:

- **in shops of packaging and ready products** – polyethylene tape waste;
- **in bottling shop #1, in bottling shop #2** – waste from PET bottles.

Personnel from the department where waste is generated carries out the transfer through the central storage or the raw materials storage with registration by the head of the structural department of the fact of waste transfer in the **corresponding documents.**

Personnel of the central storage organize the transfer of waste to outside organizations and filing of the necessary transfer documentation on the fact and the amount of transfer.

Procedures for export of waste for burial, disposal, burning

Waste listed in **Section III of the Table of waste generation at** DE PJSC "Obolon" "Zibert's Brewery **"(F.20.01.OTOS)** is subject to burial, disposal, burning.
Temporary storage of waste is carried out in appropriate marked containers, depending on the types of waste, located on the territory of the enterprise in accordance with **"Scheme for temporary storage of waste at** DE PJSC "Obolon" "Zibert's Brewery **(Scheme 3).**

Heads of departments are responsible for the temporary storage of waste; organize separate collection of waste sorting (if necessary) and storage in compliance with sanitation and environmental requirements.

The organization of works for export of waste for burial, disposal, burning according the concluded contracts is conducted by: Economics Department (FFOG), energetical station (FTE), shop road transport (FKA), bottling shop # 1 (FVR1), bottling shop # 2 (FVR21, FVR22), brew house (FVV), Department of Supply (PCF) according to the types of waste, as defined in "**Table of waste generation at Obolon PJSC "Zibert's Brewery" (Ф.17.ФТОС.01).**

Personnel of the electric shop keeps count in the log of used luminescent lamps of mercury-containing waste (lamps, thermometers) that are temporarily stored.

Data (in tones) on the removed waste is given to the leasing engineer on environment once a quarter on the 1st day of the month following the quarter.

Preparation of report data

Senior Engineer Environmental Protection (OTOS) keeps track of the number allocated to waste disposal in the form of 1-TU "Accounting for waste and packaging materials and containers" under the form of computer reporting of waste in the company and transferring them to the recycling and acts performed works.

Quarterly, leading engineer of the Environment (OTOS), conducts calculation pay charges for waste disposal..

According to the calculation provided by collecting accounting company shall pay the tax calculation of the fee for waste disposal.

Lead engineer of the Environment (OTOS) prepares a statistical report on the creation, processing and disposal of waste of 1-4 hazard classes in F-1 hazardous waste and submits to the State Statistics Committee of Statistics at appropriate time.

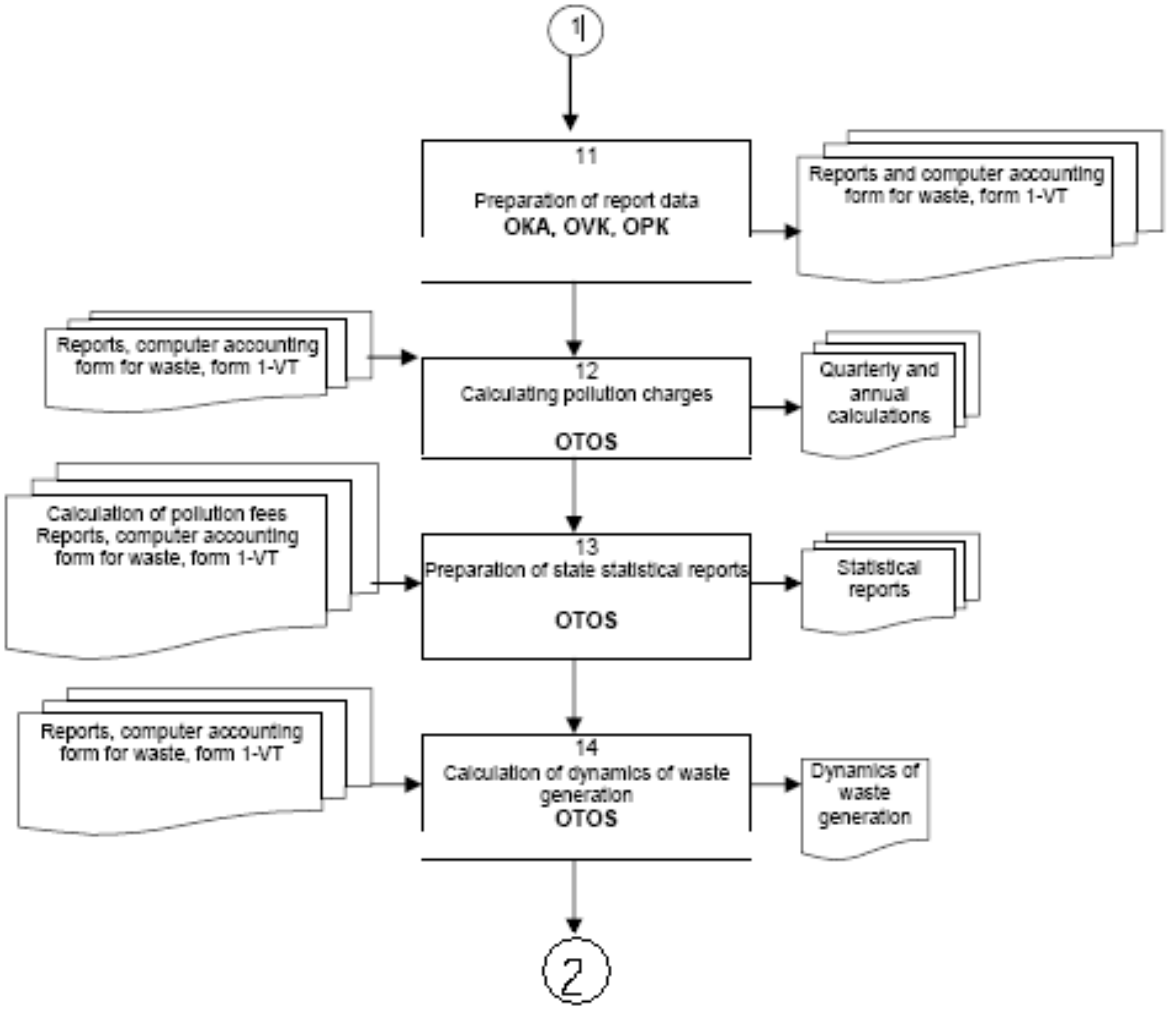
Senior Engineer on Environmental Protection (OTOS) analyzes the waste generation for the reporting year and for the first quarter of current year and calculates the **Dynamics of waste production (F.17.02.OTOS).**

The leading engineer on the environment (OTOS) in accordance with norms of waste generation carries out normative calculations and determines grounds for the volumes of waste for the following Year, which are submitted to the State agencies no later than 1 June of the current year.

In case of emergency situations that lead to the production of products, such products are removed until further decision on utilization/disposal. If utilization is necessary the nonconforming products are temporarily stored in the specially-designated place and are marked accordingly.

In case of emergency that results in spilling of hazardous chemicals (acids and alkalis) works aimed at neutralizing the spilled chemicals with alkali or sand are carried out with further cleaning of the spill place with sufficient amount of water. Neutralized solution is collected into specially-marked containers for further removal for utilization.

Flow chart 1



Responsibility

Responsibility for upholding the standards of this manual and for sorting and timely removal of waste from production facilities and shops is assigned to the heads of structural departments which are defined in the Table of waste generation at DE PJSC "Obolon" “Zibert’s Brewery” (Ф.17. ФТОС.01).

Control over the execution of the demands of this manual is assigned to the leading engineer on the environmental protection.

Flow chart 2 WASTE MANAGEMENT

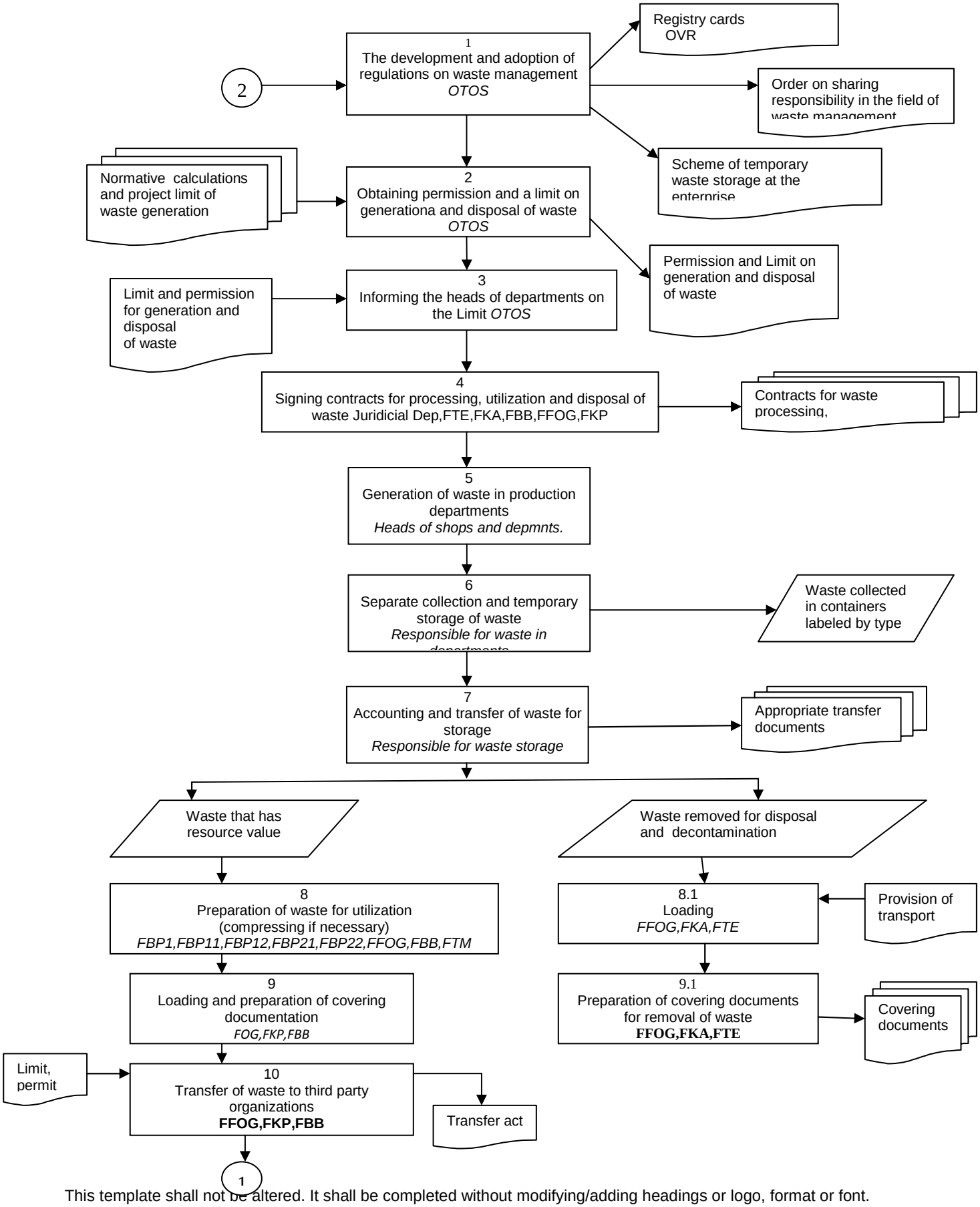
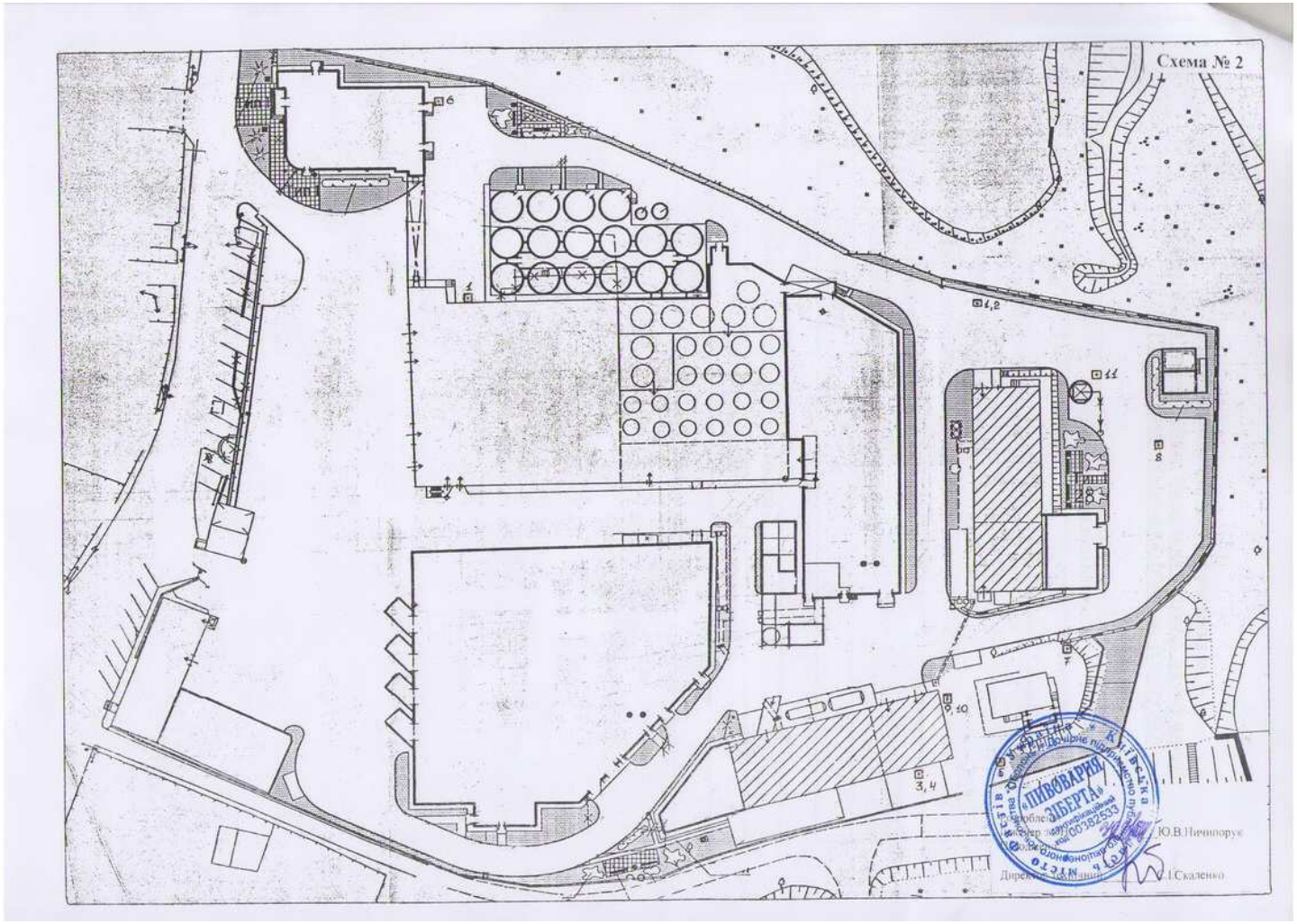


Chart 3 Scheme of temporary storage of waste



F.17.FTOC.01

Table of waste generation at DE PJSC "Obolon" “Zibert’s Brewery”

Number according to the marking in the Scheme of temporary storage of waste	Types of waste	Ha-zard class waste	Divisions of formation and waste collection	The capacity of waste collection and appropriate inscription	Temporary storage of waste		Responsibility for transfer to third parties	Transfer to third parties
					Temporary waste storage on the premises	Responsibility for storage		
1	2	3	4	5	6	7	8	9
Section I Waste that is subject to recycling at the enterprise								
11.	**Beer sparging**	4	Brew house	Technological equipment (closed metal bunker)	Behind the boiler	Senior master of Brewing house	Senior master of Brewing house	As animal feed to agricultural enterprises
7.	**Ferrous metals** Including: 4.1 write-off equipment 2.4 Waste electrodes	4	FBR,Brewing house, fermentation house, bottling house, sewerage pumping stations, power station, polling station on the introduction of new equipment, motor transport workshop	*Concreted area for the boiler Metal container "Waste metal shavings" (near the mechanical workshop)* Concreted area for boiler room "scrap"	*Concreted area for the boiler Metal container "Waste metal shavings" (near the mechanical workshop) Concreted area for boiler room "scrap"»*	Chief mechanic	Chief mechanic	Utilization

8.	**Waste Paper:** packaging from materials and raw materials	4	Shop bottling, shipping containers and finished products, house # 3 (Storehouse of packaging, raw materials and auxiliary materials)	In special containers "Waste Paper “	In the open platform (behind the boiler)	Head of economic department	Head of economic department	Utilisation
1.	**bottle cullet**	4	Bottling house # 1 (Filling line into glass bottle), Expedition and packaging of finished products	Special metal containers "cullet"	Metal containers on a specially designated area (near the boiler)	Senior. master of bottling house # 1, head of the expedition packaging and finished products	Chief Supply	Utilization
9.	**Low-pressure substandard polyethylene** (waste from polyethylene tape	4	The storehouse of packaging, raw materials and auxiliary materials (house # 3), bottling house # 1, bottling house# 2 expedition packaging and finished products	At the concreted area "Waste polyethylene"	At the concreted area "Waste polyethylene"	Senior. master of bottling house # 1,senior master of bottling house#2	Chief Supply	Pressing and utilization
10.	**Waste polietylentaraf-Talat (PET bottles)**	4	Bottling house # 1 ,bottling house #2, Expedition and packaging of finished products	At the concreted area «Waste PET»	At the concreted area «Waste PET»	Senior. master of bottling house # 1,senior master of bottling house#2	Chief Supply	Pressing and utilization
3.	**Spent accumulators/batteries**	3	Shop Road Transport Freight containers and finished products	Concreted area under the canopy	Shop Road Transport	Head of the department of road transport	Head of the department of road transport	Utilization

				"Used Batteries"				
5.	**Spent oil and grease**	3	FTMM, brewing house, fermentation house, bottling houses,FKA, sewerage pumping stations, power station, station on implementation of. new equipment, shipping containers and finished products	Metal sealed containers "Used Oil"	In the metal structure on a pallet (about KNS)	Head of the department of road transport	Head of the department of road transport	Utilization
4.	**Spent tires**	4	FKA, station of packaging and finished products	Designated area "Waste tire"	FKA, station of packaging and finished products	Head of the department of road transport	Head of the department of road transport	Utilization
Section III Waste to landfills, disposal, incineration outside the enterprise								
1 Waste to be disposed in landfills (incombustible)								
2.	**Mixed household waste,**	4	FFOG, production workshops	Metal containers, concreted platform "Mixed waste"	Collectors of household waste from the premises	Head of economic department	Head of economic department /FFOG/	Waste disposal into landfills
	2.1 Waste grain admixture, alloy	4	Brewing house			Senior master of brewing house		
	2.2 Food waste	4	Canteen (bar)			Head of corporate trade		
	2.3 Waste from cleaning area	4	FFOG, production workshops	Metal containers, concreted area "Mixed waste"	Collectors of household waste from the premises	Heads of appropriate houses	Head of economic department /FFOG/	Waste disposal into landfills
	2.4Spent filter materials (air), bag filters	4	Bottling houses, brewing house			Heads of bottling houses#1,2,brewing house		
Section III Waste subject to disposal (detoxification and demercurization) outside DE PJSC "Obolon" "Zibert's Brewery"								
6.	**Fluorescent lamps and waste containing**	1	Production workshops	Cardboard boxes, lamps in covers	Special premises for	Head of electric shop	Master of electric station	Disposal (demercurizat

	mercury				storing spent lamps			ion)

F.17.FFOG.

Journal of production waste removal

Date of registration counter foils for waste removal	Vehicle number	Driver's name	Number of counterfoils, m3	Signature
1	2	3	4	5

F.17.FTOC.02

Dynamics of waste generation

#	Waste name	Hazard class	Previous year 201__		Current year 201__		Next year 201__
			Approved waste generation limit, tons	Actual waste, tons	Approved waste generation limit, tons, т	Actual waste, tons for 1.04.1_p	Project waste generation, tons
1	2	3	4	5	6	7	8

Numbering on the marking of
Scheme for temporary storage of waste at
DE PJSC "Obolon" "Zibert'sBrewery" (Scheme #2)

№з/п	List of waste
1.	**Broken glass**
2.	**Mixed household waste,**
3.	**Spent accumulator batteries**
4.	**Spent tires**
5.	**Spent oils and grease**
6.	**Waste fluorescent lamps**
7.	**Metal waste**
8.	**Waste paper**
9.	**Polyethylene tape (pressed)**
10.	**Waste Polietilenteraftalat (PET pressed)**
11.	**Sparging**