

MONITORING REPORT FORM (F-JI-MR)

MONITORING REPORT

Title of the project activity	Energy Efficiency Programme at the plants of LLC "Agricultural Produce Organization "Tsukrovyk Poltavschyny"
ITL number	UA1000508
Version number of the monitoring report	04
Completion date of the monitoring report	27.02.2013
Registration date of the project activity	24.12.2012
Monitoring period number and duration of this monitoring period	The 1 st monitoring period: 01/01/2008-31/12/2009
Project participant(s)	LLC "Agricultural Produce Organization "Tsukrovyk Poltavschyny" Stichting Carbon Finance (SCF)
Host Party(ies)	Ukraine
Sectoral scope(s) and applied methodology(ies)	Sectoral scope 3: Energy demand An approach for baseline setting and monitoring is applied by the project activity.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	73,753 tCO ₂
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	88,731 tCO ₂

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn” is an agri-industrial holding and one of the leading companies in the Ukrainian sugar sector. From 2004 to 2007 LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn” has been one of Top-5 Ukrainian sugar producers. Operations of LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn” are focused on the production and sale of sugar made from sugar beets, sugar by-products and related services. LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn” has leased 91,000 hectares of land to grow their own sugar beets as well as other crops and raise cattle. LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn” owns 2 trading companies (sugar and crops) and 34 production units, including the 3 of 5 sugar mills where the JI project is to be executed.

This project is being conducted at three sugar beet processing plants under ownership and operation of the project company; LLC “Agricultural Produce Organization “Tsukrovyk Poltavshyn”. The project activity is comprised of various energy efficiency improvements being implemented at each of the three sugar plants. The sugar plants are located in the towns of Globyno, Semenivka and Yareski within Poltava oblast, Ukraine.

The proposed JI project is aimed at the reduction of the emissions of carbon dioxide from the two main sources:

- (1) The combustion of fossil fuel and
- (2) Decomposition of limestone within the calcination process (as well as reduction emissions from coal combustion from the calcination process).

Overall the project aims at reducing anthropogenic emissions by reducing the energy requirements of the plant’s operation as well as introducing measures which lead to a reduced need for the calcination of limestone; through increased juice purity. The JI project activities consist of various measurements to improve the energy efficiency. The earliest measurement was conducted on 02 Nov 2006, which includes the purchase of 7 pulp presses (manufactured by “Babbini”, type P-18). Thus, the effect of GHG emission reduction by the JI project activity has been realised since 02 Nov 2006. 01 Jan 2008 is chosen as the starting date of the crediting period of the project activity, because Kyoto Protocol’s first commitment period started on 01 Jan 2008 and the ERU generated afterwards are eligible for EU-ETS. The project participants were approved by the designed parties respectively, demonstrated by LoA from State Environmental Investment Agency No. 3719/23/7 dated on 4 December 2012 and LoA from NL Agency Ministry of Economic Affairs, Agriculture and Innovation of Netherlands No. 2011JI22 dated on 4 July 2011.

The first monitoring period of the project activity is set as 01/01/2008-31/12/2009. During the first monitoring period 88,731 tCO₂ emission reductions are realised by the project activity.

A.2. Location of project activity

Host country:	Ukraine	
Region:	Poltava Oblast	
City:	Globyno, Semenivka and Yareski.	
Physical/geographical location:	The sugar plants are located at the following specific locations	
	Globinsky:	49°24’27”, 33°13’22”
	Veselopodilsky:	49°36’15”, 33°11’56”
	Yareskiivsky:	49°50’11”, 33°55’58”

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ukraine (Host party)	LLC “Agricultural Produce Organization “Tsukrovyk Poltavschny”	No
Netherlands	Stichting Carbon Finance (SCF)	No

A.4. Reference of applied methodology

With respect to “Guidance on criteria for baseline setting and monitoring, ver.3, the project select an approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI-specific approach). The paragraph 11 of the Guidance further explains that project that select a JI-specified approach may use selected elements or combinations of approved CDM baseline and monitoring methodologies or approved CDM methodological tool.

A.5. Crediting period of project activity

The fixed crediting period is selected for the project activity which started from 01/01/2008. The length of the crediting period is 120 months (10 years).

A.6. Approval of the project by project participants

The project received the Letters of Approval from authorized bodies of both project participants. The project obtained the Letter of Approval from State Environmental Investment Agency of Ukraine # 3719/23/7 dated 04/12/2012. The project obtained the Letter of Approval from NL Agency, Ministry of Economic Affairs, Agriculture and Innovation of the Netherlands # 2011JI22 dated 4 July 2011.

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

The project activity is a combination of various energy efficiency improvements. Each individual technology installed at the sugar plant will reduce the plant’s energy (or processing) requirements compared to the baseline situation. The individual measures implemented in each sugar plant are listed as follows,

Globinsky Sugar Plant

2007:

- Purchase and installation of deep pulp presses Babbini (3 pieces)
- Purchase and implementation of beet slicers Maguin (2 pieces)
- Modernization of condensate scheme removal (from evaporator)
- Insulation of the heat-exchange equipment and steam pipelines (services)
- Replacement of the economizers.

2008

- Purchase and installation of 4 centrifuges BMA-1250
- Purchase and installation of 4 frequency converters
- Insulation of the heat-exchange equipment and steam pipelines
- Automation of condensate collecting process
- Replacement of heating surface of evaporation station
- Modernization of the vacuum condensation plant
- Automation of the diffuser and purification station
- Diffuser department modernization (design)
- Modernization of the water cooling tower

2009

- The heat technological equipment and piping insulation with modern insulation materials
- Use of sweet-water effluent (water solution with low sugar content from vacuum-filters) for lime slaking
- The reparation of the diffuser DC-12 and the replacement of the drive power cables of electric motors
- The reparation of general repair of boiler BGM-35M #4 and the replacement of the overheated steam collector and burners (12 pieces); the purchase of all necessary spare parts to renovate de-aerators.

Yareskivsky Sugar Plant

2007

- Implementation of deep pulp presses P-18, 3 pieces
- Replacement of disk filters by filters EATON
- Diffuser modernization
- Increasing system capacity of defecation and saturation station
- Implementation of frequency converters
- Replacement of dried pulp pelletizers
- Replacement of calciner lining by chrome-magnesite

2008

- Implementation of filter press (suspension filtration)
- Installation of frequency converters
- Installation of 2 beet slicers Maguin
- Centrifuges Silver Weibull SW-2250 (2 pieces)
- Modernization of the scheme for pulp granulating departments

2009

- Reduction of diffusion juice consumption from 116 to 105%
- Increasing of vacuum pans volume by 50 t to decrease the steam reduction at the process of massecuite boiling
- Excluding of water pumping to A-vacuum pan
- The retirement of the use of exhausted steam for heating of residential and industrial building
- Heating of syrup and molasses tanks using juice steam of the first vessel
- The heat insulation of equipment and pipelines

Veselopodilsky Sugar Plant

2007

- Purchase and implementation of vertical crystallizer (including frequency converter)
- Mantling of four deep pulp presses with flow-back of pulp press water for diffusion device feeding
- Improvement and automation of diffuser, evaporation station and defecation and saturation
- Major repairs of the diffuser (including frequency converter)
- Insulation of the heat-exchange equipment

2008

- Modernization of the automation system for lime kilns number 1 and number 2
- Installation of frequency converters
- Replacement of the second carbonated juice decanter

There are no planned measures for the Veselopodilsky plant after 2008. This plant was closed for the 2009 campaign. Measures installed within 2007 and 2008 did result in emission savings for this plant during the 2008 operation. These savings have been quantified, and included, as described. However, no further investment is planned for this facility. Beet volumes going to the Veselopodilsky plant will be moved to other facilities for processing.

In addition to the installation, replacement and modernization measures at Globinsky, Yareskiivsky and Veselopodilsky plants, the systematic and diversified training program was conducted to train the plants' managers, technical specialists and workers. In 2007-2008, training programs in occupational health and safety were delivered to engineering personnel and workers at each of the three plants: at Globinsky plant - by Kremenchug educational organization, 60 people were trained; at Yareskiivsky – by Poltava educational centre, 125 people were trained; and at Veselopodilsky plant –also by Poltava educational centre, 65 people were trained. After 2009 training of plants' personnel in this area continues.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

There isn't any temporary deviation from registered monitoring plan or applied methodology recognized during the development of the monitoring report.

B.2.2. Corrections

The corrections recognized during the development of the monitoring report are listed at Table B.1.

Table B.1: The corrections during the development of MR – Input data for baseline

In Registered PDD	In MR												
Input data for baseline													
$FC_{NG,hist,y,I}$: 8,099.5 at 2006 for Globinsky sugar plant	$FC_{NG,hist,y,I}$: 8,100 at 2006 for Globinsky sugar plant												
$FC_{NG,hist,y,I}$: 3,550 at 2004 for Veselopodilsky sugar plant	$FC_{NG,hist,y,I}$: 6,550 at 2004 for Veselopodilsky sugar plant												
$NCV_{NG,hist,y,i}$: 8,321 at 2004 for Yareskiivsky sugar plant	$NCV_{NG,hist,y,i}$: 8,322 at 2004 for Yareskiivsky sugar plant												
$NCV_{NG,hist,y,i}$ for Globinsky sugar plant	$NCV_{NG,hist,y,i}$ for Globinsky sugar plant												
<table border="1"> <tr><td>2004</td><td>7,204</td></tr> <tr><td>2005</td><td>7,100</td></tr> <tr><td>2006</td><td>6,910</td></tr> </table>	2004	7,204	2005	7,100	2006	6,910	<table border="1"> <tr><td>2004</td><td>-</td></tr> <tr><td>2005</td><td>-</td></tr> <tr><td>2006</td><td>8,704</td></tr> </table>	2004	-	2005	-	2006	8,704
2004	7,204												
2005	7,100												
2006	6,910												
2004	-												
2005	-												
2006	8,704												
$NCV_{NG,hist,y,i}$ for Veselopodilsky sugar plant	$NCV_{NG,hist,y,i}$ for Veselopodilsky sugar plant												
<table border="1"> <tr><td>2004</td><td>8,334</td></tr> <tr><td>2005</td><td>8,373</td></tr> <tr><td>2006</td><td>8,312</td></tr> </table>	2004	8,334	2005	8,373	2006	8,312	<table border="1"> <tr><td>2004</td><td>8,333</td></tr> <tr><td>2005</td><td>8,370</td></tr> <tr><td>2006</td><td>8,308</td></tr> </table>	2004	8,333	2005	8,370	2006	8,308
2004	8,334												
2005	8,373												
2006	8,312												
2004	8,333												
2005	8,370												
2006	8,308												
EF_{coal}	EF_{coal}												

2004	101.2		2004	99.18	
2005	100.1		2005	98.10	
2006	99.73		2006	97.74	
2008	92.77		2008	90.91	
2009	92.77		2009	90.91	
2010	92.77		2010	90.91	
EF_{NG}			EF_{NG}		
2004	55.66		2004	55.38	
2005	55.70		2005	55.42	
2006	55.81		2006	55.53	
2008	55.62		2008	55.35	
2009	55.73		2009	55.45	
2010	55.62		2010	55.35	
$CaCO_3$ hist,y,i: 0.9725 at 2006 for Veselopodilsky sugar plant			$CaCO_3$ hist,y,i: 0.9690 at 2006 for Veselopodilsky sugar plant		
$MgCO_3$ hist,y,i: 0.0110 at 2006 for Veselopodilsky sugar plant			$MgCO_3$ hist,y,i: 0.0111 at 2006 for Veselopodilsky sugar plant		
Implementation of Veselopodilsky sugar plant 2007: Improvement and automation of diffuser, vacuum station and defecation and saturation			Implementation of Veselopodilsky sugar plant 2007: Improvement and automation of diffuser, evaporation station and defecation and saturation		
Implementation of Globinsky sugar plant 2009: The reparation of general repair of boiler BQM-35M #4 and the replacement of the overheated steam collector and burners (12 pieces)			Implementation of Globinsky sugar plant 2009: The reparation of general repair of boiler BGM-35M #4 and the replacement of the overheated steam collector and burners (12 pieces)		
Implementation of Yareskivsky sugar plant 2008: Centrifuges Silver Weibul SW-2250 (2 pieces)			Implementation of Yareskivsky sugar plant 2008: Centrifuges Silver Weibull SW-2250 (2 pieces)		
Implementation of Yareskivsky sugar plant 2009: The implementation of the measures on improving of massecuite uploading process for power consumption reduction at the steaming of pan.			Implementation of Yareskivsky sugar plant 2009: Vacuum pans volume by 50 t to decrease the steam reduction at the process of massecuite boiling.		

Table B.2: The corrections during the development of MR – others

In Registered PDD	In MR
Others	
Coordinate of Veselopodilsky sugar plant: 49.3615, 33.1156 Coordinate of Globinsky sugar plant: 49.2427, 33.1322 Coordinate of Yareskivsky sugar plant: 49.5011, 33.5558	Coordinate of Veselopodilsky sugar plant: 49°36'15", 33°11'56" Coordinate of Globinsky sugar plant: 49°24'27", 33°13'22" Coordinate of Yareskivsky sugar plant: 49°50'11", 33°55'58"
No relevant information.	The project received the Letters of Approval

	from authorized bodies of both project participants. The project obtained the Letter of Approval from State Environmental Investment Agency of Ukraine # 3719/23/7 dated 04/12/2012. The project obtains the Letter of Approval from NL Agency, Ministry of Economic Affairs, Agriculture and Innovation of the Netherlands № 2011JI22 dated 4 July 2011.
<p>$SP_{y,i}$: Uncertainty level of weigh hopper DVS-301(no serial number): +/-0,25% at Yareskivsky plant;</p> <p>Uncertainty level of weigh hopper SVEDA at Globinsky plant: No relevant information;</p> <p>Uncertainty level of weigh hopper DVS-301(no serial number): +/-0,25% at Veselopodilsky plant;</p>	<p>$SP_{y,i}$:Uncertainty level of weigh hopper DVS-301 (serial No.16,17,36,70): Uncertainty level +/-0.04 at Yareskivsky plant;</p> <p>Uncertainty level of weigh hopper Norma-S (serial No.1476,1160,1475,1477): +/-0.04 at Globinsky plant;</p> <p>Uncertainty level of weigh hopper DVS-301(serial No.29,28,20,28):0.01%/0.005% at Veselopodilsky plant</p>
<p>$SPB_{y,i}$: Uncertainty level of Semi-automatic line ULS-1: +/-0.2% at Yareskivsky plant;</p> <p>Uncertainty level of Semi-automatic line ULS-1 (no serial number) : +/-0.2% at Globinsky plant;</p> <p>Uncertainty level of Semi-automatic line ULS-1(no serial number): +/-0.25% at Veselopodilsky plant;</p>	<p>$SPB_{y,i}$: Uncertainty level of Semi-automatic line ULS-1(serial No:N/A): +/-0.1% at Yareskivsky plant. The type is polarimeter “Sucromat” (Anton Paar) (serial No.80343073) since 2009;</p> <p>Uncertainty level of Semi-automatic line ULS-1(serial No.N/A): +/-0.01% at Globinsky plant;</p> <p>Uncertainty level of Semi-automatic line ULS-1(serial No.1484): +/-0.01% at Veselopodilsky plant;</p>
<p>$FC_{NG,y,i}$: Uncertainty level of LIDER(serial No.1-873): +/-0.5% at Yareskivsky plant;</p> <p>Uncertainty level of LIDER VG-1 (serial No.1-187): +/-0.5% at Globinsky plant;</p> <p>Uncertainty level of Floutek-TM-VR-1 (serial No.05302000679):+/-0.5% at Veselopodilsky plant;</p>	<p>$FC_{NG,y,i}$: Uncertainty level of Floutec TM(serial No.1-873): +/-0.5% at Yareskivsky plant;</p> <p>Uncertainty level of LIDER-VG1/SSPE (serial No.359) : +/-0.5% at Globinsky plant;</p> <p>Uncertainty level of Floutek-TM-VR-1(serial No.079):0.075%/0.005% at Veselopodilsky plant</p>
<p>$FC_{Coal,y,i}$: Uncertainty level of RS-150C13 (serial No.7331) : <100kg at Yareskivsky plant;</p> <p>Uncertainty level of 5044ES150 DS24V (serial No.866/1118) at Globinsky plant: No relevant information;</p> <p>Uncertainty level of VO-2002(serial No. 05302000743): 2% at Veselopodilsky plant</p>	<p>$FC_{Coal,y,i}$: Uncertainty level of RS-150C13V(serial No.2416): at least +/-100kg at Yareskivsky plant;</p> <p>Uncertainty level of 5044ES150 DS24V(serial No.866/1118): +/-100kg at Globinsky plant;</p> <p>Uncertainty level of VO-2002(serial No. 195) at Veselopodilsky plant: No relevant information</p>
<p>$LC_{y,i}$: Uncertainty level of RS-150C13V(serial No.7331): <75kg at Yareskivsky plant;</p> <p>Uncertainty level of 5044ES150 DS24V(serial</p>	<p>$LC_{y,i}$: Uncertainty level of RS-150C13V: at least +/-100kg at Yareskivsky plant. The Tensometric scale Bulat-V2-150N(serial</p>

No.866/1118): <75kg at Globinsky plant; Uncertainty level of VO-2002(serial No. 05302000743): 2% at Veselopodilsky plant	No.2416) was used since 2009 Uncertainty level of 5044ES150 DS24V(serial No.866/1118): +/-100kg at Globinsky plant; Uncertainty level of VO-2002(serial No. 195) at Veselopodilsky plant: No relevant information
$FC_{Coal,y,I}$: Calibration at Yareskivsky Plant once every 6 months	$FC_{Coal,y,I}$: Calibration at Yareskivsky Plant once a year at 2008 and 2009
$LC_{y,i}$: Calibration at Yareskivsky Plant once every 6 months	$LC_{y,i}$: Calibration at Yareskivsky Plant once a year at 2008 and 2009

Some monitoring equipment used for data collection differs from equipment from registered PDD.

Yareskivsky sugar plant

In accordance with registered PDD semi-automatic line ULS-1 was used for sugar content measuring.

Actually in 2008 semi-automatic line ULS-1 was used. In 2009 semi-automatic line was replaced with automatic polarimeter “Sucromat” (Anton Paar). Serial # 80343073, calibration certificate # 1833/1671 dated 30/07/2010, commissioning certificate dated 30/07/2009.

In accordance with registered PDD measuring meter for gas volume and consumption “Lider” was used at the plant. It was replaced with measuring equipment “Floutek TM”. Serial # - 1-873, calibration certificate # 3973 dated 05/08/2009, commissioning certificate dated 28/12/2009.

In accordance with registered PDD scales RS-150S13V were used for coal and limestone consumption measuring. However, scales RS-150S13V were used by the end of 2008. In 2009 tensometric scales “Bulat-V2-150N” has been used. Serial # 207, technical passport of tensometric scales dated 28/12/2009.

Globinsky sugar plant

In accordance with registered PDD the weigh hoppers SVEDA were used. They were replaced with weigh hoppers Norma-S. Serial # 1160, 1475, 1476, 1477, the results of periodical calibrations are in the technical passports of weigh hoppers, commissioning certificate dated 28/08/2008.

Table B.3: The corrections during the development of MR – Changes between the ex-ante figures and the ex post figures

In Registered PDD			In MR		
<i>Changes between the ex-ante figures and the ex post figures</i>					
$SP_{y,i}$:			$SP_{y,i}$:		
	2008	2009		2008	2009
Yareskivsky plant	47,122	55,100	Yareskivsky plant	51,281	69,780
Globinsky plant	37,290	48,848	Globinsky plant	37,143	51,497
<i>Beets Processed:</i>			<i>Beets Processed:</i>		
	2008	2009		2008	2009
Yareskivsky plant	331,362	380,00 0	Yareskivsky plant	355,023	483,089
Globinsky plant	264,016	344,00 0	Globinsky plant	264,016	349,028

$SPB_{y,i}$			$SPB_{y,i}$		
	2008	2009		2008	2009
Yareskiivsky plant	17.23	16.90	Yareskiivsky plant	17.02	16.95
Globinsky plant	16.04	16.65	Globinsky plant	16.68	17.06
Veselopodilsky plant	16.76	-	Veselopodilsky plant	16.74	-
$FC_{NG,y,i}$			$FC_{NG,y,i}$		
	2008	2009		2008	2009
Yareskiivsky plant	13,567	29,781 ¹	Yareskiivsky plant	15,577	18,686
Globinsky plant	10,705	25,738 ¹	Globinsky plant	10,705	12,393
Veselopodilsky plant	11,981	-	Veselopodilsky plant	11,981	-
$PE_{NG,2009}$: Effect of energy efficiency			$PE_{NG,2009}$: Effect of energy efficiency		
	2009			2009	
Yareskiivsky plant	0.5405		Yareskiivsky plant	0.5147	
Globinsky plant	0.5269		Globinsky plant	0.4678	
$FC_{Coal,y,i}$			$FC_{Coal,y,i}$		
	2008	2009		2008	2009
Yareskiivsky plant	2,139	2,139	Yareskiivsky plant	2,208	1,576
Globinsky plant	1,115	1,115	Globinsky plant	1,132	1,095
Veselopodilsky plant	1,367	-	Veselopodilsky plant	1,365	-
$LC_{y,i}$			$LC_{y,i}$		
	2008	2009		2008	2009
Yareskiivsky plant	20,288	20,288	Yareskiivsky plant	21,683	19,904
Globinsky plant	14,585	14,485	Globinsky plant	14,585	16,760
Total Emission Reduction (tCO ₂)			Total Emission Reduction (tCO ₂)		
2008	36,321		2008	33,449	
2009	37,432		2009	55,282	
Total	73,753		Total	88,731	

B.2.3. Justification of monitoring plan review

There are three types of the changes between the registered PDD (ex-ante) and the MR (ex post). The first type (Table B.1) is the correction of the input data which was used to determine the baseline condition in the registered PDD. Most of them are about the rounding issue. Globinsky sugar plant hadn't been commissioned during 2004-2005. Thus, $NCV_{NG, hist,y, I}$ for Globinsky sugar plan should be unavailable. The second type (Table B.2) is about the updates of the project activity and of the monitoring devices during the first monitoring period, even till recently. In general, the updates of the monitoring devices bring lower uncertainty, which improves the quality of the monitoring plan. There were the temporary lack of the calibration of the weight hopper for $FC_{Coal,y,I}$ and $LC_{y,i}$. The reason is, the weight hoppers were replaced with the new one which doesn't need to take the calibration at the 1st service year. The third type (Table B.3) is about the difference between the ex-ante figures in the registered PDD and ex post figures in MR.

¹ In the registered PDD and its calculation, there isn't prediction of the quantity of natural gas consumption in 2009. The registered PDD uses “ $PE_{NG,2009}$: Effect of energy efficiency” to predict the natural gas saving per tonnes of sugar production. Here $FC_{NG,y,i}$ is calculated by multiplying $PE_{NG,2009}$ with $SP_{2009,i}$.

The ex post figures could be naturally different from the ex-ante figures. According to the monitoring data, the performance of the energy efficiency in 2008 and 2009 is better than the predication.

B.2.4. Changes to project design of registered project activity

The implemented project is as same as the registered project activity following the Guidelines on Assessment of Different Types of Changes from the Project Activity as Described in the Registered PDD.

B.2.5. Changes to start date of crediting period

The project activity did not request the changes to the start date of crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

This section is left blank intentionally.

SECTION C. Description of monitoring system

A monitoring team is organized to supervise the implementation and operation of the project activity from the view of JI development. See Figure 1. The members are assigned with responsibilities, including but not limited to the collection and record of monitoring data, date report, process supervision and the development of monitoring report.

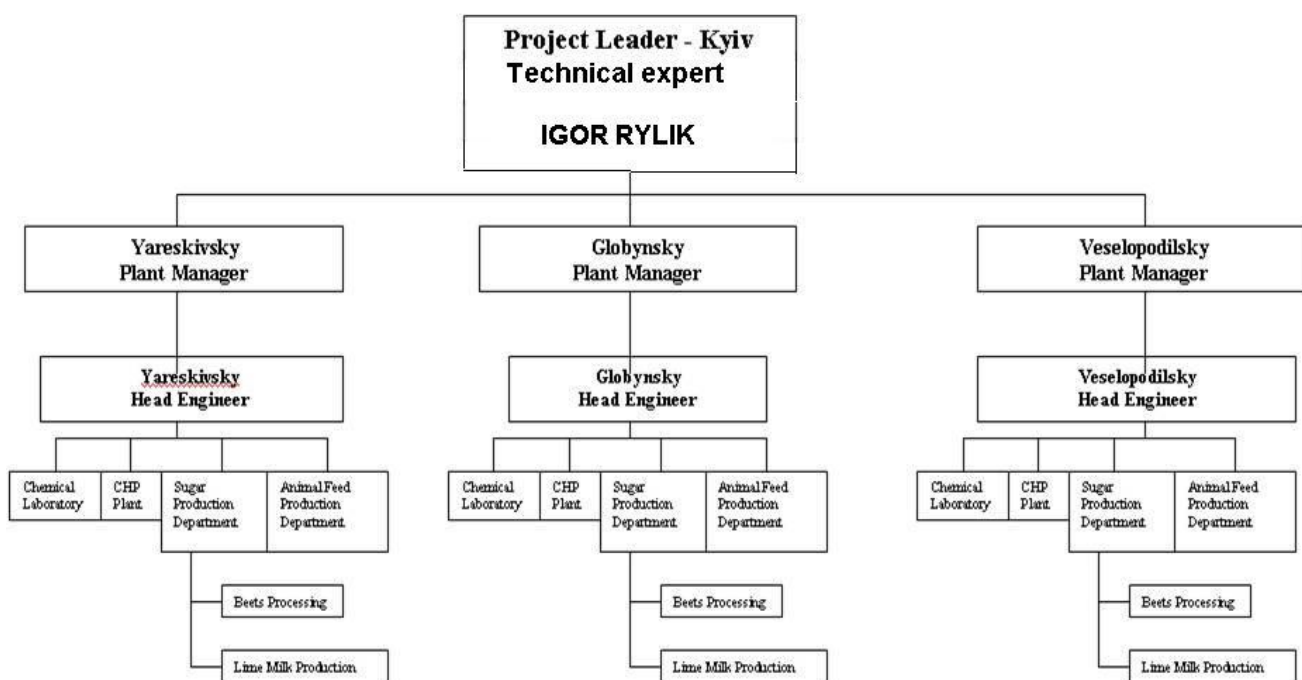


Figure 1: JI Monitoring Management System

Values on natural gas consumption, limestone consumption, sugar production, sugar content of sugar beets, net calorific value of natural gas, net calorific value of coal, percent of CaCO₃ та MgCO₃ are monitored each month. Values on coal consumption are monitored each day. Monitoring data is given to the Sugar department of LLC firm “Astarta-Kyiv”.

Moreover, Yareskivsky and Globinsky sugar plants implemented and certified Quality Management System by DSTU ISO 9001 in accordance with Ukrainian procedure UkrSEPRO. The Quality Management System assists to optimize the management of the plants.

Please refer to Annex 1 for serial numbers and calibration dates of measurement equipment.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Baseline parameters:

Data/Parameter	$SBC_{hist,y,i}$																		
Unit	tonnes																		
Description	The mass of beets processed in project year y at plant i																		
Source of data	Appropriate data collected as part of JI project																		
Value(s) applied	<p>Yareskivsky sugar plant</p> <table border="1"> <tr> <td>2004</td> <td>283,785</td> </tr> <tr> <td>2005</td> <td>256,890</td> </tr> <tr> <td>2006</td> <td>342,992</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2004</td> <td>-</td> </tr> <tr> <td>2005</td> <td>-</td> </tr> <tr> <td>2006</td> <td>144,201</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2004</td> <td>123,910</td> </tr> <tr> <td>2005</td> <td>158,236</td> </tr> <tr> <td>2006</td> <td>200,471</td> </tr> </table>	2004	283,785	2005	256,890	2006	342,992	2004	-	2005	-	2006	144,201	2004	123,910	2005	158,236	2006	200,471
2004	283,785																		
2005	256,890																		
2006	342,992																		
2004	-																		
2005	-																		
2006	144,201																		
2004	123,910																		
2005	158,236																		
2006	200,471																		
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks																		
Additional comment																			

Data/Parameter	$SP_{hist,y,i}$
Unit	tonnes
Description	Sugar quantity in 2004-2006 at plant i
Source of data	Appropriate data collected as part of JI project

Value(s) applied	Yareskivsky sugar plant:	
	2004	34,537
	2005	35,993
	2006	47,610
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	17,885
	Veselopodilsky sugar plant	
	2004	14,082
2005	20,825	
2006	24,827	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$SPB_{hist,y,i}$	
Unit	%	
Description	Sugar content in sugar beets in accordance with baseline in 2004-2006 at plant i	
Source of data	Appropriate data collected as part of JI project	
Value(s) applied	Yareskivsky sugar plant	
	2004	15.34
	2005	17.35
	2006	16.39
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	15.71
	Veselopodilsky sugar plant:	
	2004	14.81
2005	16.89	
2006	15.69	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$FC_{coal,hist,y,i}$	
Unit	tonnes	
Description	Coal consumption at the historical period (2004-2006) at plant i	
Source of data	Appropriate data collected as part of JI project	

Value(s) applied	Yareskivsky sugar plant:	
	2004	1,671
	2005	1,759
	2006	1,976
	Globinsky sugar plant:	
	2004	-
	2005	-
	2006	877
	Veselopodiskiy sugar plant:	
	2004	858
2005	1,133	
2006	1,237	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$FC_{NG,hist,y,i}$	
Unit	ths. m ³	
Description	Natural gas consumption for historical period (2004-2006) at plant i	
Source of data	Appropriate data collected as part of JI project	
Value(s) applied	Yareskivsky sugar plant	
	2004	14,125
	2005	13,862
	2006	16,831
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	8,100
	Veselopodilsky sugar plant	
	2004	6,550
2005	8,688	
2006	10,635	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$LC_{hist,y,i}$	
Unit	tonnes	
Description	Limestone consumption at the historical period (2004 -2006) at plant i	
Source of data	Appropriate data collected as part of JI project	

Value(s) applied	Yareskivsky sugar plant:	
	2004	20,859
	2005	18,708
	2006	23,017
	Globinsky sugar plant:	
	2004	-
	2005	-
	2006	11,009
	Veselopodilsky sugar plant:	
	2004	9,024
2005	12,947	
2006	15,043	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$NCV_{NG, hist, y, i}$	
Unit	kcal/m ³	
Description	Net calorific value of natural gas at historical period in year y at plant i	
Source of data	Natural gas supplier	
Value(s) applied	Yareskivsky sugar plant	
	2004	8,322
	2005	8,280
	2006	8,513
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	8,704
	Veselopodilsky sugar plant	
	2004	8,333
2005	8,370	
2006	8,308	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$NCV_{coal hist, y, i}$	
Unit	kcal/kg	
Description	Net calorific value of coal at historical period in year y at plant i	
Source of data	Coal supplier	

Value(s) applied	Yareskivsky sugar plant	
	2004	7,204
	2005	7,100
	2006	6,910
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	7,230
	Veselopodilsky sugar plant	
	2004	7,010
2005	7,010	
2006	9,610	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$CaCO_3$ <i>hist,y,i</i>	
Unit	Fraction $CaCO_3$ /RM	
Description	The percent of $CaCO_3$ in raw material limestone in year y at plant i	
Source of data	Limestone Supplier	
Value(s) applied	Yareskivsky sugar plant	
	2004	0.9730
	2005	0.9721
	2006	0.9690
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	0.972
	Veselopodilsky sugar plant	
	2004	0.9730
2005	0.9721	
2006	0.9690	
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Data/Parameter	$MgCO_3$ <i>hist,y,i</i>	
Unit	Fraction $MgCO_3$ /RM	
Description	The percent of $MgCO_3$ in the raw material limestone in year y at plant i	
Source of data	Limestone Supplier	

Value(s) applied	Yareskivsky sugar plant	
	2004	0.0125
	2005	0.0121
	2006	0.0111
	Globinsky sugar plant	
	2004	-
	2005	-
	2006	0.0125
	Veselopodilsky sugar plant	
	2004	0.0125
	2005	0.0121
	2006	0.0111
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks	
Additional comment		

Project parameters:

Not applicable.

D.2. Data and parameters monitored

Baseline parameters:

Data/Parameter	EF_{NG}	
Unit	tCO ₂ /TJ	
Description	Carbon emissions factor for natural gas	
Measured/Calculated/Default	Default	
Source of data	National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2010 ²	
Value(s) of monitored parameter	2004	55.38
	2005	55.42
	2006	55.53
	2008	55.35
	2009	55.45
	2010	55.35
Monitoring equipment	Literature	

² The document can be downloaded from:
http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

Measuring/Reading/Recording frequency	Annually																												
Calculation method (if applicable)																													
QA/QC procedures	Emission factors reviewed to be in line with national or international fuel standards Level of Uncertainty: Low																												
Purpose of data	For the calculation of project emission or project net GHG removals by sinks																												
Additional comment	In accordance with National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2010, EF_{NG} shall be calculated as follows, <table border="1" data-bbox="576 674 1477 987"> <thead> <tr> <th></th> <th>Carbon content (tC/TJ)³</th> <th>Oxidation factor⁴</th> <th>$EF_{NG} = \text{Carbon content} * \text{Oxidation factor} * 44/12$</th> </tr> </thead> <tbody> <tr> <td>2004</td> <td>15.18</td> <td>0.995</td> <td>55.38</td> </tr> <tr> <td>2005</td> <td>15.19</td> <td>0.995</td> <td>55.42</td> </tr> <tr> <td>2006</td> <td>15.22</td> <td>0.995</td> <td>55.53</td> </tr> <tr> <td>2008</td> <td>15.17</td> <td>0.995</td> <td>55.35</td> </tr> <tr> <td>2009</td> <td>15.20</td> <td>0.995</td> <td>55.45</td> </tr> <tr> <td>2010</td> <td>15.17</td> <td>0.995</td> <td>55.35</td> </tr> </tbody> </table>		Carbon content (tC/TJ) ³	Oxidation factor ⁴	$EF_{NG} = \text{Carbon content} * \text{Oxidation factor} * 44/12$	2004	15.18	0.995	55.38	2005	15.19	0.995	55.42	2006	15.22	0.995	55.53	2008	15.17	0.995	55.35	2009	15.20	0.995	55.45	2010	15.17	0.995	55.35
	Carbon content (tC/TJ) ³	Oxidation factor ⁴	$EF_{NG} = \text{Carbon content} * \text{Oxidation factor} * 44/12$																										
2004	15.18	0.995	55.38																										
2005	15.19	0.995	55.42																										
2006	15.22	0.995	55.53																										
2008	15.17	0.995	55.35																										
2009	15.20	0.995	55.45																										
2010	15.17	0.995	55.35																										

Data/Parameter	EF_{coal}												
Unit	tCO ₂ /TJ												
Description	The carbon emission factor for coal												
Measured/Calculated/Default	Default												
Source of data	National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2010 ⁵												
Value(s) of monitored parameter	<table border="1" data-bbox="576 1357 895 1570"> <tbody> <tr> <td>2004</td> <td>99.18</td> </tr> <tr> <td>2005</td> <td>98.10</td> </tr> <tr> <td>2006</td> <td>97.74</td> </tr> <tr> <td>2008</td> <td>90.91</td> </tr> <tr> <td>2009</td> <td>90.91</td> </tr> <tr> <td>2010</td> <td>90.91</td> </tr> </tbody> </table>	2004	99.18	2005	98.10	2006	97.74	2008	90.91	2009	90.91	2010	90.91
2004	99.18												
2005	98.10												
2006	97.74												
2008	90.91												
2009	90.91												
2010	90.91												
Monitoring equipment	Literature												
Measuring/Reading/Recording frequency	Annually												

³ Carbon contents of natural gas are cited from Table P2.8, Table P2.29, Table P35 and Table P2.41 of the Report respectively.

⁴ Oxidation factor of natural gas are cited from Section P2.6 (page 445), Table P2.3, Table P2.36 and Table P.2.42 of the Report respectively.

⁵ The document available at:

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

Calculation method (if applicable)																													
QA/QC procedures	Data variables reviewed to be in line with national or international fuel standards Level of Uncertainty: Low																												
Purpose of data	For the calculation of project emission or project net GHG removals by sinks																												
Additional comment	In accordance with National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2010, EF_{coal} shall be calculated as follows, <table border="1" data-bbox="571 584 1477 898"> <thead> <tr> <th></th> <th>Carbon content (tC/TJ)⁶</th> <th>Oxidation factor⁷</th> <th>EF_{coal} = Carbon content * Oxidation factor * 44/12</th> </tr> </thead> <tbody> <tr> <td>2004</td> <td>27.6</td> <td>0.98</td> <td>99.18</td> </tr> <tr> <td>2005</td> <td>27.3</td> <td>0.98</td> <td>98.10</td> </tr> <tr> <td>2006</td> <td>27.2</td> <td>0.98</td> <td>97.74</td> </tr> <tr> <td>2008</td> <td>25.3</td> <td>0.98</td> <td>90.91</td> </tr> <tr> <td>2009</td> <td>25.3</td> <td>0.98</td> <td>90.91</td> </tr> <tr> <td>2010</td> <td>25.3</td> <td>0.98</td> <td>90.91</td> </tr> </tbody> </table>		Carbon content (tC/TJ) ⁶	Oxidation factor ⁷	EF_{coal} = Carbon content * Oxidation factor * 44/12	2004	27.6	0.98	99.18	2005	27.3	0.98	98.10	2006	27.2	0.98	97.74	2008	25.3	0.98	90.91	2009	25.3	0.98	90.91	2010	25.3	0.98	90.91
	Carbon content (tC/TJ) ⁶	Oxidation factor ⁷	EF_{coal} = Carbon content * Oxidation factor * 44/12																										
2004	27.6	0.98	99.18																										
2005	27.3	0.98	98.10																										
2006	27.2	0.98	97.74																										
2008	25.3	0.98	90.91																										
2009	25.3	0.98	90.91																										
2010	25.3	0.98	90.91																										

Data/Parameter	EF_{CaCO_3}
Unit	tCO ₂ /t CaCO ₃
Description	The carbon emission factor for CaCO ₃
Measured/Calculated /Default	Default
Source of data	Section 4.8.2 (P.116), National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2009 ⁸
Value(s) of monitored parameter	Stoichiometric emission factor; 0.44 tCO ₂ /t CaCO ₃
Monitoring equipment	Literature
Measuring/Reading/Recording frequency	Annually
Calculation method (if applicable)	
QA/QC procedures	Emission factors are checked annually Level of Uncertainty: Low
Purpose of data	For the calculation of project emission or project net GHG removals by sinks
Additional comment	

⁶ Carbon contents of coal are cited from Table P2.15, Page 458, Page 164 and Page 470 of the Report respectively.

⁷ Oxidation factor of coal are cited from Section P2.6 (page 445), Table P2.3, Table P2.36 and Table P2.42 of the Report respectively.

⁸ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

Data/Parameter	EF_{MgCO_3}
Unit	tCO ₂ /t MgCO ₃
Description	Carbon emission factor for MgCO ₃
Measured/Calculated /Default	Default
Source of data	Section 4.8.2 (P.116), National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases in Ukraine for 1990-2009 ⁹
Value(s) of monitored parameter	Stoichiometric emissions factor: 0.522 tCO ₂ /tMgCO ₃
Monitoring equipment	Literature
Measuring/Reading/Recording frequency	Annually
Calculation method (if applicable)	
QA/QC procedures	Emissions factors are checked annually Level of Uncertainty: Low
Purpose of data	For the calculation of project emission or project net GHG removals by sinks
Additional comment	

Data/Parameter	$SP_{y,i}$												
Unit	Tonnes												
Description	Sugar production in year y at plant i												
Measured/Calculated /Default	Measured												
Source of data	The bags accounting system SUM-232												
Value(s) of monitored parameter	<p>Yareskivsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>51,281</td> </tr> <tr> <td>2009</td> <td>69,780</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>37,143</td> </tr> <tr> <td>2009</td> <td>51,497</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>35,042</td> </tr> <tr> <td>2009</td> <td>-</td> </tr> </table>	2008	51,281	2009	69,780	2008	37,143	2009	51,497	2008	35,042	2009	-
2008	51,281												
2009	69,780												
2008	37,143												
2009	51,497												
2008	35,042												
2009	-												
Monitoring equipment	The bags accounting system SUM-232												
Measuring/Reading/Recording frequency	Monthly												

⁹ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

Calculation method (if applicable)	
QA/QC procedures	Produced sugar is scaled by bags accounting system SUM-232. The calibration is undertaken by plant specialists once a year. Sugar is put into the bags with help of weigh hopper DVS-301. Uncertainty level +/-0.04 at Yareskivsky plant and Globinsky plant, 0.01%/0.005% at Veselopodilsky plant. Calibration is undertaken by plant specialists once a year. State check is undertaken by State Enterprise "Poltavastandartmetrologiya".
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks
Additional comment	

Data/Parameter	$SPB_{y,i}$												
Unit	%												
Description	Average sugar content in sugar beets in year y at plant i												
Measured/Calculated /Default	Measured												
Source of data	-The semi-automatic line ULS-1; -Automatic polarimeter "Sucromat" (Anton Paar).												
Value(s) of monitored parameter	<p>Yareskivsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>17.02</td> </tr> <tr> <td>2009</td> <td>16.95</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>16.68</td> </tr> <tr> <td>2009</td> <td>17.06</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>16.74</td> </tr> <tr> <td>2009</td> <td>-</td> </tr> </table>	2008	17.02	2009	16.95	2008	16.68	2009	17.06	2008	16.74	2009	-
2008	17.02												
2009	16.95												
2008	16.68												
2009	17.06												
2008	16.74												
2009	-												
Monitoring equipment	-The semi-automatic line ULS-1; -Automatic polarimeter "Sucromat" (Anton Paar).												
Measuring/Reading/Recording frequency	Monthly												
Calculation method (if applicable)													
QA/QC procedures	Sugar content in sugar beets is measured by semi-automatic line ULS-1 and automatic polarimeter "Sucromat" (Anton Paar). The calibration is undertaken by SE "Poltavastandartmetrologiya" once a year. Uncertainty level - +/-0.2% and +/-0.01%, correspondingly.												
Purpose of data	For the calculation of baseline emission or baseline net GHG removals by sinks												
Additional comment													

Project parameters:

Data/Parameter	$FC_{NG,y,i}$												
Unit	ths.m ³												
Description	Natural gas consumption for sugar plants needs												
Measured/Calculated /Default	Measured												
Source of data	Tsukrovyk												
Value(s) of monitored parameter	<p>Yareskiivsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>15,577</td> </tr> <tr> <td>2009</td> <td>18,686</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>10,705</td> </tr> <tr> <td>2009</td> <td>12,393</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>11,981</td> </tr> <tr> <td>2009</td> <td>-</td> </tr> </table>	2008	15,577	2009	18,686	2008	10,705	2009	12,393	2008	11,981	2009	-
2008	15,577												
2009	18,686												
2008	10,705												
2009	12,393												
2008	11,981												
2009	-												
Monitoring equipment	The accounting of natural gas consumed for production process is done by an automated measuring-management meter. The meter can measure data on a momentary, hourly, daily, monthly, off-nominal or emergency cases of gas consumption. Consumption data is sent via radio signal to a computer where it is stored and can be printed on user's request.												
Measuring/Reading/Recording frequency	Monthly												
Calculation method (if applicable)													
QA/QC procedures	Calibration of the meter is done at least once every 2 years. The calibrations are executed by the representatives of gas supplier (JSC "Poltavagas") before and during the season (September-March).												
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks												
Additional comment													

Data/Parameter	$NCV_{NG,y,i}$
Unit	kcal/m ³
Description	Net calorific value of natural gas
Measured/Calculated /Default	Measured
Source of data	Supplier's certificate

Value(s) of monitored parameter	Yareskiivsky sugar plant
	2008 8,278
	2009 8,278
	Globinsky sugar plant
	2008 8,608
	2009 8,372
	Veselopodilsky sugar plant
	2008 8,307
	2009 -
	Monitoring equipment
Measuring/Reading/Recording frequency	Monthly
Calculation method (if applicable)	
QA/QC procedures	
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks
Additional comment	

Data/Parameter	$FC_{Coal,y,i}$
Unit	Tonnes
Description	Coal consumption for sugar plants needs
Measured/Calculated/Default	Measured
Source of data	Tsukrovyk
Value(s) of monitored parameter	Yareskiivsky sugar plant
	2008 2,208
	2009 1,576
	Globinsky sugar plant
	2008 1,132
	2009 1,095
	Veselopodilsky sugar plant
	2008 1,365
	2009 -
	Monitoring equipment
Measuring/Reading/Recording frequency	Daily
Calculation method (if applicable)	

QA/QC procedures	State calibration is performed once every 6 months. Test calibration is conducted once every two months. Review and checks are done by using of sampling weights of 4th rank with total mass of 80 t. The results of state calibrations, reviews and checks are put into the technical passport of the scales.
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks
Additional comment	The Calibration of the mechanical carriage scale in Yareskivsky plant was done once a year during 2008 and 2009. Since December 2009, the mechanical carriage scale was retired and was replaced by the Tensometric scale. The calibration of the Tensometric scale was done on 28 Dec 2009.

Data/Parameter	$NCV_{Coal,y,i}$												
Unit	kcal/kg												
Description	Net calorific value of coal												
Measured/Calculated /Default	Measured												
Source of data	Supplier's certificate												
Value(s) of monitored parameter	<p>Yareskivsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>7,126</td> </tr> <tr> <td>2009</td> <td>6,822</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>5,780</td> </tr> <tr> <td>2009</td> <td>7,290</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>6,490</td> </tr> <tr> <td>2009</td> <td>-</td> </tr> </table>	2008	7,126	2009	6,822	2008	5,780	2009	7,290	2008	6,490	2009	-
2008	7,126												
2009	6,822												
2008	5,780												
2009	7,290												
2008	6,490												
2009	-												
Monitoring equipment	Operated by the coal supplier												
Measuring/Reading/Recording frequency	Monthly												
Calculation method (if applicable)													
QA/QC procedures													
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks												
Additional comment													

Data/Parameter	$LC_{y,i}$												
Unit	Tonnes												
Description	The mass of raw material limestone burned in the kiln in project year y at plant i												
Measured/Calculated /Default	Measured												
Source of data	Tsukrovyk												
Value(s) of monitored parameter	<p>Yareskiivsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>21,683</td> </tr> <tr> <td>2009</td> <td>19,904</td> </tr> </table> <p>Globinsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>14,585</td> </tr> <tr> <td>2009</td> <td>16,760</td> </tr> </table> <p>Veselopodilsky sugar plant</p> <table border="1"> <tr> <td>2008</td> <td>17,594</td> </tr> <tr> <td>2009</td> <td>-</td> </tr> </table>	2008	21,683	2009	19,904	2008	14,585	2009	16,760	2008	17,594	2009	-
2008	21,683												
2009	19,904												
2008	14,585												
2009	16,760												
2008	17,594												
2009	-												
Monitoring equipment	The mechanical carriage scales/ Tensometric scale												
Measuring/Reading/ Recording frequency	Monthly												
Calculation method (if applicable)													
QA/QC procedures	State calibration is performed once every 6 months.												
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks												
Additional comment	The calibration of the mechanical carriage scale in Yareskiivsky plant was done once a year during 2008 and 2009. Since December 2009, the mechanical carriage scale was retired and was replaced by the Tensometric scale. The calibration of the Tensometric scale was done on 28 Dec 2009.												

Data/Parameter	$CaCO_{3,y,i}$
Unit	-
Description	The percent of $CaCO_3$ in the raw material limestone in project year y at plant i
Measured/Calculated /Default	Measured
Source of data	Limestone supplier

Value(s) of monitored parameter	Yareskiivsky sugar plant	
	2008	0.974
	2009	0.973
	Globinsky sugar plant	
	2008	0.969
	2009	0.970
Monitoring equipment	Operated by the Limestone supplier	
	Measuring/Reading/Recording frequency	
	Monthly	
Calculation method (if applicable)		
QA/QC procedures		This data is provided by the limestone supplier with every shipment. Level of Uncertainty: Low
Purpose of data		For the calculation of project emission or actual net GHG removals by sinks
Additional comment		

Data/Parameter	$MgCO_{3,y,i}$	
Unit	-	
Description	The percent of $MgCO_3$ in the raw material limestone in project year y at plant i	
Measured/Calculated/Default	Measured	
Source of data	Limestone supplier	
Value(s) of monitored parameter	Yareskiivsky sugar plant	
	2008	0.0121
	2009	0.0125
	Globinsky sugar plant	
	2008	0.0119
	2009	0.0125
	Veselopodilsky sugar plant	
	2008	0.0121
	2009	-
Monitoring equipment		
Measuring/Reading/Recording frequency		Monthly
Calculation method (if applicable)		

QA/QC procedures	This data is provided by the limestone supplier with every shipment. Level of Uncertainty: Low
Purpose of data	For the calculation of project emission or actual net GHG removals by sinks
Additional comment	

D.3. Implementation of sampling plan

This section is left blank intentionally.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

The baseline emissions of the project activity are the counterfactual project emission when the same quantity of sugar (adjusted with the quantity of beet and sugar content) is produced as the reality during 2008-2009. The baseline technical indicators are set by the operational record of the three sugar plants during 2004-2006. Table E.1. presents the operational record during 2004-2006.

Table E.1: Operational record during 2004-2006

	Parameters	2004	2005	2006
Yareskiivsky Sugar Plant	$SBC_{hist,y,i}$ (tonnes)	283,785	256,890	342,992
	$SP_{hist,y,i}$ (tonnes)	34,537	35,993	47,610
	$SPB_{hist,y,I}$ (%)	15.34	17.35	16.39
	$FC_{coal,hist,y,i}$ (tonnes)	1,671	1,759	1,976
	$FC_{NG,hist,y,I}$ (ths. m ³)	14,125	13,862	16,831
	$LC_{hist,y,i}$ (tonnes)	20,859	18,708	23,017
	$NCV_{NG,hist,y,i}$ (kcal/m ³)	8,322	8,280	8,513
	$NCV_{coal,hist,y,I}$ (kcal/kg)	7,204	7,100	6,910
	$CaCO_3_{hist,y,i}$ (Fraction CaCO ₃ /RM)	0.9730	0.9721	0.9690
	$MgCO_3_{hist,y,i}$ (Fraction MgCO ₃ /RM)	0.0125	0.0121	0.0111
	Globinsky Sugar Plant	$SBC_{hist,y,i}$ (tonnes)	-	-
$SP_{hist,y,i}$ (tonnes)		-	-	17,885
$SPB_{hist,y,I}$ (%)		-	-	15.71
$FC_{coal,hist,y,i}$ (tonnes)		-	-	877
$FC_{NG,hist,y,I}$ (ths. m ³)		-	-	8,100
$LC_{hist,y,i}$ (tonnes)		-	-	11,009
$NCV_{NG,hist,y,i}$ (kcal/m ³)		-	-	8,704
$NCV_{coal,hist,y,I}$ (kcal/kg)		-	-	7,230
$CaCO_3_{hist,y,i}$ (Fraction CaCO ₃ /RM)		-	-	0.972
$MgCO_3_{hist,y,i}$ (Fraction MgCO ₃ /RM)		-	-	0.0125

Veselopodilsky Sugar Plant	$SBC_{hist,y,i}$ (tonnes)	123,910	158,236	200,471
	$SP_{hist,y,i}$ (tonnes)	14,082	20,825	24,827
	$SPB_{hist,y,I}$ (%)	14.81	16.89	15.69
	$FC_{coal,hist,y,i}$ (tonnes)	858	1,133	1,237
	$FC_{NG,hist,y,I}$ (ths. m ³)	6,550	8,688	10,635
	$LC_{hist,y,i}$ (tonnes)	9,024	12,947	15,043
	$NCV_{NG,hist,y,i}$ (kcal/m ³)	8,333	8,370	8,308
	$NCV_{coal,hist,y,I}$ (kcal/kg)	7,010	7,010	9,610
	$CaCO_3_{hist,y,i}$ (Fraction CaCO ₃ /RM)	0.9730	0.9721	0.9690
	$MgCO_3_{hist,y,i}$ (Fraction MgCO ₃ /RM)	0.0125	0.0121	0.0111

With the historical operational record during 2004-2006, the average baseline technical indicators shall be calculated and is presented in Table E.2. The baseline emissions from each input source, i.e. natural gas, coal and limestone, shall be calculated by multiplying the quantity of sugar production with each baseline technical indicators. The baseline emissions of the project activity at 2008 and 2009 are presented in Table E.3.

Table E.2: Baseline technical indicators

	Baseline indicators	Value(tCO ₂ /t sugar)
Yareskivsky Sugar Plant	$SNG_{Hist,i}$	0.7445
	$SC_{Hist,i}$	0.1376
	$SLC_{Hist,i}$	0.2323
Globinsky Sugar Plant	$SNG_{Hist,i}$	0.9125
	$SC_{Hist,i}$	0.1481
	$SLC_{Hist,i}$	0.2673
Veselopodilsky Sugar Plant	$SNG_{Hist,i}$	0.8499
	$SC_{Hist,i}$	0.1622
	$SLC_{Hist,i}$	0.2704

Table E.3: Baseline emissions

		2008	2009
Yareskivsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	51,281	60,780
	$BE_{NG,y,i}$ (tCO ₂)	36,440	49,814
	$BE_{Coal,y,i}$ (tCO ₂)	6,635	9,070
	$BE_{Calcim,y,i}$ (tCO ₂)	11,430	15,625
	Total: $BE_{y,i}$ (tCO₂)	54,505	74,509
Globinsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	37,143	51,497
	$BE_{NG,y,i}$ (tCO ₂)	31,764	43,053
	$BE_{Coal,y,i}$ (tCO ₂)	5,078	6,882
	$BE_{Calcim,y,i}$ (tCO ₂)	9,350	12,674
	Total: $BE_{y,i}$ (tCO₂)	46,192	62,609
Veselopodilsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	35,042	-

	$BE_{NG,y,i}$ (tCO ₂)	28,066	-
	$BE_{Coal,y,i}$ (tCO ₂)	5,276	-
	$BE_{Calcin,y,i}$ (tCO ₂)	8,973	-
	<i>Total: $BE_{y,i}$</i> (tCO ₂)	42,315	-
Total baseline emission (tCO ₂)		143,012	137,118

E.2. Calculation of project emissions or actual net GHG removals by sinks

The project emissions of the project activity are the realised emissions when the project activity produced sugar during 2008-2009. Whilst the energy efficiency measures are installed gradually, the project technical indicators change because of the improvement of the energy efficiency. The project technical indicators are calculated by the realised operational record of the three sugar plants at 2008 and 2009. Table E.4. presents the operational record at 2008 and 2009.

Table E.4: Operational record at 2008 and 2009

	Parameters	2008	2009
Yareskivsky Sugar Plant	$SP_{y,i}$ (tonnes)	51,281	69,780
	$SPB_{y,I}$ (%)	17.02	16.95
	$FC_{coal,y,i}$ (tonnes)	2208	1576
	$FC_{NG,y,I}$ (ths. m ³)	15,577	18,686
	$LC_{y,i}$ (tonnes)	21,683	19,904
	$NCV_{NG,i}$ (kcal/m ³)	8278	8278
	$NCV_{coal,y,I}$ (kcal/kg)	7126	6822
	$CaCO_{3y,i}$ (Fraction CaCO ₃ /RM)	0.974	0.973
	$MgCO_{3y,i}$ (Fraction MgCO ₃ /RM)	0.0121	0.0125
Globinsky Sugar Plant	$SP_{y,i}$ (tonnes)	37,143	51,497
	$SPB_{y,I}$ (%)	16.68	17.06
	$FC_{coal,y,i}$ (tonnes)	1132	1095
	$FC_{NG,y,I}$ (ths. m ³)	10,705	12,393
	$LC_{y,i}$ (tonnes)	14,585	16,760
	$NCV_{NG,i}$ (kcal/m ³)	8608	8372
	$NCV_{coal,y,I}$ (kcal/kg)	5780	7290
	$CaCO_{3y,i}$ (Fraction CaCO ₃ /RM)	0.969	0.970
	$MgCO_{3y,i}$ (Fraction MgCO ₃ /RM)	0.0119	0.0125
Veselopodilsky Sugar Plant	$SP_{y,i}$ (tonnes)	35,042	-
	$SPB_{y,I}$ (%)	16.74	-
	$FC_{coal,y,i}$ (tonnes)	1365	-
	$FC_{NG,y,I}$ (ths. m ³)	11,981	-
	$LC_{y,i}$ (tonnes)	17,594	-

	$NCV_{NG,i}$ (kcal/m ³)	8307	-
	$NCV_{coal,y,I}$ (kcal/kg)	6490	-
	$CaCO_{3,y,i}$ (Fraction $CaCO_3$ /RM)	0.968	-
	$MgCO_{3,y,i}$ (Fraction $MgCO_3$ /RM)	0.0121	-

With the realised operational record at 2008 and 2009, the project emissions from each input source, i.e. natural gas, coal and limestone, shall be calculated by multiplying the quantity of input sources with their emission factors. The project emissions of the project activity at 2008 and 2009 are presented in Table E.5.

Table E.5: Project emissions

		2008	2009
Yareskivsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	51,281	69,780
	$BE_{NG,y,i}$ (tCO ₂)	29,952	35,914
	$BE_{Coal,y,i}$ (tCO ₂)	5,989	4,092
	$BE_{Calcin,y,i}$ (tCO ₂)	9,429	7,443
	<i>Total: $BE_{y,i}$(tCO₂)</i>	45,371	47,449
Globinsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	37,143	51,497
	$BE_{NG,y,i}$ (tCO ₂)	21,353	24,090
	$BE_{Coal,y,i}$ (tCO ₂)	2,490	3,038
	$BE_{Calcin,y,i}$ (tCO ₂)	6,309	7,259
	<i>Total: $BE_{y,i}$(tCO₂)</i>	30,153	34,387
Veselopodilsky Sugar Plant	$SP_{BL,y,i}$ (tonnes)	35,042	-
	$BE_{NG,y,i}$ (tCO ₂)	23,062	-
	$BE_{Coal,y,i}$ (tCO ₂)	3,372	-
	$BE_{Calcin,y,i}$ (tCO ₂)	7,605	-
	<i>Total: $BE_{y,i}$(tCO₂)</i>	34,039	-
Total project emission (tCO ₂)		110,485	82,472

E.3. Calculation of leakage

According to the Project Design Document of the project activity, there is not any leakage emissions caused by the project activity.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Table E.6: Summary of calculation

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
2008	143,012	109,563	0	33,449
2009	137,118	81,836	0	55,282
Total	280,130	191,399	0	88,731

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Table E.7.: Comparison of actual emission reductions and the estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO₂e)	73,753	88,731

E.6. Remarks on difference from estimated value in registered PDD

The difference between the realised emission reductions and the estimated emission reductions in registered PDD is caused by the larger amount of sugar production and the higher energy efficiency by these modification measures compared with the forecast. Table E.8. present the difference between the forecast and reality of the sugar production and the emission per tonnes of sugar production. Both of them cause the difference between the actual value of emission reduction and the estimated value in registered PDD.

Table E.8: The difference between the forecast and reality

		2008		2009	
		Forecast	Reality	Forecast	Reality
Sugar production (tonnes)	Yareskiivsky Sugar Plant	47,122	51,281	55,100	69,780
	Globinsky Sugar Plant	37,290	37,290	48,848	50,868
	Veselopodilsky Sugar Plant	35,042	35,042	-	-
Emission per tonnes of sugar production (tCO ₂ /sugar)	Yareskiivsky Sugar Plant	0.8483	0.8848	0.8317	0.6800
	Globinsky Sugar Plant	0.8118	0.8874	0.7632	0.6748
	Veselopodilsky Sugar Plant	0.9767	0.9714	-	-

Serial numbers and calibration dates of measurement equipment (Yareskiivsky plant)

Parameter	Metering device	Manufacturer/ Type	Units	Serial number	Uncertainty level	Year of manufacturing	Year of installation	Date of last and next to last calibration	Date of next calibration
Natural gas consumption	Measuring- management meter for gas volume and consumption	FLOUTEC TM/LLC “Ukrghosteh”	m ³	1-873	0,5%	2007	2007	05.08.2009 (calibration is undertaken one in 2 years)	05.08.2011
Limestone consumption	Mechanical carriage scale	RS-150S13V/ Armavirsky mechanical plant	t	2416	At least +/- 100 kg	1985	1985	15.10.2008 13.10.2009	The last year of operation is 2009
	Tensometric scales (since December 2009)	Bulat-V2-150N /LLC Produce and Commercial Company “Bulat-O”	t	207		2009	2009	28.12.2009	28.06.2010
Coal consumption	Mechanical carriage scale	RS-150C13V/ Armavirsky mechanical plant	t	2416	At least +/- 100 kg	1985	1985	15.10.2008 13.10.2009	The last year of operation is 2009
	Tensometric scales (since December 2009)	Bulat-V2-150N /LLC Produce and Commercial Company “Bulat-O”	t	207		2009	2009	28.12.2009	28.06.2010
Sugar production	Bags accounting system	SUM-232/ LLC “Sveda Ltd”	units	SV.232.000	0%	2005	2005	01.09.2008 28.08.2009	05.09.2010
	Weigh hopper	DVS-301/ LLC “Sveda Ltd”	kg	16	+/- 0,04 kg	2002	2002	16.10.2008 14.10.2009	14.10.2010
	Weigh hopper	DVS-301/ LLC “Sveda Ltd”	kg	17	+/- 0,04 kg	2002	2002	16.10.2008 14.10.2009	14.10.2010
	Weigh hopper	DVS-301/ LLC “Sveda Ltd”	kg	36	+/- 0,04 kg	2006	2006	16.10.2008 14.10.2009	14.10.2010

	Weigh hopper	DVS-301/ LLC "Sveda Ltd"	kg	70	+/- 0,04 kg	2006	2006	16.10.2008 14.10.2009	14.10.2010
Sugar content in sugar beets	Semi-automatic line	ULS-1/ Kyiv plant of computing and control machines	%	No serial number	+/-0,2%	1974	1975	30.07.2009	30.07.2010
		Automatic polarimeter "Sucromat" /Anton Paar, GmbH & Co	%	80343073	+/-0,01%	2008	2008	26.08.2008 30.07.2009	19.08.2010

Serial numbers and calibration dates of measurement equipment (Globinsky plant)

Parameter	Metering device	Type/manufacturer	Units	Serial number	Uncertainty level	Year of manufacturing	Year of installation	Date of last and next to last calibration	Date of next calibration
Natural gas consumption	Measuring-management meter for gas volume and consumption	LIDER-VG1 / SSPE "Spetsavomatika"	m ³	359	+/-0,5 %	28.07.2004	2006	27.08.08 27.08.09	27.08.2010
Limestone consumption	Mechanical carriage scales	5044ES150 DS24V/ Plant "Armalit"	t	866/1118	+/-100 kg	1989	1989	15.10.2008 15.04.2009	13.10.2009
Coal consumption	Mechanical carriage scales	5044ES150 DS24V/ Plant "Armalit"	t	866/1118	+/-100kg	1989	1989	15.10.2008 15.04.2009	13.10.2009
Sugar production	Bags accounting system	SUM-232/ LLC Scientific-Production Firm "Sveda", Zaporizhya	units	SV.232.000	0%	2009	2009	03.09.2009	20.08.2010
	Weigh hopper	"Norma-S"/ Scientific – production enterprise "Mehanotron"	kg	1160	+/- 0.1%	2002	2002	31.08.2006 19.08.2009	09.09.2010
	Weigh hopper	"Norma-S"/ Scientific – production enterprise "Mehanotron"	kg	1475	+/-0.1%	2006	2006	19.08.2009	09.08.2010
	Weigh hopper	"Norma-S"/ Scientific – production enterprise "Mehanotron"	kg	1476	+/-0.1%	2006	2006	19.08.2009	09.09.2010

	Weigh hopper	"Norma-S"/ Scientific – production enterprise "Mehanotron"	kg	1477	+/-0.1%	2006	2006	19.08.2009	09.09.2010
Sugar content in sugar beets	Semi-automatic line	ULS-1/ Kyiv plant of computing and control machines	%	No serial number	+/-0,01%	1977	1988	27.08.2008 27.08.2009	27.08.2010

Serial numbers and calibration dates of measurement equipment (Veselopodilsky plant)

Parameter	Metering device	Type/manufacturer	Units	Serial number	Uncertainty level	Year of manufacturing	Year of installation	Date of last and next to last calibration	Date of next calibration
Natural gas consumption	Measuring-management meter for gas volume and consumption	“FLOUTEK-TM-VR-1”	m ³	079	0,075%	1996	1997	08.2008	The plant was not operational since 2009
Limestone consumption	Mechanical carriage scales	VO-2002, plant “Armalit”	t	195	-	1991	1991	08.10.2008 11.04.2008	06.04.2009
Coal consumption	Mechanical carriage scales	VO-2002, plant “Armalit”	t	195	--	1991	1991	08.10.2008 11.04.2008	06.04.2009
Sugar production	Weigh hopper	DVS-301, LLC “Sveda Ltd”, Zaporizhya	kg	29	0,01%	2000	2001	08.2008	The plant was not operational since 2009
	Weigh hopper	DVS-301, LLC “Sveda Ltd”, Zaporizhya	kg	28	0,01%	2000	2001	08.2008	The plant was not operational in since 2009
	Weigh hopper	DVS-301, LLC “Sveda Ltd”, Zaporizhya	kg	20	0,005%	2002	2002	08.2008	The plant was not operational since 2009
	Weigh hopper	DVS-301, LLC “Sveda Ltd”, Zaporizhya	kg	28	0,005%	2002	2002	08.2008	The plant was not operational since 2009
Sugar content in sugar beets	Semi-automatic line	ULS-1	%	1484	+/-0,01%	-	-	18.08.2008	The plant was not operational since 2009