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:

"Realization of a complex of energy saving activities at PJSC "ROSAVA"

Sectoral Scope[1]: 1 Energy industries (renewable/ non-renewable sources).

Version: 04.

Date: November 16, 2012

A.2. Description of the project:

PJSC "ROSAVA" is the greatest tyre manufacturer in Ukraine, one of the leading companies in CIS countries on the quality of manufactured product. PJSC "ROSAVA" is high tech and socially responsible company which uses up-to-date standards and management principles.

The main activity of the company is tyres manufacturing under the "ROSAVA" trademark. One of the trends of its development is off-take projects (production of tyres for foreign customers from Germany, Turkey, Great Britain, Russia and others).

PJSC "ROSAVA" is located in south-eastern part of Bila Tserkva city, 80 km distance from Kyiv. Convenient geographical location of the company, presence of railway and Kyiv-Odesa highway ensure prompt delivery of tyres to customers in Ukraine and to foreign partners.

Wide range of tyres, more than 150 sizes, are manufactured for passenger cars, light trucks, trucks, agricultural and road building vehicles.

Tyres for passenger cars are manufactured in economy segment with marks ВС and БЦ, and since 2006 in medium segment. Medium class tyres are exported to 36 countries of the world. In Ukraine they are widely used by owners of foreign cars of B and C classes. About 60% of total volume of all tyres range is sold in domestic market, the rest of tyres are exported to more than 60 countries in Europe, Asia, Africa, North and South America as well as CIS countries.

PJSC "ROSAVA" production is certified according to several international standards, among which:

- ISO 9001 (certified by TNO Certification b.v. company, Netherlands);
- Certificates of conformity to noise level requirements of EC (IGTT a.s.) – Czech Republic;
- INMETRO Conformity Certificate, Brazil;
- Technical results of independent testing by the Cooper Tire&Rubber Company Europe LTD, England;
- 30 EEC UN, 50 EEC UN, 54 EEC UN International Rules;
- Certification systems of the Russian Federation, Republic of Belarus;
- UkrSEPRO Certificate, Ukraine.

[1] http://cdm.unfccc.int/DOE/scopes.html

High quality of PJSC "ROSAVA" production is proved by numerous domestic and international awards. The company was awarded more than 50 ones.

No production equipment all-scale upgrade took place at PJSC "ROSAVA". The reason for this is high cost of such process and absence of state policy aimed at the reduction of GHGs emission into the atmosphere.

The history of the project started with the decision on main production site modernization (Order # 10 dated 10/02/2000 issued by the Head of the Ventilation and Supply Lines Shop (V&SL Shop). The order was the incentive to start the works on mounting the waste heat utilization system with its further usage for heating the main production site premises and in the production process.

The implementation of production process modernization activities resulted in reduction of specific electricity and heat consumption in the production process that allowed to decrease the amount of electricity consumed from the Ukrainian Electricity Transmission Grid (hereinafter – UETG) and heat needed for goods manufacturing. Specific electricity and heat consumption reduction will allow to decrease the amount of electricity and heat consumed during the production process, leading to the reduction of fossil fuel used for electricity and heat generation and thus resulting in GHGs reduction at Ukrainian power engineering enterprises. The reduction of fossil fuel amount consumed for electricity and heat generation will lead to GHGs reduction.

JI project "Realization of a complex of energy saving activities at PJSC "ROSAVA" implementation was initiated in 2000, taking into account the possibility of Kyoto mechanisms funds involvement.

Without JI project activity the baseline for PJSC "ROSAVA" would involve production equipment maintenance leaving specific energy resources consumption on the same level as before the project activity implementation and thus without reducing GHGs emissions into the atmosphere.

Project activities are aimed at improvement in power efficiency of the plant by the implementation of 2 subprojects:

1. Implementation of energy efficiency measures and modernization of technological equipment on the main production site is aimed at establishing of high-efficient equipment and optimization of technological processes, which will allow to reduce the electricity and heat consumption in tyres production at the main production site. Reduction of electric energy consumption in tyres production at the main production site will allow to reduce energy consumption from Ukrainian Electricity Transmission Grid (hereinafter – UETG), which will result in decrease of fuel consumption for energy production and, correspondingly, reduction in greenhouse gas emissions at the power plants of Ukraine. Reduction of heat consumption in tyres production will allow to decrease fuel consumption for energy production and, correspondingly, reduction in greenhouse gas emissions.

2. Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production is aimed at establishing of high-efficient equipment and optimization of technological processes, which will allow to reduce the consumption of electricity and heat in heavy tyres production. Reduction of electricity consumption will allow to reduce energy consumption from UETG, which will result in decrease of fuel consumption for energy production and, correspondingly, reduction in greenhouse gas emissions at the power plants of Ukraine. Reduction of

heat consumption in tyres production will allow to decrease fuel consumption for energy production and, correspondingly, reduction in greenhouse gas emissions.

The implementation of scheduled activities on decrease of energy efficiency of the PJSC "ROSAVA" production will lead to the reduction of electricity and heat consumption in rubber technical goods production leading to the reduction of GHG emissions into the atmosphere.

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)	• PJSC "ROSAVA"	No
Republic Lithuania	• CF Partners (Lithuania), UAB	No
*Please indicate if the Party involved is a host Party.		

Type of economic activities according to KVED PJSC "ROSAVA" (EDRPOU code of the object – 30253385): 25.11.0 – tyres, tyre casing and tyre tubes production; 50.30.1 – automobile details and devices wholesale; 50.30.2 – automobile details and devices retail; 51.55.0 – chemical goods wholesale; 65.23.0 – other types of financial intermediation; 73.10.1 – natural sciences research and development.

A.4. Technical description of the project:

A.4.1. Location of the project:

The project is located on the territory of PJSC "ROSAVA". PJSC "ROSAVA" is located in the Kyiv Region in Bila Tserkva city. Geographic location of the project is illustrated in the figure 1.

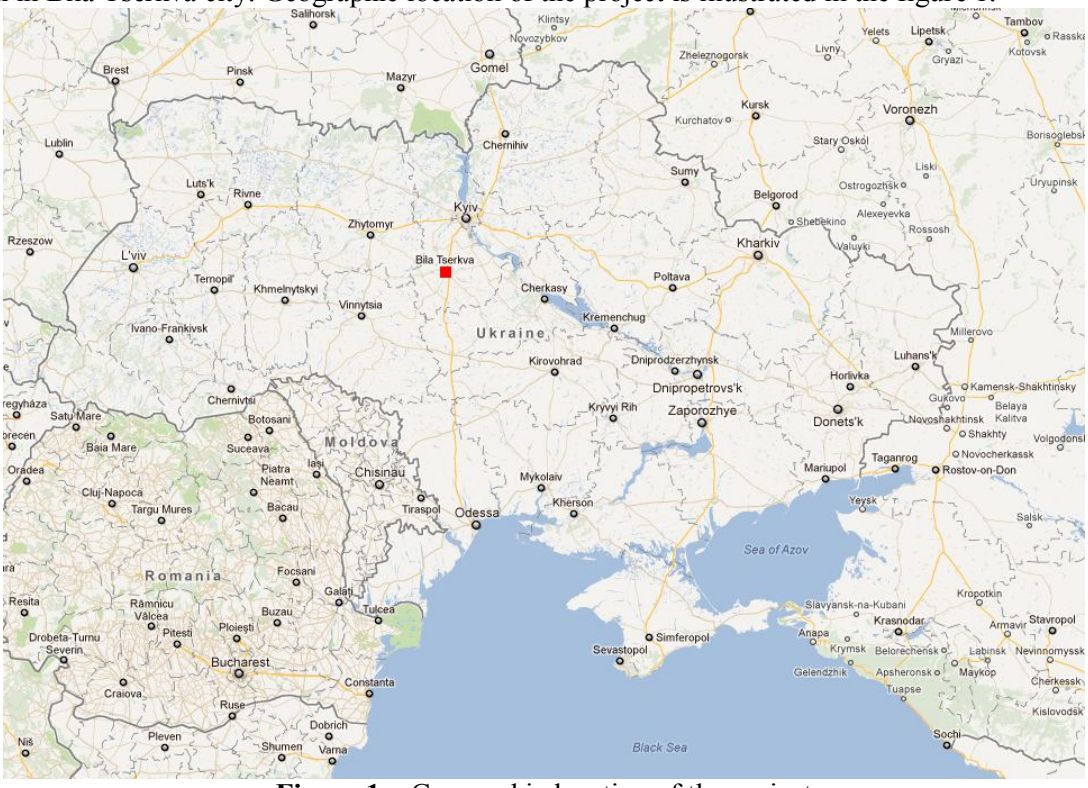

Figure 1 – Geographic location of the project

A.4.1.1. Host Party(ies):

Ukraine

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

Kyiv Region

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

Bila Tserkva city

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

The project is located on the territory of PJSC "ROSAVA". PJSC "ROSAVA" is located in south-eastern part of Bila Tserkva city, 80 km distance from Kyiv. Convenient geographical location of the company, presence of railway and Kyiv-Odesa highway ensure prompt delivery of tyres to customers in Ukraine and to foreign partners.

Geographic coordinates of PJSC "ROSAVA":
- 49º 78' 49" North latitude;
- 30º 16' 73" East longitude.

Area of production capacity of PJSC "ROSAVA" is illustrated in figure 2.

Figure 2 – Area of production capacity of PJSC "ROSAVA"

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

Production of automobile tyres consists of the following steps:
- manufacture of rubber compounds and tyre components;
- assembly of tyre parts;
- vulcanization.

Production of rubber compounds and tyre components:

Production of automobile tyre casing begins with the manufacture of rubber compounds, the composition of which largely depends on the functional purpose of tyres. Therefore, the rubber compound can include up to ten different components - sulfur, carbon, rubber and others. When the rubber compound is ready, it is used for manufacturing so-called “tread part” that is cut into separate details when dried. At this stage of automobile tyres production carcass and breaker (belt) are manufactured. Another important element is tyre bead which is inextensible and a very hard part of tyre. The main part of tyre bead is bead core made of bead wire.

Assembly of tyre parts.

Assembly of tyre parts is made the following way: first, casing plies and bead are applied on a special drum, and then tread and sidewall are put on its center. It should be noted that tyres for passenger cars usually have wider tread, because it usually substitutes sidewall, that significantly increases the accuracy of tyre assembly. As for carcass and breaker (belt), they are made of textile or reinforced steel cord. Rubberized fabric which is used for manufacturing of tyre carcass and breaker (belt) is cut in accordance with predetermined angle into strips of various widths depending on the size of tyres to be.

Vulcanization.

After assembling the tyres are put into mold of curing press. During this process steam or heated water is supplied inside a tyre. As a result, on sidewalls and tread the pattern is printed. Besides, in the process of vulcanizing the tyre rubber gains flexibility and hardness. After vulcanization tyres are ready to use.

To implement planned measures for energy efficiency in full, both the factory own funds and credit resources are involved.

Reduction of greenhouse gas emissions may be achieved as a result of plant power efficiency improvement by the implementation of 2 subprojects:

1. Implementation of energy efficiency measures and modernization of technological equipment on the main production site.

According to the technological scheme, tyres production requires considerable amounts of electricity and heat.

The proposed subproject will allow to reduce the specific consumption of electricity and heat per tonne of processed rubber compounds through the implementation of the following modernization activities:

- waste heat utilization for further consumption for main production site premises heating, and consumption by the technologies (image of the waste heat utilization unit is presented in Figure 3). A huge amount of low-grade energy which was previously released into the atmosphere is generated in the result of steam consumption by the process equipment. This activity envisages design and mounting of waste heat utilization system which includes installation of the relevant heat-exchange and pumping equipment;
- replacement of present 45с13нж and 45с16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company. This activity envisages replacement of more than 300 condensate drains. Condensate drains replacement enhanced the efficiency of steam consumption;
- thyristor frequency transducers installation on power engineering equipment. Energy efficiency is achieved by installation on water supply pipelines pressure sensors that have feedback to thyristor frequency transducers. Pressure balancing in the system within the parameters set is achieved due to the automatic regulation of the engine rotation frequency, leading to reduction of electricity consumption;
- replacement of Chodos curing presses and 55" curing presses produced by Tambovpolimermash company by KHP 46-150 curing presses with 24 kW capacity of Harburg Freudenberg company (Germany) production (image of the KHP 46-150 curing presses is presented in Figure 4). Installed within project activity curing presses consume 29% less electricity than previous ones;
- implementation of tyres curing steam mode. Before implementation of this activity tyres vulcanization process was performed by curing presses using steam and hot water. The system of hot water generation consists of heat exchangers, pumps, pipelines, temperature and pressure regulators. Huge amount of heat and electricity was consumed by this system. The proposed steam mode allows to exclude from operation the hot water system for tyres production, transportation and vulcanization. Due to the project implementation the tyres curing process envisages tyre steaming both from the inside and outside;
- replacement of five present 18 НДС and 20 НДС pumping units with 400 kW engines by 1Д 1250/63 pumping units with 315 kW engines for reciprocal industrial water supply network at the Steam and Water Supply and Sewerage Shop (SWS&S Shop);
- replacement of present НЦ 400х200 (1 unit) and 3В 200 (2 units) pumping units with 400 kW and 320 kW engines by ЦНС-105 (2 units) pumping units for chemically purified water networks (CPW-20) at the Ventilation and Supply Lines Shop (V&SL Shop);
- replacement of insulation of Ду 325 mm steam supply pipeline under 20 atm. pressure from Bila Tserkva HPP by PAROC Wired Mat 65 insulation. Steam supply pipeline insulation replacement using up-to-date heat isolation materials allowed to vastly minimize heat loss during the transportation;
- replacement of eight KDA mark ring molding units by one LIBEPAL 610-10 model bead ring production line with 90 kW capacity produced by VIPO company;
- replacement of 3 present ІРУ-16 tread extruding units by one Triplex tread extruding unit with 900 kW capacity of Berstorff company production;

- modernization of compressor plant through the TK-250 compressor equipment replacement by SM 6000 one with 1500 kW capacity of Samsung company production (image of compressor plant is presented in Figure 5);
- reconstruction of steam supply system to the softening agent warehouse. New pipeline using up-to-date heat isolation materials was constructed within this project activity, this excluded irrational heat losses;
- installation of two PLT2 13-20" tyre assembling machines with 30 kW capacity produced by Harburg Freudenberg company (Germany) (image of tyre assembling machine is presented in Figure 6). Within the framework of this activity new more efficient tyre assembling machines were installed.

Reduction of GHG emissions is calculated based on the reduction of specific electricity and heat consumption per 1 tonne of rubber compounds processing as a result of the scheduled production modernization. Expected reduction of specific electricity consumption per 1 tonne of rubber compounds processing after the mentioned modernization activities implementation is 1.13 MW·hour per 1 tonne of processed rubber compounds. Expected reduction of specific heat consumption per 1 tonne of rubber compounds processing after the mentioned modernization activities implementation is 5.07 Gcal per 1 tonne of processed rubber compound. The estimated specific energy resources consumption reduction is calculated as difference between data on baseline specific consumption and actual data on specific consumption after modernization activities implementation.

Figure 3 – Waste heat utilization unit at the main production site

Figure 4 – KHP 46-150 curing presses

Figure 5 – Compressor station

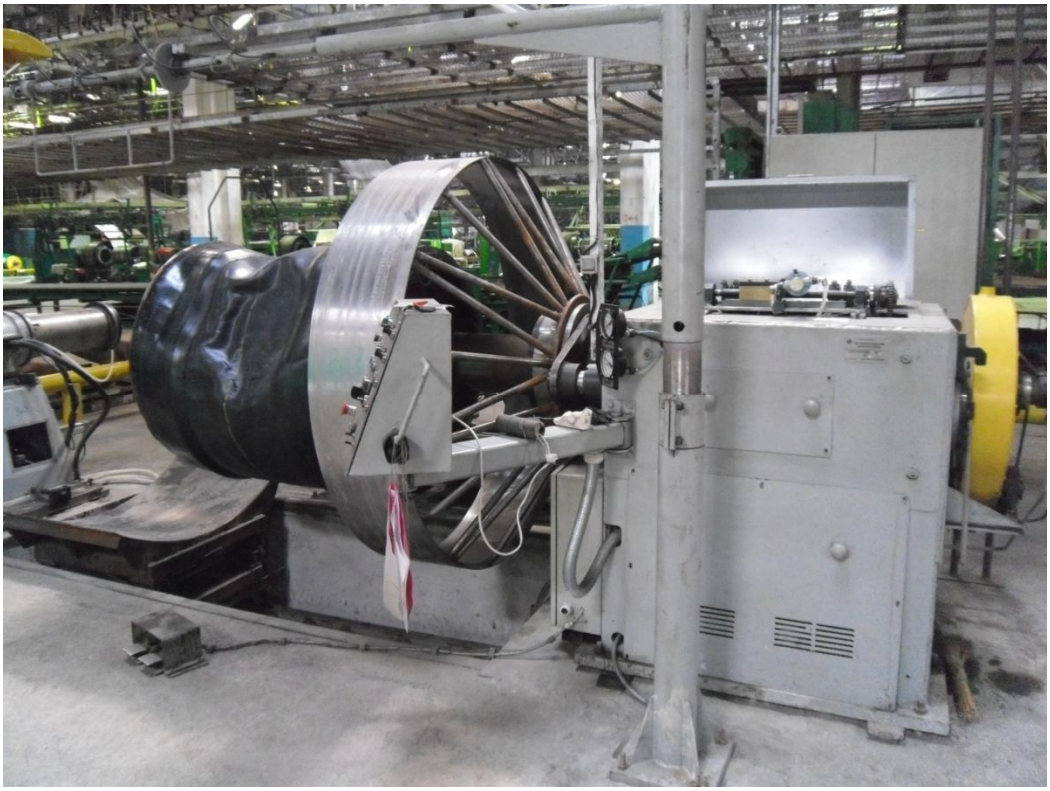

Figure 6 – PLT2 13-20” tyre assembling machine

The subproject implementation schedule is presented in the table below.

Stage	Start of work	End of work
1	2	3
Waste heat utilization for further consumption for main production site premises heating, and consumption by the technologies	10/02/2000	15/10/2003
Replacement of present 45c13нж and 45c16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company	29/06/2004	21/10/2009
Thyristor frequency transducers installation on power engineering equipment	13/01/2005	16/11/2010
Replacement of Chodos curing presses and 55” curing presses produced by Tambovpolimermash company by KHP 46-150 curing presses with 24 kW capacity of Harburg Freudenberg company (Germany) production	19/05/2008	10/02/2011
Implementation of tyres curing steam mode	15/08/2006	01/11/2010
Replacement of five present 18 НДС and 20 НДС pumping units with 400 kW engines by 1Д 1250/63 pumping units with 315 kW engines for reciprocal industrial water supply network at the Steam and Water Supply and Sewerage Shop (SWS&S Shop)	17/10/2007	19/11/2008

1	2	3
Replacement of present НЦ 400x200 (1 unit) and 3В 200 (2 units) pumping units with 400 kW and 320 kW engines by ЦНС-105 (2 units) pumping units for chemically purified water networks (CPW-20) at the Ventilation and Supply Lines Shop (V&SL Shop)	13/01/2006	12/09/2006
Replacement of insulation of Ду 325 mm steam supply pipeline under 20 atm. pressure from Bila Tserkva HPP by PAROC Wired Mat 65 insulation	21/08/2009	05/11/2009
Replacement of eight KDA mark ring molding units by one LIBEPAL 610-10 model bead ring production line with 90 kW capacity produced by VIPO company	19/05/2008	25/12/2008
Replacement of 3 present ІРУ-16 tread extruding units by one Triplex tread extruding unit with 900 kW capacity of Berstorff company production	25/04/2006	18/07/2006
Modernization of compressor plant through the ТК-250 compressor equipment replacement by SM 6000 one with 1500 kW capacity of Samsung company production	19/10/2007	08/07/2008
Reconstruction of steam supply system to the softening agent warehouse	05/02/2009	05/10/2009
Installation of two PLT2 13-20" tyre assembling machines with 30 kW capacity produced by Harburg Freudenberg company (Germany)	21/12/2010	31/03/2013

The expected reductions in specific electricity and heat consumption in rubber compounds processing under the project scenario in relation to the baseline scenario are presented in the schedules below. The data on specific electricity consumption are presented in figure 7 and the data on specific heat consumption are presented in figure 8.

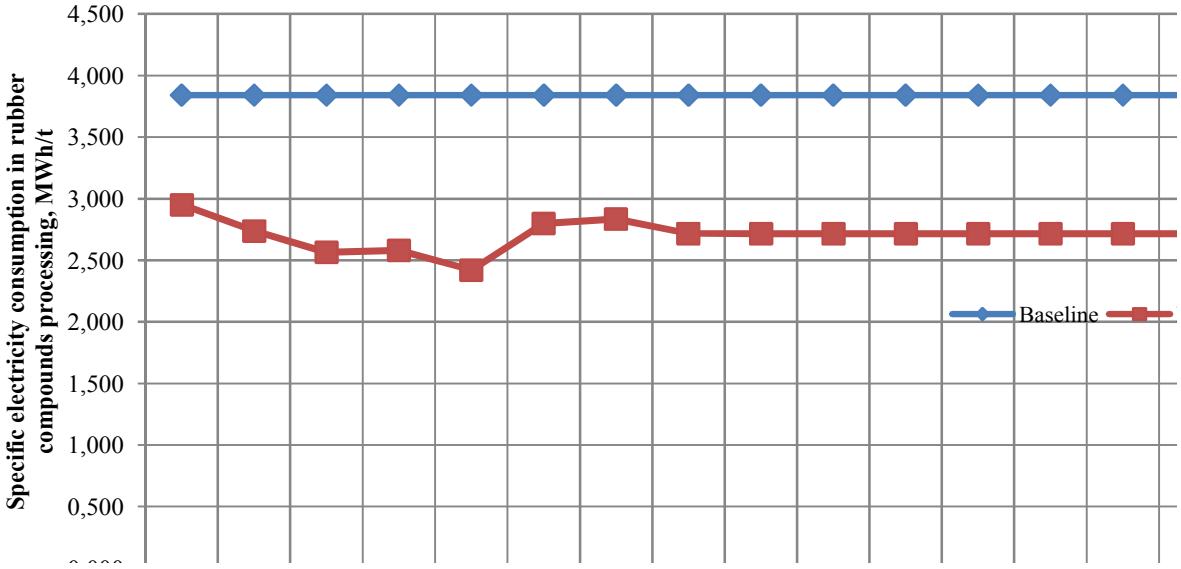

Figure 7 – Schedule of the expected reductions in specific electricity consumption in rubber compounds processing on the main production site

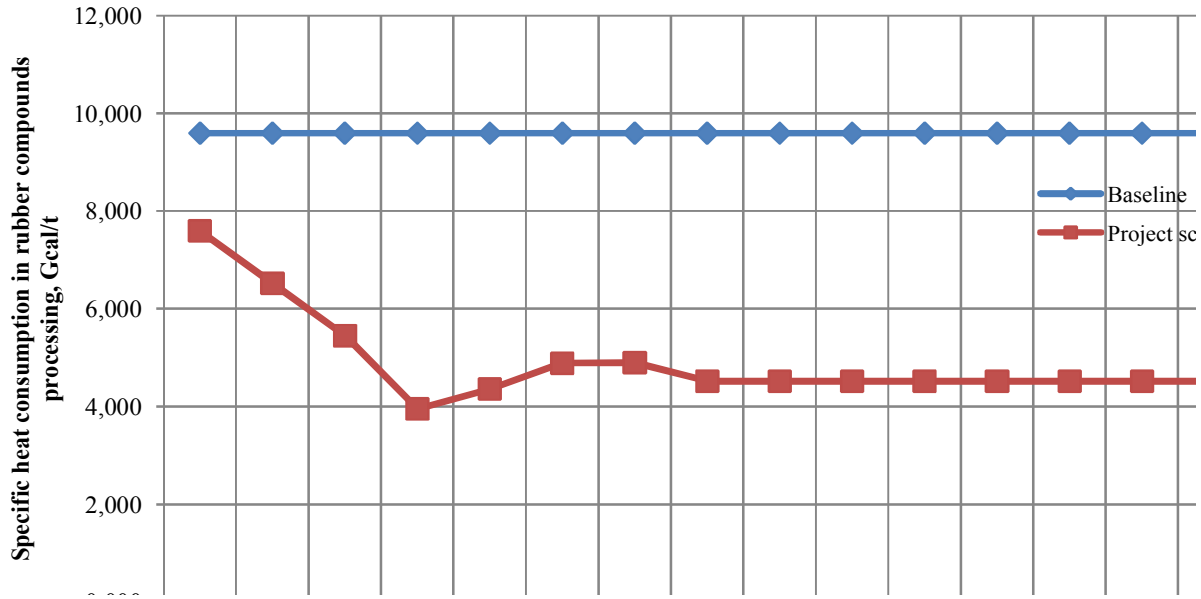

Figure 8 – Schedule of the expected reductions in specific heat consumption in rubber compounds processing on the main production site

2. Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production.

According to the technological scheme, heavy tyres production requires considerable amounts of electricity and heat.

The proposed subproject will allow to reduce the specific consumption of electricity and heat per tonne of processed rubber compounds through the performance of the following modernization activities:

- replacement of present 45с13нж and 45с16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company (image of condensate drain produced by Spirax Sarco company is presented in Figure 9). This activity envisages replacement of more than 150 condensate drains. Condensate drains replacement enhanced steam consumption efficiency;
- thyristor frequency transducers installation on power engineering equipment. Energy efficiency is achieved by installation on water supply pipelines pressure sensors that have feedback to thyristor frequency transducers. Pressure balancing in the system within the parameters set is achieved due to the automatic regulation of the engine rotation frequency, leading to reduction of electricity consumption;
- waste heat utilization for further consumption for heavy tyres production site premises heating, and consumption by the technologies (image of waste heat utilization unit is presented in Figure 10). A huge amount of low-grade energy which was previously released into the atmosphere is generated in the result of steam consumption by the process equipment. This activity envisages design and mounting of waste heat utilization system which includes installation of the relevant heat-exchange and pumping equipment;

- replacement of two present 300Д70 pumping units with 315 kW engines by two Д250x70 pumping units with 132 kW engines at the water supply facilities;
- change of the tyre tubes production technological process (tyres vulcanization without bond freezing). Before this project activity implementation the tyres vulcanization process included bond freezing. For this aim 2 refrigerating machines and 4 chemical pumps were used. Implementation of this activity allowed to avoid the usage of refrigerating machines and chemical pumps leading to electricity consumption reduction;
- installation of two СПР 2-815-1660 assembling workbenches with 12 kW capacity produced by Pavlograd Plant of Technological Equipment, Pavlograd city. Within the framework of this activity new more efficient assembling workbenches were installed.

Figure 9 – Condensate drain produced by Spirax Sarco company

Figure 10 – Waste heat utilization unit at the site of heavy tyres production

Reduction of GHG emissions is calculated based on the reduction of specific electricity and heat consumption per 1 tonne of rubber compounds processing as a result of the scheduled production modernization. Expected reduction of specific electricity consumption per 1 tonne of rubber compounds processing after the mentioned modernization activities implementation is 2.44 MW·hour per 1 tonne of processed rubber compounds. Expected reduction of specific heat consumption per 1 tonne of rubber compounds processing after the mentioned modernization activities implementation is 8.8 Gcal per 1 tonne of processed rubber compound. The estimated specific energy resources consumption reduction is calculated as difference between data on baseline specific consumption and actual data on specific consumption after modernization activities implementation.

The subproject implementation schedule is presented in the table below.

Stage	Start of work	End of work
1	2	3
Replacement of present 45с13нж and 45с16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company	06/02/2008	12/10/2009
Thyristor frequency transducers installation on power engineering equipment	23/01/2007	27/10/2010
Waste heat utilization for further consumption for heavy tyres production site premises heating, and consumption by the technologies	12/11/2007	17/12/2007

1	2	3
Replacement of two present 300Д70 pumping units with 315 kW engines by two Д250x70 pumping units with 132 kW engines at the water supply facilities	20/08/2009	21/10/2009
Change of the tyre tubes production technological process (tyres vulcanization without bond freezing)	16/08/2011	06/09/2012
Installation of two СПР 2-815-1660 assembling workbenches with 12 kW capacity produced by Pavlograd Plant of Technological Equipment, Pavlograd city	06/04/2011	30/12/2012

The expected reductions in specific electricity and heat consumption in rubber compounds processing under the project scenario in relation to the baseline scenario are presented in the schedules below. The data on specific electricity consumption are presented in figure 11 and the data on specific heat consumption are presented in figure 12.

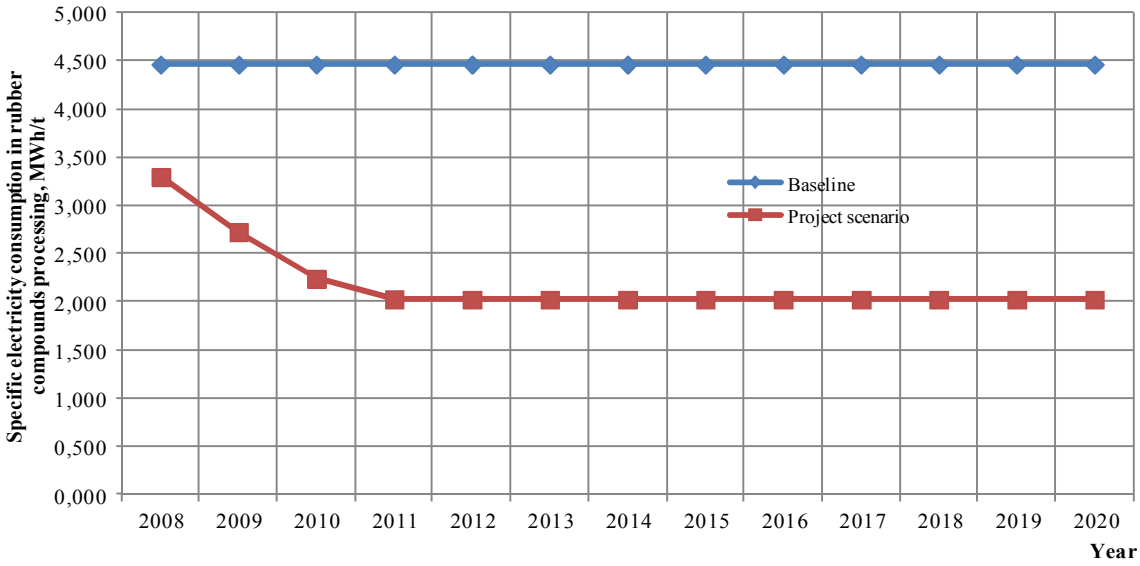

Figure 11 – Schedule of the expected reductions in specific electricity consumption in rubber compounds processing on the site of heavy tyres production

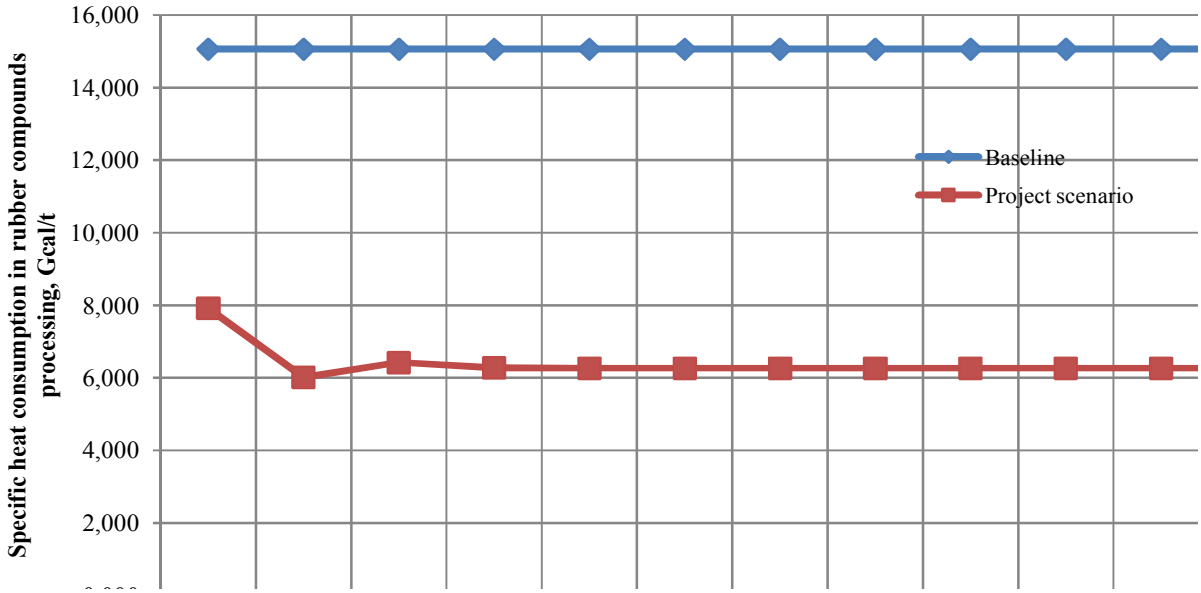

Figure 12 – Schedule of the expected reductions in specific heat consumption in rubber compounds processing on the site of heavy tyres production

The project envisages the implementation of new, technically complicated equipment, which demands high level of qualification from maintenance staff in order to reach the estimated energy efficiency figures.

Specialists both from leading world companies and Ukrainian enterprises were involved in consulting and development of the modernization projects.

To minimize potential problems related to the lack of experience, specialists of the company regularly take extension training courses, participate in industry seminars and conferences.

High level of qualification of PJSC "ROSAVA" personnel and the company management interest in the project implementation are the guarantee for successful implementation of the project.

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:

The main activity of PJSC "ROSAVA" is the production of rubber technical goods (automobile tyres). Large amount of electricity and heat is needed to suffice production needs of the enterprise. Electricity and heat consumption by the enterprise production equipment causes GHGs emission.

The emissions reduction will occur due to the implementation of 2 subprojects:

1. Implementation of energy efficiency measures and modernization of technological equipment on the main production site;

2. Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production.

The implementation of the proposed subprojects will allow to reduce specific electricity and heat consumption per tonne of processed rubber compounds. Emissions reduction will be achieved by the reduction of specific electricity and heat consumption per tonne of processed rubber compounds. Electricity and heat consumption reduction will lead to the reduction of fossil fuel used for electricity and heat generation and thus resulting in GHGs reduction at Ukrainian power engineering enterprises and plant boiler-house.

Environmental legislation is not yet perfect in Ukraine, so far it is not fully adapted to the current requirements of international environmental bodies and European Union standards. There is no targeted state policy in Ukraine requiring to reduce greenhouse gases emission.

Significant financial resources are required for implementation of all activities scheduled according to the project. Project-related costs are planned to be partly compensated at the expense of reduction in energy recourses and thus, leading to the decrease of production cost. However this mechanism of investments reimbursement does not allow to fulfill all the measures within the enterprise modernization project framework.

To implement the planned energy-saving measures in full, both own funds of the Company and credit resources are used. The latter source has been disadvantageous because of high interest rates. The possibility to attract investments using mechanism of joint implementation allows the Company management to perform measures which could not be implemented without funds that PJSC "ROSAVA" plans to receive from selling emission reduction units.

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

Beginning of crediting period starts in 2004. From the beginning of crediting period till the end of 2007, the assigned amount units (AAUs) will be generated.

	Years
Length of the crediting period	4
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2004	71 771
2005	105 703
2006	125 794
2007	141 211
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	444 479
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	111 120

The first commitment period under the Kyoto Protocol is from 2008 till 2012.

	Years
Length of the crediting period	5
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	164 822
2009	88 774
2010	95 522
2011	106 818
2012	139 347
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	595 283
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	119 057

In case of the first commitment period under the Kyoto Protocol extension, the crediting period may be extended till the end of project expected operational lifetime.

	Years
Length of the crediting period	8
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	153 187
2014	160 846
2015	168 889
2016	177 333
2017	186 201
2018	195 511
2019	205 285
2020	215 549
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1 462 801
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	182 850

A.5. Project approval by the Parties involved:

Project Idea Note for the potential joint implementation project, intending to obtain a letter of endorsement by the owner of the source, was sent to the State Environmental Investment Agency of Ukraine. The State Environmental Investment Agency of Ukraine issued for this purpose a Letter of Endorsement # 2689/23/7 dated 20/09/2012.

After the procedure of project determination the final version of documentation and the Determination Report will be submitted to the State Environmental Investment Agency of Ukraine in order to obtain the Letter of Approval.

SECTION B. Baseline

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

The baseline for this project was set in accordance with GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03)[2]. According to provisions of this document baseline scenario setting may be based on JI specific approach, applicable only to certain JI project, or on the standard approach, which applies methodologies approved by CDM Executive Board, including methodologies for small-scale projects.

The JI specific approach was chosen for setting the baseline for the proposed JI project. As per GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03) separate parts of different methodologies approved by the CDM Executive Board may be used for setting the baseline of the similar projects based on JI specific approach. According to the JI specific approach separate elements of methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality" (version 04.0.0)[3] were used for setting the baseline.

Baseline setting is based on identification of the most plausible among the alternative scenarios, that are able to secure output production quality, without reducing the volume of production, and meet the requirements of the Ukrainian effective legislation.

As per GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03) the following key factors were used for setting the baseline of the proposed project:

- sectoral policy and legislation (Some provisions of Ukrainian legislation concerning the part on pollutants emission were used (Law # 2707-XII dated 16/10/1992 of Ukraine "On environmental protection"[4]);
- economic situation in the relevant sector (high cost of works and equipment needed for full-scale upgrade of the enterprise);
- funds availability (JI project implementation envisages huge amount of investments and limits funds availability);
- availability of technologies (project envisages the installation of new technically complicated equipment which demands high level of qualification from maintenance staff in order to reach the estimated energy efficiency figures).

GHGs emission reduction is not obligatory according to the active legislation of Ukraine. Law # 2707-XII of Ukraine "On environmental protection" dated 16/10/1992 regulates the national policy of Ukraine on air pollution. This Law does not include any requirements concerning GHG emissions by the industry. Requirements concerning permissible air pollution are envisaged by the Order # 309 dated 27/06/2006 "On approving the maximum permissible dose of stationary sources pollutants"[5], issued by the Ministry of Environmental Protection of Ukraine.

[2] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v4.0.0.pdf
[4] http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=2707-12
[5] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0912-06

Baseline of this project was selected by following the steps:
1. Identification of plausible and efficient alternatives;
2. Elimination of alternatives that do not comply with active legislation and regulations;
3. Elimination of alternatives that include barriers for their achievement.

Step 1. Identification of plausible and efficient alternatives

To determine the baseline, two the most plausible alternatives were selected for the project activity.

Alternative 1.1	Continuation of current situation at the plant without energy efficiency improvement activities
Alternative 1.2	Project activities implementation without joint implementation mechanisms

1.1 Continuation of current situation at the plant without energy efficiency improvement activities

According to this alternative, the enterprise will not implement any modernization of enterprise production capacity and technological vehicles.

1.2 Project activities implementation without joint implementation mechanisms

This alternative envisages the implementation of all the modernization activities at the plant, without joint implementation mechanisms involvement.

Step 2. Elimination of alternatives that do not comply with active legislations and regulations

All the above mentioned alternatives comply with the active legislation and relevant regulations.

Step 3. Elimination of alternatives that include barriers for their achievement

Substep 3a. Financial barriers

Alternative 1.1 does not include significant financial issues, the plant does not require modernizations and may continue to purchase energy resource for production and heating needs of the plant.

Alternative 1.2 is not financially attractive without engaging the joint implementation mechanisms. Implementation of this alternative requires significant plant modernization and financial investments that are possible to obtain by initiating joint implementation project.

Substep 3b. Technological barriers

Alternative 1.1 does not include technological barriers, the plant does not require modernization and may continue to use its production facilities, following the corresponding operational instructions and planned maintenance and repair works.

Alternative 1.2 requires significant plant modernization. The project envisages the installation of new technically complicated equipment which demands high level of qualification from maintenance staff in order to reach the estimated energy efficiency figures.

Setting the baseline

After fulfilling the three steps, only one plausible scenario was chosen, i.e. continuation of current situation at the plant without energy efficiency improvement activities envisaged by the project (alternative 1.1), and thus, it is the baseline of the proposed joint implementation project. The alternative 1.2 was set aside at step 3, as there are too many barriers (technical and financial) for its implementation.

Baseline scenario for PJSC "ROSAVA" is to maintain present production equipment in proper working condition, whereas specific energy resources consumption remains at the same level as it used to be before project activity implementation. Hence no GHGs emission reduction is generated.

For setting the baseline of this project the conservative approach was taken into account while identifying the parameters used for baseline emissions calculation. All monitoring parameters and key factors used for the project were taken on the basis of conservativeness, i. e. using the minimal values of coefficients for calculation, if applicable. For baseline setting all possible emission sources were considered.

Uncertainty for this project involves measurement data uncertainty. Latter, on the other hand, is almost excluded since measurement equipment used for baseline parameters assessment is subject to periodic calibration. Measurements are cross-checked at the enterprise. The monthly data are analyzed on conformity to annual data. Hence uncertainty level may be neglected.

Detailed description of baseline emissions calculation is provided in the Section D.1.1.4 of this document.

Key parameters for baseline setting are defined in the tables below.

Data/Parameter	$EF_{co2,elec}$
Data unit	t $CO_{2\ e}$/MWh
Description	Indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	2004-2005 – "Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines" (Version 2.3)[6]; 2006-2007– Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5)[7]; 2008 – The order # 62 dated 15/04/2011, issued by the National Environmental Investment Agency of Ukraine[8]; 2009 – The order # 63 dated 15/04/2011, issued by the National Environmental Investment Agency of Ukraine[9]; 2010 –The order # 43 dated 28/03/2011, issued by the National Environmental Investment Agency of Ukraine[10]; 2011-2020 – The order # 75dated 12/05/2011, issued by the National Environmental Investment Agency of Ukraine[11]
Value of data applied (for ex ante calculations/determinations)	0.916 – year 2004; 0.896 – years 2005-2007; 1.082 – year 2008; 1.096 – year 2009; 1.093 – year 2010; 1.090 – years 2011-2020
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Studies to determine this factor for 2004-2005 were held by the Ministry of Economic Affairs of the Netherlands, for 2006-2007 were held by the Global Carbon B.V. company and determined by the TÜV SÜD company, the further research was held under the control of the National Environmental Investment Agency of Ukraine
QA/QC procedures (to be) Applied	-
Any comment	-

[6] ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/GuidVol1.doc
[7] http://ji.unfccc.int/UserManagement/FileStorage/46JW2KL36KM0GEMI0PHDTQF6DVI514
[8] http://www.neia.gov.ua/nature/doccatalog/document?id=127171
[9] http://www.neia.gov.ua/nature/doccatalog/document?id=127172
[10] http://www.neia.gov.ua/nature/doccatalog/document?id=126006
[11] http://www.neia.gov.ua/nature/doccatalog/document?id=127498

Data/Parameter	$SEC_{elec\ main\ site}$
Data unit	MWh/t
Description	Baseline specific electricity consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological production data on the main production site within 3 years before subproject activity implementation, i. e. from 2001 till 2003. Data source for this parameter is "Report on production and economic activity of the preparation shop" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	3.841
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) Applied	-
Any comment	-

Data/Parameter	$P_{main\ site,\ y}$
Data unit	tonne
Description	Project amount of processed rubber compounds on the main production site in a year *y*
Time of determination/monitoring	Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Report on production and economic activity of the preparation shop"
Value of data applied (for ex ante calculations/determinations)	The expected amount of processed rubber compounds is calculated based on the estimated production data of the enterprise

Year	tonne
2004	54394.200
2005	59980.076
2006	57448.875
2007	55368.644
2008	51761.821
2009	29745.513
2010	27973.752
2011	26171.738
2012	28860.700
2013	31693.900
2014	33278.600
2015	34942.500
2016	36689.600
2017	38524.100
2018	40450.300
2019	42472.800
2020	44596.400

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains
QA/QC procedures (to be) Applied	Checkweighing scales used for rubber compound weight control are subject to periodic calibration
Any comment	-

Data/Parameter	η
Data unit	std units
Description	Heat generation energy efficiency (CEE)
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" (version 01)[12], table 1
Value of data applied (for ex ante calculations/determinations)	0.92
Justification of the choice of data or description of measurement methods and procedures (to be) applied	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" is subject to periodic revision and submission of relevant corrective data
QA/QC procedures (to be) Applied	-
Any comment	-

Data/Parameter	$SEC_{heat\ main\ site}$
Data unit	Tcal/t
Description	Baseline specific heat consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological production data on the main production site within 3 years before subproject activity implementation, i. e. from 2001 till 2003. Data source for this parameter is "Report on production and economic activity of the preparation shop" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	0.009593
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) Applied	-
Any comment	-

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

Data/Parameter	$OXID_{NG}$
Data unit	std units
Description	Carbon oxidation factor during natural gas combustion
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"National inventory report of anthropogenic emissions by sources and removals by sinks of GHGs in Ukraine for 1990-2010"[13] (hereinafter – National Inventory Report of Ukraine), table П 2.30, table П 2.36, table П 2.42
Value of data applied (for ex ante calculations/determinations)	0.995
Justification of the choice of data or description of measurement methods and procedures (to be) applied	National Inventory Report of Ukraine is subject to periodic revision and submission of relevant corrective data
QA/QC procedures (to be) Applied	-
Any comment	-

[13] http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php

<table>
<tr><td>Data/Parameter</td><td>W_{NG}</td></tr>
<tr><td>Data unit</td><td>t C/TJ</td></tr>
<tr><td>Description</td><td>Carbon emission factor during natural gas combustion</td></tr>
<tr><td>Time of determination/monitoring</td><td>Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units</td></tr>
<tr><td>Source of data (to be) used</td><td>National Inventory Report of Ukraine, table П 2.8</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>
<table>
<tr><td>Year</td><td>t C/TJ</td></tr>
<tr><td>2004</td><td>15.18</td></tr>
<tr><td>2005</td><td>15.19</td></tr>
<tr><td>2006</td><td>15.22</td></tr>
<tr><td>2007</td><td>15.16</td></tr>
<tr><td>2008</td><td>15.17</td></tr>
<tr><td>2009</td><td>15.20</td></tr>
<tr><td>2010</td><td>15.17</td></tr>
<tr><td>2011</td><td>15.17</td></tr>
<tr><td>2012</td><td>15.17</td></tr>
<tr><td>2013</td><td>15.17</td></tr>
<tr><td>2014</td><td>15.17</td></tr>
<tr><td>2015</td><td>15.17</td></tr>
<tr><td>2016</td><td>15.17</td></tr>
<tr><td>2017</td><td>15.17</td></tr>
<tr><td>2018</td><td>15.17</td></tr>
<tr><td>2019</td><td>15.17</td></tr>
<tr><td>2020</td><td>15.17</td></tr>
</table>
</td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>National Inventory Report of Ukraine is subject to periodic revision and submission of relevant corrective data</td></tr>
<tr><td>QA/QC procedures (to be) Applied</td><td>-</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Data/Parameter	$SEC_{elec\ heavy\ tyres}$
Data unit	MWh/t
Description	Baseline specific electricity consumption in rubber compounds processing in heavy tyres production
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological data on heavy tyres production within 3 years before subproject activity implementation, i. e. from 2005 till 2007. Data source for this parameter is "Report on production and economic activity of the preparation shop at heavy tyres production site" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	4.466
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) Applied	-
Any comment	-

Data/Parameter	$P_{heavy\ tyres,\ y}$
Data unit	tonne
Description	Project amount of processed rubber compounds for the year *y* in heavy tyres production
Time of determination/monitoring	Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Report on production and economic activity of the preparation shop at heavy tyres production site"
Value of data applied (for ex ante calculations/determinations)	The expected amount of processed rubber compounds is calculated based on the estimated production data of the enterprise
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains
QA/QC procedures (to be) Applied	Checkweighing scales used for rubber compound weight control are subject to periodic calibration
Any comment	-

Year	tonne
2008	5 568.774
2009	4 653.580
2010	6 866.838
2011	8 491.125
2012	13 749.051
2013	15 131.708
2014	15 888.293
2015	16 682.708
2016	17 516.843
2017	18 392.685
2018	19 312.319
2019	20 277.935
2020	21 291.832

Data/Parameter	$SEC_{heat\ heavy\ tyres}$
Data unit	Tcal/t
Description	Baseline specific heat consumption in rubber compounds processing in heavy tyres production
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological data on heavy tyres production within 3 years before subproject activity implementation, i. e. from 2005 till 2007. Data source for this parameter is "Report on production and economic activity of the preparation shop at heavy tyres production site" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	0.015068
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) Applied	-
Any comment	-

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:

Emission sources within baseline and project scenarios are power engineering enterprises of Ukraine that produce electricity and heat for PJSC "ROSAVA" production and heating needs, and also plant boiler-house generating heat for heavy tyres production. Emissions reduction will be achieved by the reduction of specific electricity and heat consumption needed for production process. Electricity and heat consumption reduction will lead to the reduction of fossil fuel used for electricity and heat generation and thus resulting in GHGs emission reduction.

It is important to note that the implementation of measures mentioned above will allow to reduce greenhouse gas emissions into the atmosphere, that cannot be achieved without the project implementation. PJSC "ROSAVA" has no financial benefits from the reduction of greenhouse gases emission into the atmosphere. Therefore any reduction of harmful emissions to the atmosphere achieved within the joint implementation project will be additional.

The additionality of proposed joint implementation project was assessed according to the "Tool for the demonstration and assessment of additionality" (version 06.1.0)[14]. This tool presumes a step-by-step assessment of project additionality.

[14] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf

Step 1. Identification of alternatives to the project activity consistent with mandatory laws and regulations

Sub-step 1a. Define alternatives to the project activity:

As mentioned in section B.1, two more activities were determined besides the joint implementation project:
1 Continuation of current situation at the plant without energy efficiency improvement activities;
2 Project activities implementation without joint implementation mechanisms.

Outcome of Step 1a: the identified alternatives are realistic and credible.

Sub-step 1b. Consistency with mandatory laws and regulations:

GHGs emission reduction is not obligatory according to the active legislation of Ukraine. Law # 2707-XII of Ukraine "On environmental protection" dated 16/10/1992 regulates the national policy of Ukraine on air pollution. This Law does not include any requirements concerning GHG emissions by the industry. Requirements concerning permissible air pollution are envisaged by the Order # 309 dated 27/06/2006 "On approving the maximum permissible dose of stationary sources pollutants", issued by the Ministry of Environmental Protection of Ukraine.

Outcome of Step 1b: the alternatives mentioned above are in compliance with mandatory legislation and regulations.

Step 2.Investment analysis

Sub- step 2a. Determine appropriate analysis method.

"Tool for the demonstration and assessment of additionality" (version 06.1.0) provides three options of investment analysis:
Option I. Apply simple cost analysis;
Option II. Apply investment comparison analysis;
Option III. Apply benchmark analysis.

The proposed project gives also other advantages besides income from the realization of emission reduction units according to the joint implementation mechanism, so the option I is not applied for this project.

The baseline set "Continuation of current situation at the plant without energy efficiency improvement activities" does not involve any investments, so the option II is not applied for this project.

Regarding the abovementioned, the option III was chosen as appropriate.

Sub-step 2b.Option I. Apply simple cost analysis

Not applied.

Sub-step 2b. Option II. Apply investment comparison analysis

Not applied.

Sub-step 2b. Option III. Apply benchmark analysis.

For all modernization activities within the project activity, investments of 105.155 million Euros are necessary, including:

Stage	Cost million. EUR
1	2
Subproject "Implementation of energy efficiency measures and modernization of technological equipment on the main production site"	
Waste heat utilization for further consumption for main production site premises heating, and consumption by the technologies	2.071
Replacement of present 45с13нж and 45с16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company	0.579
Thyristor frequency transducers installation on power engineering equipment	0.642
Replacement of Chodos curing presses and 55" curing presses produced by Tambovpolimermash company by KHP 46-150 curing presses with 24 kW capacity of Harburg Freudenberg company production	44.266
Implementation of tyres curing steam mode	0.337
Replacement of five present 18 НДС and 20 НДС pumping units with 400 kW engines by 1Д 1250/63 pumping units with 315 kW engines for reciprocal industrial water supply network at the Steam and Water Supply and Sewerage Shop (SWS&S Shop)	0.372
Replacement of present НЦ 400x200 (1 unit) and 3В 200 (2 units) pumping units with 400 kW and 320 kW engines by ЦНС-105 (2 units) pumping units for chemically purified water networks (CPW-20) at the Ventilation and Supply Lines Shop (V&SL Shop)	0.263
Replacement of insulation of Ду 325 mm steam supply pipeline under 20 atm. pressure from Bila Tserkva HPP by PAROC Wired Mat 65 insulation	0.100
Replacement of eight KDA mark ring molding units by one LIBEPAL 610-10 model bead ring production line with 90 kW capacity produced by VIPO company	3.954
Replacement of 3 present ІРУ-16 tread extruding units by one Triplex tread extruding unit with 900 kW capacity of Berstorff company production	4.052
Modernization of compressor plant through the ТК-250 compressor equipment replacement by SM 6000 one with 1500 kW capacity of Samsung company production	44.121
Reconstruction of steam supply system to the softening agent warehouse	0.119
Installation of two PLT2 13-20" tyre assembling machines with 30 kW capacity produced by Harburg Freudenberg company (Germany)	1.925
Subproject "Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production"	
Replacement of present 45с13нж and 45с16нж condensate drains by TD42L and TD42H condensate drains produced by Spirax Sarco company	0.284
Thyristor frequency transducers installation on power engineering equipment	0.408

1	2
Waste heat utilization for further consumption for heavy tyres production site premises heating, and consumption by the technologies	0.846
Replacement of two present 300Д70 pumping units with 315 kW engines by two Д250x70 pumping units with 132 kW engines at the water supply facilities	0.144
Change of the tyre tubes production technological process (tyres vulcanization without bond freezing)	0.076
Installation of two СПР 2-815-1660 assembling workbenches with 12 kW capacity produced by Pavlograd Plant of Technological Equipment, Pavlograd city	0.597
Total	**105.155**

The implementation of all modernization activities will allow to reduce the consumption of following energy resources:
- electricity;
- heat.

Due to the project implementation the amount of electricity savings is estimated starting from 48 th. MWh per year at the first stages of project implementation up to 102 th. MWh per year after implementing all the enterprise modernization activities. According to the PJSC "ROSAVA" financial documents the electricity cost during the crediting period fluctuated from 24 to 70 EUR per MWh of electricity. The expected PJSC "ROSAVA" income from electricity savings will equal to 1.2 mln EUR per year at the first stages of project implementation up to 7 mln EUR per year after the enterprise modernization activities implementation.

Due to the project implementation the amount of heat savings is estimated starting from 110 Tcal per year at the first stages of project implementation up to 400 Tcal per year after implementing all the enterprise modernization activities. According to the PJSC "ROSAVA" financial documents the heat energy cost during the crediting period fluctuated from 11 to 54 EUR per Gcal of heat. The expected PJSC "ROSAVA" income from heat savings will equal to 1.2 mln EUR per year at the first stages of project implementation up to 22.5 mln EUR per year after the enterprise modernization activities implementation.

The herein costs, rates and investments are provided value added tax not included.

The value of the key parameter was selected in accordance with "Guidelines on the assessment of investment analysis" (Version 05)[15]. As per requirements of the mentioned document, weighted average cost of capital was calculated as weighted average cost of equity and debt. Cost of debt per the data of National Bank of Ukraine, as the annual average interest rate in foreign currency in the investment decision-making context is 10,7%[16]. According to the algorithm provided by the Guidelines, return on equity is equal to the sum of a risk free rate of return, an equity risk premium and a risk premium for the host country[17], later equals 14.75%. The key parameter is 12.725% respectively.

[15] http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf
[16] http://bank.gov.ua/files/4-Financial_markets(4.1).xls
[17] http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem06.xls

To estimate the future cost of energy resources an inflation forecast based on retrospective data of the past years was used. The model was calculated in Euro, hence the forecasted inflation rates based on the past years for Eurozone were used. Inflation rate for 2007 was 2,4%[18], hence future prices on energy resources are adjusted by 2,4% per year.

On the basis of data mentioned above the internal rate of return (IRR) for the project was calculated for expected crediting period. It made up 8.5%. So the project benchmark is lower than the benchmark chosen. It indicates that the project is not financially attractive.

For calculation of internal rate of return a return on equity was taken into account when developing a funds flow during the last project year.

Sub-step 2c.Calculation and comparison of financial indicators (only applicable to Options II and III)

Financial indicators, Net Present Value (NPV) and Internal Rate of Return (IRR), were calculated for two options: with and without joint implementation mechanism.

Calculated in sub-step 2b discount rate 12.725% was used for calculation. The financial indicators were calculated for the expected crediting period.

The expected income from emission reduction units sale with the year 2007 price of 10 euro per 1 tonne of CO_{2e} was calculated for financial indicators of project activities involving joint implementation mechanism advantages.

Simple pay-back period without involvement of joint implementation mechanisms is 17 years, with involvement – 16 years.

The calculations of NPV and IRR for both variants are provided in the table below.

	Without joint implementation mechanism involvement	With joint implementation mechanism involvement
NPV, million euro	-7.318	-1.188
IRR, %	8.5	12.0

As calculation shows, the project is not financially attractive without involvement of joint implementation mechanism, however its application makes the project more attractive for investment. So we can conclude that the project is additional.

[18] http://www.imf.org/external/pubs/ft/weo/2006/02/pdf/weo0906.pdf

Sub-step 2d. Sensitivity analysis (only applicable for Options II and III)

Profitability of the proposed project mainly depends on the cost of energy resources in Ukraine thus the sensitivity of the project basically depends on fluctuation of energy resources prices in Ukraine. For the project profitability without joint implementation mechanism involvement to reach the same level with JI mechanism involvement the cost of energy resources must increase greatly. But increase of energy resources cost is not profitable for the enterprise, because it will result in an increase of production cost. Possible increase of energy resources cost was considered in calculation of financial indicators.

Project sensitivity was estimated at range of ±10% of energy resources cost changes.

	-10%	0%	+10%
NPV, mln EUR	-10.007	-7.318	-4.629
IRR, %	6.9	8.5	10.1

As the estimation shows the project is not financially attractive even if the energy resources price increases in future. So we can conclude that the project is additional.

Outcome of Step 2: the proposed project activity is not financially attractive without involvement of JI mechanism though the latter makes it more economically attractive. Thus the project is additional.

Step 3. Barrier analysis

The investment analysis was used for additionality demonstration, so as per "Tool for the demonstration and assessment of additionality" (version 06.1.0) we proceed to the next step .

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed joint implementation project activity

There are no similar projects in Ukraine envisaging implementation of energy efficiency activities at the enterprises producing tyres.

Sub-step 4b. Discuss any similar projects that are occurring

Other similar projects are not being implemented.

Conclusion: the realization of the project will allow to reduce greenhouse gas emissions into the atmosphere, that cannot be achieved otherwise. Any reduction of harmful emissions into the atmosphere achieved within joint implementation project activity will be additional.

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

The project boundaries encompass emissions that refer to electricity and heat consumption in production process.

Geographical boundaries of the project encompass physical (geographic) location of the emissions source. Project boundaries coincide with physical boundaries of PJSC "ROSAVA" and power engineering enterprises that produce electricity and heat for PJSC "ROSAVA" production and heating needs. AES Kyivoblenergo PJSC is the supplier of electricity to PJSC "ROSAVA", Bilotserkivska TPP PJSC and plant boiler-house produce heat for heating needs of the enterprise. The project boundaries encompass the region where these enterprises are located.

Emission sources of the project within baseline and project scenarios are power engineering enterprises of Ukraine that produce electricity and heat for PJSC "ROSAVA" production and heating needs, and also plant boiler-house generating heat for heavy tyres production.

Emission sources of the project are production equipment and PJSC "ROSAVA" boiler-house, i.e. all emission sources are under the control of project participants and are significant.

Project and baseline emission sources within project boundary are provided in Figure 13.

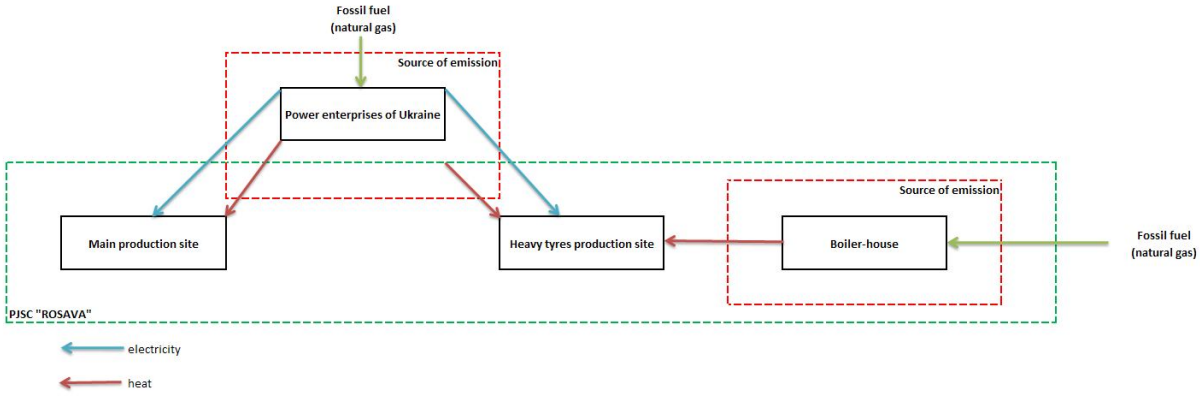

Figure 13 – Project boundary

GHG emissions are attributed to fossil fuel combustion for production needs of the enterprise. The main emissions caused by fossil fuel combustion are CO_2 emissions; CH_4 and N_2O emissions are insufficient and are not included.

	Source	Gas	Included?	Justification/Explanation
Baseline	Electricity and heat consumption to meet production and heating needs of the PJSC "ROSAVA"	CO_2	Yes	Main source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source
Project scenario	Electricity and heat consumption to meet production and heating needs of the PJSC "ROSAVA"	CO_2	Yes	Main source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source

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 baseline setting: 20/09/2012.

Persons setting the baseline:

Name of company:	"Climate Protection Bureau LLP" Company
Address:	Suite 2, 23-24 Great James Street
City:	London
Country:	UK
Contact person:	Viktor Khalabuzar
Position:	Managing Partner
Telephone:	+380 67 4090881
Fax:	+380 44 2941495
E-mail:	fin@climate-pb.com

"Climate Protection Bureau LLP" Company is not a project participant.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

Starting date of the joint implementation project is February 10, 2000.

C.2. Expected operational lifetime of the project:

Expected operational lifetime of the project is at least 17 years (204 months).

Operational lifetime of the project was set based on the operational lifetime of equipment used within the JI project.

C.3. Length of the crediting period:

17 (seventeen) years, which equals 204 (two hundred and four) months.

The crediting period starts on January 1, 2008.

During the period from 01 January 2004 till 31 December 2007 the assigned amount units (AAUs) will be generated, the duration of the period is 4 years (48 months).

Emission reduction units (ERU) are attributed to the first commitment period under Kyoto Protocol that is 5 years (60 months), from 01 January 2008 till 31 December 2012

In case of the first commitment period under the Kyoto Protocol extension (authorized by the Host country), the crediting period may be extended till the end of project expected operational lifetime.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The monitoring plan for this project was chosen according to the GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03). In accordance with the requirements of this document, the choice of the monitoring plan was based on the specific approach, applied only for this particular joint implementation project.

The monitoring plan set for this joint implementation project is aimed to ensure all data needed for the determination of baseline and project emissions, and correspondingly emissions reduction achieved due to this JI project activity. The information about this project is set above.

The JI specific approach was used for setting the monitoring plan, baseline and project emissions. Certain elements of the following methodologies were used within the JI specific approach:

- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01)[19] – concerning calculation of emissions caused by electricity consumption;
- ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (version 04.0.0) – concerning calculation of emissions caused by heat consumption.

The monitoring plan for the JI project envisages:

- collection and archiving of all relevant data needed for assessment and calculation of emissions from the sources within project during the crediting period;
- collection and archiving of all relevant data needed for identification of baseline emissions from within project during the crediting period;
- monitoring process quality control and assurance procedures;
- GHGs emission reduction periodic calculation procedure.

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

As per GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03) for baseline setting for this project the following key factors were used:

- sectoral policy and legislation (some provisions of Ukrainian legislation concerning calibration of measurement equipment were used (Law of Ukraine "On metrological activity" [20] # 113/98-BP dated 11/02/1998);
- availability of technologies (the project envisages the implementation of new, technically complicated equipment, which demands high level of qualification from maintenance staff in order to reach the estimated energy efficiency figures).

Measurement equipment used for data monitoring is included to the State Register of Measurement Equipment of Ukraine, and is subject to periodic examination and calibration.

Key parameters, which are not monitored during the whole crediting period, but defined only once and available already at the project design stage:

- baseline specific electricity consumption in rubber compounds processing on the main production site ($SEC_{elec\ main\ site}$);
- baseline specific heat consumption in rubber compounds processing on the main production site ($SEC_{heat\ main\ site}$);
- baseline specific electricity consumption in rubber compounds processing in heavy tyres production ($SEC_{elec\ heavy\ tyres}$);
- baseline specific heat consumption in rubber compounds processing in heavy tyres production ($SEC_{heat\ heavy\ tyres}$).

Key parameters that are monitored during the whole crediting period:

- project electricity consumption in rubber compounds processing on the main production site ($EC_{main\ site,\ PC}$);
- indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers ($EF_{co2,elec}$);
- project heat consumption in rubber compounds processing on the main production site ($HC_{main\ site,\ PC}$);
- heat generation energy efficiency (CEE) (η);
- carbon oxidation factor during natural gas combustion ($OXID_{NG}$);

[20] http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=113%2F98-%E2%F0

- carbon emission factor during natural gas combustion (W_{NG});
- project electricity consumption in rubber compounds processing in heavy tyres production ($EC_{heavy\ tyres,\ PC}$);
- project heat consumption in rubber compounds processing in heavy tyres production ($HC_{heavy\ tyres,\ PC}$);
- project amount of processed rubber compounds on the main production site in a year *y* ($P_{main\ site,\ y}$);
- the project amount of processed rubber compounds for the year *y* in heavy tyres production ($P_{heavy\ tyres,\ y}$).

The set monitoring plan excludes the possibility of not obtaining the monitoring data due to the back-up measuring equipment at the enterprise which meter the monitoring parameters.

The principle of conservativeness was used while setting the monitoring plan for identifying the parameters used for emissions calculation. As per GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03), if applicable, measurement data were used for calculation, in case of their absence the national data were used, otherwise data of methodologies approved by CDM Executive Board were used. While setting the monitoring plan all possible emission sources were considered.

Uncertainty for this project involves measurement data uncertainty. Latter, on the other hand, is almost excluded since measurement equipment used for baseline parameters assessment is subject to periodic calibration. Measurements are cross-checked at the enterprise. The monthly data are analyzed on conformity to annual data. Hence uncertainty level may be neglected.

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	2	3	4	5	6	7	8	9
1. $EC_{main\ site,\ PC}$	project electricity consumption in rubber compounds processing on the main production site	"Distribution of the received energy recourses"	MWh	m	monthly	1	Electronic/paper	Data is to be kept during the whole crediting period and for two years after the last transfer of ERUs for the project

1	2	3	4	5	6	7	8	9
2. $EF_{co2,elec}$	indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers	"Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines" (Version 2.3), Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5) and Orders of the National Environmental Investment Agency of Ukraine	t CO_{2eq}/MWh	e	annually	1	Electronic/paper	the same
3. $HC_{main\ site,\ PC}$	project heat consumption in rubber compounds processing on the main production site	"Distribution of the received energy recourses"	Tcal	m	monthly	1	Electronic/paper	the same

1	2	3	4	5	6	7	8	9
4. η	heat generation energy efficiency (CEE)	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" (version 01)	std units	e	annually	1	Electronic/paper	the same
5. $OXID_{NG}$	carbon oxidation factor during natural gas combustion, mass or volume unit	National Inventory Report of Ukraine	std units	e	annually	1	Electronic/paper	the same
6. W_{NG}	carbon emission factor during natural gas combustion	National Inventory Report of Ukraine	t C/ TJ	e	annually	1	Electronic/paper	the same
7. $EC_{heavy\ tyres,\ PC}$	project electricity consumption in rubber compounds processing in heavy tyres production	"Distribution of the received energy recourses"	MWh	m	monthly	1	Electronic/paper	the same

1	2	3	4	5	6	7	8	9
8. $HC_{heavy\ tyres,\ PC}$	project heat consumption in rubber compounds processing in heavy tyres production	"Distribution of the received energy recourses"	Tcal	m	monthly	1	Electronic/paper	the same

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

Project emissions are calculated as follows:

$$PE_y = PE_{main\ site,\ y} + PE_{heavy\ tyres,\ y}, \quad (1)$$

where
PE_y – total project emission level, t CO_{2e};
$PE_{main\ site,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing on the main production site, t CO_{2e};
$PE_{heavy\ tyres,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing in heavy tyres production, t CO_{2e}.

Emissions are calculated for each of the proposed subprojects separately:

1. Implementation of energy efficiency measures and modernization of technological equipment on the main production site – emissions calculation for this subproject concerning electricity consumption is based on the formulas defined in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01), and concerning heat consumption – approved consolidated methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (version 04.0.0).

The following formula is used to calculate project emission level for this subproject:

$$PE_{main\ site,\ y} = PE_{elec\ PC,\ main\ site,\ y} + PE_{heat\ PC,\ main\ site,\ y}, \quad (1.1)$$

where
$PE_{main\ site,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing on the main production site, t CO_{2e};
$PE_{elec\ PC,\ main\ site,\ y}$ – project emissions caused by electricity consumption in rubber compounds processing on the main production site, t CO_{2e};
$PE_{heat\ PC,\ main\ site,\ y}$ – project emissions caused by the heat energy consumption in rubber compounds processing on the main production site, t CO_{2e}.

$PE_{elec\ PC,\ main\ site,\ y}$ is calculated by the following formula:

$$PE_{elec\ PC,\ main\ site,\ y} = EC_{main\ site,\ PC} \cdot EF_{co2,\ elec}, \quad (1.1.1)$$

where
$PE_{elec\ PC,\ main\ site,\ y}$ – project emissions caused by electricity consumption in rubber compounds processing on the main production site, t CO_{2e};
$EC_{main\ site,\ PC}$ – project electricity consumption in rubber compounds processing on the main production site, MWh;
$EF_{co2,\ elec}$ – indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers, t CO_{2eq}/MWh.

$PE_{heat\ PC,\ main\ site,\ y}$ is calculated by the following formula:

$$PE_{heat\ PC,\ main\ site,\ y} = 4{,}1868 \cdot HC_{main\ site,\ PC} \cdot EF_{co2,\ NG}/\eta, \quad (1.1.2)$$

where
$PE_{heat\ PC,\ main\ site,\ y}$ – project emissions caused by the heat energy consumption in rubber compounds processing project scenario on the main production site, t CO_{2e};
$HC_{main\ site,\ PC}$ – project heat consumption in rubber compounds processing on the main production site, Tcal;

$EF_{co2, NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
η – heat generation energy efficiency (CEE);
4,1868 – conversion factor for Tcal to TJ.

$EF_{co2, NG}$ is calculated by the following formula:

$$EF_{co2, NG} = OXID_{NG} \cdot W_{NG} \cdot 44/12, \quad (1.1.2.1)$$

where
$EF_{co2, NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
$OXID_{NG}$ – carbon oxidation factor during natural gas combustion, mass or volume unit;
W_{NG} – carbon emission factor during natural gas combustion, t C/ TJ.
44/12 – stechiometric ratio between molecular weight of CO_2 and carbon, t CO_{2e}/t C.

2. Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production – emissions calculation for this subproject concerning electricity consumption is based on the formulas defined in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01), and concerning heat consumption – approved consolidated methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (version 04.0.0).

The following formula is used to calculate project emission level for this subproject:

$$PE_{heavy\ tyres, y} = PE_{elec\ PC, heavy\ tyres, y} + PE_{heat\ PC, heavy\ tyres, y}, \quad (1.2)$$

where:
$PE_{heavy\ tyres, y}$ – emissions caused by electricity and heat consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$PE_{elec\ PC, heavy\ tyres, y}$ – project emissions caused by electricity consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$PE_{heat\ PC, heavy\ tyres, y}$ – project emissions, caused by the heat energy consumption in rubber compounds processing in heavy tyres production, t CO_{2e}.

$PE_{elec\ PC,\ heavy\ tyres,\ y}$ is calculated by the following formula:

$$PE_{elec\ PC,\ heavy\ tyres,\ y} = EC_{heavy\ tyres,\ PC} \cdot EF_{co2,\ elec}, \quad (1.2.1)$$

where:
$PE_{elec\ PC,\ heavy\ tyres,\ y}$ – project emissions caused by electricity consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$EC_{heavy\ tyres,\ PC}$ – project electricity consumption in rubber compounds processing in heavy tyres production, MWh;
$EF_{co2,\ elec}$ – indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers, t CO_{2eq}/MWh.

$PE_{heat\ PC,\ heavy\ tyres,\ y}$ is calculated by the following formula:

$$PE_{heat\ PC,\ heavy\ tyres,\ y} = 4{,}1868 \cdot HC_{heavy\ tyres,\ PC} \cdot EF_{co2,\ NG}/\eta, \quad (1.2.2)$$

where:
$PE_{heat\ PC,\ heavy\ tyres,\ y}$ – project emissions, caused by the heat energy consumption in rubber compounds processing in heavy tyres production, t CO_{2e}.
$HC_{heavy\ tyres,\ PC}$ – project heat consumption in rubber compounds processing in heavy tyres production, Tcal;
$EF_{co2,\ NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
η – heat generation energy efficiency (CEE);
4,1868 – conversion factor for Tcal to TJ.

$EF_{co2, NG}$ is calculated by the following formula:

$$EF_{co2, NG} = OXID_{NG} \cdot W_{NG} \cdot 44/12, \quad (1.2.2.1)$$

where
$EF_{co2,NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
$OXID_{NG}$ – carbon oxidation factor during natural gas combustion, mass or volume unit;
W_{NG} – carbon emission factor during natural gas combustion, t C/TJ.
44/12 – stechiometric ratio between molecular weight of CO_2 and carbon, t CO_{2e}/t C.

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
1	2	3	4	5	6	7	8	9
1. $EF_{co2,elec}$	indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers	"Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines" (Version 2.3), Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5) and Orders of the National Environmental Investment Agency of Ukraine	t CO_{2eq}/MWh	e	annually	1	Electronic/paper	Data is to be kept during the whole crediting period and for two years after the last transfer of ERUs for the project

1	2	3	4	5	6	7	8	9
2. $SEC_{elec\ main\ site}$	baseline specific electricity consumption in rubber compounds processing on the main production site	fixed value based on the chronological data	MWh/t	c	fixed data	1	Electronic/paper	the same
3. $P_{main\ site,\ y}$	project amount of processed rubber compounds on the main production site in a year *y*	"Report on production and economic activity of the preparation shop"	t	c	monthly	1	Electronic/paper	the same
4. η	heat generation energy efficiency (CEE)	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" (version 01)	std units	e	annually	1	Electronic/paper	the same
5. $SEC_{heat\ main\ site}$	baseline specific heat consumption in rubber compounds processing on the main production site	fixed value based on the chronological data	Tcal/t	c	fixed data	1	Electronic/paper	the same

1	2	3	4	5	6	7	8	9
6. $OXID_{NG}$	carbon oxidation factor during natural gas combustion	National Inventory Report of Ukraine	std units	e	annually	1	Electronic/paper	the same
7. W_{NG}	carbon emission factor during natural gas combustion	National Inventory Report of Ukraine	t C/ TJ	e	annually	1	Electronic/paper	the same
8. $SEC_{elec\ heavy\ tyres}$	baseline specific electricity consumption in rubber compounds processing in heavy tyres production	fixed value based on the chronological data	MWh/t	c	fixed data	1	Electronic/paper	the same
9. $P_{heavy\ tyres,\ y}$	the project amount of processed rubber compounds for the year *y* in heavy tyres production	"Report on production and economic activity of the preparation shop at heavy tyres production site"	t	c	monthly	1	Electronic/paper	the same
10. $SEC_{heat\ heavy\ tyres}$	baseline specific heat consumption in rubber compounds processing in heavy tyres production	fixed value based on the chronological data	Tcal/t	c	fixed data	1	Electronic/paper	the same

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 are calculated by the following formula:

$$BE_y = BE_{main\ site,\ y} + BE_{heavy\ tyres,\ y}, \quad (2)$$

where:
BE_y – total baseline emissions leve, t CO_{2e};
$BE_{main\ site,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing on the main production site, t CO_{2e};
$BE_{heavy\ tyres,\ y}$ – emissions caused by electricity and heat consumption in heavy tyres production, t CO_{2e}.

Emissions are calculated separately for each proposed subproject:

1. Implementation of energy efficiency measures and modernization of technological equipment on the main production site – emissions calculation for this subproject concerning electricity consumption is based on the formulas defined in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01), and concerning heat consumption – approved consolidated methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (version 04.0.0).

The following formula is used to calculate baseline emissions level for this subproject:

$$BE_{main\ site,\ y} = BE_{elec\ BC,\ main\ site,\ y} + BE_{heat\ BC,\ main\ site,\ y}, \quad (2.1)$$

where:
$BE_{main\ site,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing on the main production site, t CO_{2e};
$BE_{elec\ BC,\ main\ site,\ y}$ – baseline emissions caused by electricity consumption in rubber compounds processing on the main production site, t CO_{2e};
$BE_{heat\ BC,\ main\ site,\ y}$ – baseline emissions caused by the heat energy consumption in rubber compounds processing on the main production site, t CO_{2e};

$BE_{elec\ BC,\ main\ site,\ y}$ is calculated by the following formula:

$$BE_{elec\ BC,\ main\ site,\ y} = EC_{main\ site,\ BC} \cdot EF_{co2,\ elec}, \quad (2.1.1)$$

where:
$BE_{elec\ BC,\ main\ site,\ y}$ – baseline emissions caused by electricity consumption in rubber compounds processing on the main production site, t CO_{2e};
$EC_{main\ site,\ BC}$ – baseline electricity consumption in rubber compounds processing on the main production site, MWh;
$EF_{co2,\ elec}$ – indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers, t CO_{2eq}/MWh

$EC_{main\ site,\ BC}$ is calculated by the following formula:

$$EC_{main\ site,\ BC} = SEC_{elec\ main\ site} \cdot P_{main\ site,\ y}, \quad (2.1.1.1)$$

where:
$EC_{main\ site,\ BC}$ – baseline electricity consumption in rubber compounds processing on the main production site, MWh;
$SEC_{elec\ main\ site}$ – baseline specific electricity consumption in rubber compounds processing on the main production site, MWh/t;
$P_{main\ site,\ y}$ – baseline amount of processed rubber compounds on the main production site in a year *y*, t.

$BE_{heat\ BC,\ main\ site,\ y}$ is calculated by the following formula:

$$BE_{heat\ BC,\ main\ site,\ y} = 4{,}1868 \cdot HC_{main\ site,\ BC} \cdot EF_{co2,\ NG}/\eta, \quad (2.1.2)$$

where:
$BE_{heat\ BC,\ main\ site,\ y}$ – baseline emissions caused by the heat energy consumption in rubber compounds processing on the main production site, t CO_{2e};
$HC_{main\ site,\ BC}$ – baseline heat consumption in rubber compounds processing on the main production site, Tcal;
$EF_{co2,\ NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;

η – heat generation energy efficiency (CEE);
4,1868 – conversion factor for Tcal to TJ.

$HC_{main\ site,\ BC}$ is calculated by the following formula:

$$HC_{main\ site,\ BC} = SEC_{heat\ main\ site} \cdot P_{main\ site,\ y}, \quad (2.1.2.1)$$

where:
$HC_{main\ site,\ BC}$ – baseline heat consumption in rubber compounds processing on the main production site, Tcal ;
$SEC_{heat\ main\ site}$ – baseline specific heat consumption in rubber compounds processing on the main production site, Tcal/t;
$P_{main\ site,\ y}$ – project amount of processed rubber compounds on the main production site in a year *y*, t.

$EF_{co2,\ NG}$ is calculated by the following formula:

$$EF_{co2,\ NG} = OXID_{NG} \cdot W_{NG} \cdot 44/12, \quad (2.1.2.2)$$

where:
$EF_{co2,NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
$OXID_{NG}$ – carbon oxidation factor during natural gas combustion, mass or volume unit;
W_{NG} – carbon emission factor during natural gas combustion, t C/TJ.
44/12 – stechiometric ratio between molecular weight of CO_2 and carbon, t CO_{2e}/t C.

2. Implementation of energy efficiency measures and modernization of technological equipment on the site of heavy tyres production – emissions calculation for this subproject concerning electricity consumption is based on the formulas defined in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01), and concerning heat consumption – approved consolidated methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (version 04.0.0).

The following formula is used to calculate baseline emissions level for this subproject:

$$BE_{heavy\ tyres,\ y} = BE_{elec\ BC,\ heavy\ tyres,\ y} + BE_{heat\ BC,\ heavy\ tyres,\ y}, \quad (2.2)$$

where:
$BE_{heavy\ tyres,\ y}$ – emissions caused by electricity and heat consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$BE_{elec\ BC,\ heavy\ tyres,\ y}$ – baseline emissions caused by electricity consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$BE_{heat\ BC,\ heavy\ tyres,\ y}$ – baseline emissions caused by the heat energy consumption in rubber compounds processing in heavy tyres production, t CO_{2e};

$BE_{elec\ BC,\ heavy\ tyres,\ y}$ is calculated by the following formula:

$$BE_{elec\ BC,\ heavy\ tyres,\ y} = EC_{heavy\ tyres,\ BC} \cdot EF_{co2,\ elec}, \quad (2.2.1)$$

where:
$BE_{elec\ BC,\ heavy\ tyres,\ y}$ – baseline emissions caused by electricity consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$EC_{heavy\ tyres,\ BC}$ – baseline electricity consumption in rubber compounds processing in heavy tyres production, MWh;
$EF_{co2,\ elec}$ – indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers, t CO_{2eq}/MWh.

$EC_{heavy\ tyres,\ BC}$ is calculated by the following formula:

$$EC_{heavy\ tyres,\ BC} = SEC_{elec\ heavy\ tyres} \cdot P_{heavy\ tyres,\ y}, \quad (2.2.1.1)$$

where:

$EC_{heavy\ tyres,\ BC}$ – baseline electricity consumption in rubber compounds processing in heavy tyres production, MWh;
$SEC_{elec\ heavy\ tyres}$ – baseline specific electricity consumption in rubber compounds processing in heavy tyres production, MWh/t;
$P_{heavy\ tyres,\ y}$ – the project amount of processed rubber compounds for the year *y* in heavy tyres production, t.

$BE_{heat\ BC,\ heavy\ tyres,\ y}$ is calculated by the following formula:

$$BE_{heat\ BC,\ heavy\ tyres,\ y} = 4{,}1868 \cdot HC_{heavy\ tyres,\ BC} \cdot EF_{co2,\ NG}/\eta, \quad (2.2.2)$$

where:

$BE_{heat\ BC,\ heavy\ tyres,\ y}$ – baseline emissions caused by the heat energy consumption in rubber compounds processing in heavy tyres production, t CO_{2e};
$HC_{heavy\ tyres,\ BC}$ – baseline heat consumption in rubber compounds processing in heavy tyres production, Tcal;
$EF_{co2,\ NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
η – heat generation energy efficiency (CEE);
4,1868 – conversion factor for Tcal to TJ.

$HC_{heavy\ tyres,\ BC}$ is calculated by the following formula:

$$HC_{heavy\ tyres,\ BC} = SEC_{heat\ heavy\ tyres} \cdot P_{heavy\ tyres,\ y}, \quad (2.2.2.1)$$

where:
$HC_{heavy\ tyres,\ BC}$ – baseline heat consumption in rubber compounds processing in heavy tyres production, Tcal;
$SEC_{heat\ heavy\ tyres}$ – baseline specific heat consumption in rubber compounds processing in heavy tyres production, Tcal/t;
$P_{heavy\ tyres,\ y}$ – the project amount of processed rubber compounds for the year *y* in heavy tyres production, t.

$EF_{co2,\ NG}$ is calculated by the following formula:

$$EF_{co2,\ NG} = OXID_{NG} \cdot W_{NG} \cdot 44/12, \quad (2.2.2.2)$$

where:
$EF_{co2,NG}$ – CO_2 emission factor from natural gas combustion, t CO_{2e}/TJ;
$OXID_{NG}$ – carbon oxidation factor during natural gas combustion, mass or volume unit;
W_{NG} – carbon emission factor during natural gas combustion, t C/TJ.
44/12 – stechiometric ratio between molecular weight of CO_2 and carbon, t CO_{2e}/t C.

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

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 indicating unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	Comment

Not applied to this project.

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 applied to this project.

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

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

It is not applicable for this project. Leakage is not envisaged by the project because project activity encompasses reduction of energy resources consumed within baseline.

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

Not applicable to this project.

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):

Annual emission reduction for the project will be calculated according to the following formula:

$$ER_y = BE_y – PE_y, \quad (3)$$

where:
ER_y – emission reductions per year *y* under the project activity, t CO_{2eq};
PE_y – emissions per year *y* within the project, t CO_{2eq};
BE_y – emissions per year *y* within the baseline, t $CO_{2eq;}$

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:

This project will allow to reduce energy resources consumption for PJSC "ROSAVA" production and heating needs, i.e. electricity and heat needed for production process. Electricity and heat consumption reduction for enterprise's production and heating needs will result in GHGs emission reduction. Therefore, general project impact on environment is positive. In the framework of procedures performed on demand of relevant state services, the enterprise reports periodically on environmental data. The enterprise reports on NO_x, SO_x and dust emissions.

In accordance with Order of the Ministry of Environmental Protection of Ukraine # 108 dated 09/03/2006[21], State Administration of Environmental Protection in Kyiv Region issued the permission for emission, after the volume of emissions was justified in accordance with guidelines approved by this order. Documents design, which justifies the volume of emissions are conducted by agencies, organizations and institutions authorized to design such documents and registered in corresponding inventory of the Ministry of Environmental Protection of Ukraine.

Relevant documentation and permissions on pollutants emission are archived and stored by the monitoring team of PJSC "ROSAVA".

[21] http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0341-06

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.
1	2	3
$EC_{main\ site,\ PC}$ (D.1.1.1 – 1)	Low	Project electricity consumption in rubber compounds processing on the main production site, estimated by on-site measuring with relevant measurement equipment. Measurement equipment applied for measuring of electric energy amount is subject to periodic checkup and calibration. The data are registered in the report "Distribution of the received energy recourses"
$EF_{co2,elec}$ (D.1.1.1 – 2, D.1.1.3 – 1)	Low	Indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers, determined according to data taken from "Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines" (Version 2.3), Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5) and relevant Orders of the National Environmental Investment Agency of Ukraine. Researches on this factor determination are held annually and registered by a relevant order
$HC_{main\ site,\ PC}$ (D.1.1.1 – 3)	Low	Project heat consumption in rubber compounds processing on the main production site, estimated by on-site measuring with relevant measurement equipment. Measurement equipment applied for measuring of heat energy amount is subject to periodic checkup and calibration. The data are registered in the report "Distribution of the received energy recourses"
η (D.1.1.1 – 4, D.1.1.3 – 4)	Low	Heat generation energy efficiency (CEE) is determined according to "Tool to determine the baseline efficiency of thermal or electric energy generation systems" (version 01), this document is subject to periodic revision and submission of relevant corrective data
$OXID_{NG}$ (D.1.1.1 – 5, D.1.1.3 – 6)	Low	Carbon oxidation factor during natural gas combustion is determined according to National Inventory Report of Ukraine, this document is subject to periodic revision and submission of relevant corrective data

1	2	3
W_{NG} (D.1.1.1 – 6, D.1.1.3 – 7)	низький	Carbon emission factor during natural gas combustion is determined according to National Inventory Report of Ukraine, this document is subject to periodic revision and submission of relevant corrective data
$EC_{heavy\ tyres,\ PC}$ (D.1.1.1 – 7)	низький	Project electricity consumption in rubber compounds processing in heavy tyres production, estimated by on-site measuring with relevant measurement equipment. Measurement equipment applied for measuring of electric energy amount is subject to periodic checkup and calibration. The data are registered in the report "Distribution of the received energy recourses"
$HC_{heavy\ tyres,\ PC}$ (D.1.1.1 – 8)	низький	Project heat consumption in rubber compounds processing in heavy tyres production, estimated by on-site measuring with relevant measurement equipment. Measurement equipment applied for measuring of heat energy amount is subject to periodic checkup and calibration. The data are registered in the report "Distribution of the received energy recourses"
$SEC_{elec\ main\ site}$ (D.1.1.3 – 2)	низький	Baseline specific electricity consumption in rubber compounds processing on the main production site is a fixed value and is based on the chronological data on production within 3 years before the subproject implementation
$P_{main\ site,\ y}$ (D.1.1.3 – 3)	низький	Project amount of processed rubber compounds on the main production site in a year *y* is calculated. Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains. Checkweighing scales used for rubber compound weight control are subject to periodic calibration. The data are registered in the "Report on production and economic activity of the preparation shop"
$SEC_{heat\ main\ site}$ (D.1.1.3 – 5)	низький	Baseline specific heat consumption in rubber compounds processing on the main production site is a fixed value and is based on the chronological data on production within 3 years before the subproject implementation
$SEC_{elec\ heavy\ tyres}$ (D.1.1.3 – 8)	низький	Baseline specific electricity consumption in rubber compounds processing in heavy tyres production is a fixed value and is based on the chronological data on production within 3 years before the subproject implementation

1	2	3
$P_{heavy\ tyres,\ y}$ (D.1.1.3 – 9)	низький	The project amount of processed rubber compounds for the year *y* in heavy tyres production is calculated. Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains. Checkweighing scales used for rubber compound weight control are subject to periodic calibration. The data are registered in the "Report on production and economic activity of the preparation shop at heavy tyres production site"
$SEC_{heat\ heavy\ tyres}$ (D.1.1.3 – 10)	низький	Baseline specific heat consumption in rubber compounds processing in heavy tyres production is a fixed value and is based on the chronological data on production within 3 years before the subproject implementation

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

The monitoring of data indicated in the previous section will be performed within the framework of general operation of the project on energy-saving measures at the PJSC "ROSAVA".

Process personnel read the monitored data which are subject to measuring from the relevant measurement equipment and make relevant notes in the technological registers. General data on energy resources consumption and amount of processed rubber compounds per month is provided in monthly reports according to the section D. 2 ("Distribution of the received energy recourses", "Report on production and economic activity of the preparation shop", "Report on production and economic activity of the preparation shop at heavy tyres production site"), which are the documents of official accounting. Monthly reports are archived in electronic and paper formats at monitoring team.

Location schemes of electricity and heat measurement units involved in the project are illustrated in the figures 14 and 15 accordingly.

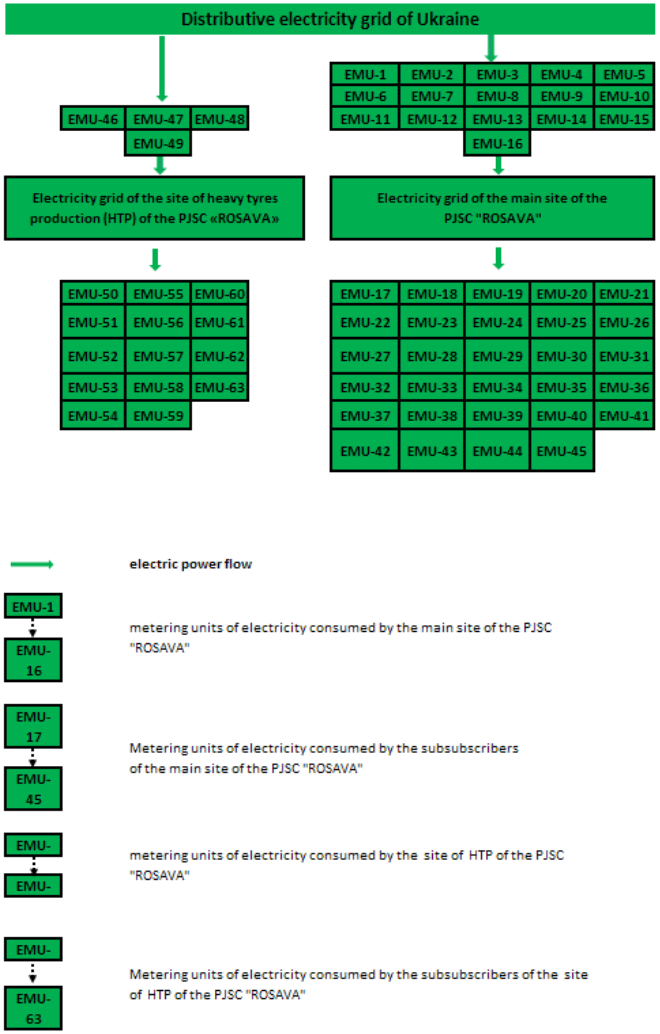

Figure 14 – Location scheme of electricity metering units (EMU) involved in the project

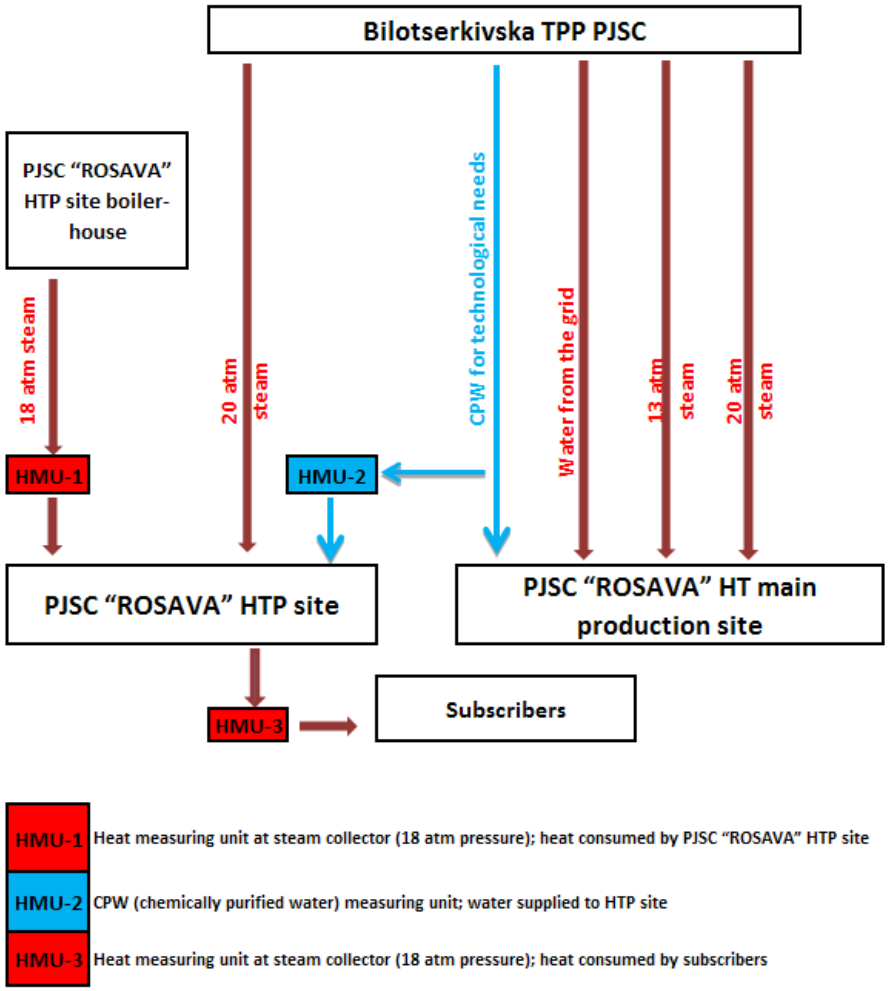

Figure 15 – Location scheme of heat measuring units (HMU) involved in the project.

The Chairman of the Board – General director of PJSC "ROSAVA" assigns staff to duties that include operation and maintenance of process equipment involved in the project. These functions include also recording of all data required for the monitoring. The monitoring team leader is the head of Heat Engineering Team of PJSC "ROSAVA" Power Engineering Department. Monitoring is to be performed in a close communication with process control staff, and will include monitoring itself, and also analysis and archiving of all data defined in the section above. Organizational activity on calculation of emission reductions will also be in scope of monitoring group activity. On manager's errand joint implementation project developer performs calculations of emission reductions. For proving the authenticity of periodic data on energy consumption, they will be analyzed according to relevant registered parameters, provided by process control staff. If discrepancies between data appear, their origin is to be defined in cooperation with process control staff. If inconsistency of data is discovered in monitoring, relevant corrections are to be done in monitoring of the relevant parameter.

All information on monitoring data and corrective actions is to be archived for further verification of emission reductions. Head of the team is responsible for the preparation and archiving of monitoring reports. The Chairman of the Board– General director occasionally analyses summarized monitoring data and relevant documentation. Developer of joint implementation project will assist in organization of monitoring if needed.

The PJSC "ROSAVA" chief metrologist is responsible for maintenance of measurement equipment in working condition and for their timely repair and calibration.

While main measuring equipment being repaired, monitoring data are taken by additional (back-up) measuring devices. The risk of needed for calculation monitoring data absence can be eliminated due to additional (back-up) measuring devices.

Scheme of monitoring data accumulation and archiving is illustrated in the Figure 16.

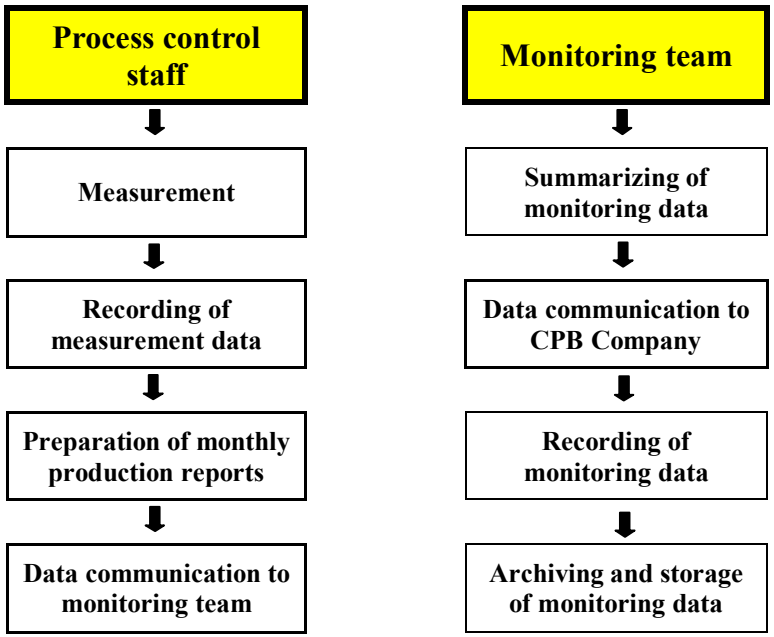

Figure 16 – The monitoring management structure

Scope of responsibilities of process control staff includes measurement and archiving of measurement results. Process control personnel communicates measurement results to monitoring team for them to arrange calculations of greenhouse gas emissions reduction. On errand of the head of monitoring team developer of joint implementation project performs calculations of greenhouse gas emissions reduction. The scope of responsibilities of monitoring team includes also collection of data that are not measured but have to be monitored. Monitoring team is obliged to ensure monitoring data backup, data should be stored in isolated place to avoid their loss in the case of force majeure, that can lead to the loss of key monitoring data.

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

Persons establishing the monitoring plan:

Name of company:	"Climate Protection Bureau LLP" Company
Address:	Suite 2, 23-24 Great James Street
City:	London
Country:	UK
Contact person:	Viktor Khalabuzar
Position:	Managing Partner
Telephone:	+380 67 4090881
Fax:	+380 44 2941495
E-mail:	fin@climate-pb.com

"Climate Protection Bureau LLP" Company is not a project participant.

SECTION E. Estimation of greenhouse gas emissions reduction

E.1. Estimated project emissions:

Project emissions are estimated according to the formula described in section D.1.1.2.

Year	Estimated project emissions ($t CO_{2e}$)
2004	251 120
2005	245 834
2006	211 183
2007	183 034
2008	223 408
2009	148 933
2010	149 087
2011	139 550
2012	170 325
2013	187 171
2014	196 530
2015	206 356
2016	216 674
2017	227 507
2018	238 882
2019	250 827
2020	263 368

E.2. Estimated leakage:

Not applied to this project.

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

The sum of E.1. and E.2. is equal to E.1.

E.4. Estimated baseline emissions:

Baseline emissions are estimated according to the formula described in section D.1.1.4.

Year	Estimated baseline emissions ($t CO_{2e}$)
1	2
2004	322 891
2005	351 537
2006	336 977
2007	324 245
2008	388 230
2009	237 707
2010	244 609
2011	246 368
2012	309 672

1	2
2013	340 358
2014	357 376
2015	375 245
2016	394 007
2017	413 708
2018	434 393
2019	456 112
2020	478 917

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

Year	Estimated emission reductions ($t CO_{2e}$)
2004	71 771
2005	105 703
2006	125 794
2007	141 211
2008	164 822
2009	88 774
2010	95 522
2011	106 818
2012	139 347
2013	153 187
2014	160 846
2015	168 889
2016	177 333
2017	186 201
2018	195 511
2019	205 285
2020	215 549

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

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2004	251 120	0	322 891	71 771
2005	245 834	0	351 537	105 703
2006	211 183	0	336 977	125 794
2007	183 034	0	324 245	141 211
2008	223 408	0	388 230	164 822
2009	148 933	0	237 707	88 774
2010	149 087	0	244 609	95 522
2011	139 550	0	246 368	106 818
2012	170 325	0	309 672	139 347
2013	187 171	0	340 358	153 187
2014	196 530	0	357 376	160 846
2015	206 356	0	375 245	168 889
2016	216 674	0	394 007	177 333
2017	227 507	0	413 708	186 201
2018	238 882	0	434 393	195 511
2019	250 827	0	456 112	205 285
2020	263 368	0	478 917	215 549
Total (tonnes of CO_2 equivalent)	3 509 789	0	6 012 352	2 502 563

SECTION F. Environmental impact

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:

The proposed JI project will have positive environmental impact due to the reduction of energy resources consumed for PJSC "ROSAVA" production and heating needs resulting in GHGs emission reduction.

The project implementation will result in emissions reduction, i. e.: reduction of electricity and heat specific consumption needed for rubber compounds processing. The reduction of the mentioned energy resources specific consumption will allow to decrease the amount of electricity and heat needed for goods manufacturing, leading to the reduction of fossil fuel amount consumed for electricity and heat generation by power engineering enterprises of Ukraine

Emissions reduction achieved due to this project implementation will have an impact on the environment of Ukraine but does not influence greenhouse gases emission abroad.

The enterprise periodically reports on ecological figures in the framework of procedures conducted on the relevant state services demand. According to the Order # 108 dated 09/03/2006 issued by the Ministry of Natural Resources of Ukraine the State Administration of Environmental Protection in Kyiv Region issued to the enterprise the permit on pollutant emissions after justifying the amount of pollutants estimated according to the instructions approved by this order.

The following permits on stationary sources air pollution were issued to PJSC "ROSAVA":
- # 3210300000-236 dated 20/09/2011;
- # 3210300000-237 dated 20/09/2011.

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:

The realization of this project has facilitated the reduction of pollutant emissions from stationary sources. According to the issued permits of the State Administration of Environmental Protection in Kyiv Region the environmental impact is not sufficient, but generally positive.

According to the requirements of the Ukrainian legislation in force, namely the law of Ukraine "On environmental protection" # 1264-XII dated 25/06/1991 [22] and ДБН А.2.2-1[23], the implementation of this project does not require environmental study and thereof environmental impact assessment.

[22] http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?page=1&nreg=1264-12
[23] ДБН А.2.2-1-2003 "Structure and contents of the environmental impact assessment (EIA) materials during design and construction of enterprises, buildings and facilities"

Project activity does not have any impact on environment. State Administration of Environmental Protection in Kyiv Region issued to the enterprise the following permits:

- permit # 267-17 dated 17/06/2011 on wastes allocation;
- permit # 201/17 dated 27/07/2011 on special water consumption;
- permit # 3210300000-236 dated 20/09/2011 on stationary sources air pollution;
- permit # 3210300000-237 dated 20/09/2011 on stationary sources air pollution.

SECTION G. Stakeholders' comments

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

The host Party does not require consultations with stakeholders for joint implementation projects.

Stakeholders' comments will be collected during publishing of the project within the determination procedure.

Annex 1

CONTACT INFORMATION ON THE PROJECT PARTICIPANTS

Organisation:	PJSC "ROSAVA" (Private Joint Stock Company "ROSAVA")
Street/P.O.Box:	Levanevskyi
Building:	91
City:	Bila Tserkva
State/Region:	Kyiv
Postal code:	09108
Country:	Ukraine
Phone:	+38 04563 37719
Fax:	+38 04563 74156
E-mail:	rosava@rosava.com
URL:	http://rosava.com/en/
Represented by:	
Title:	Power Engineering Department Heat Engineering Team
Salutation:	Mr.
Last name:	Chadiuk
Middle name:	Ivanovych
First name:	Mykola
Department:	Power Engineering Department Heat Engineering Team
Phone (direct):	+38 045 6337861
Fax (direct):	+38 045 6337861
Mobile:	+38 066 8777080
Personal e-mail:	mykola.chadyuk@rosava.com

Organisation:	"Climate Protection Bureau LLP" Company
Street/P.O.Box:	Suite 2, 23-24 Great James Street
Building:	
City:	London
State/Region:	
Postal code:	
Country:	UK
Phone:	+44 20 8144 1311
Fax:	
E-mail:	
URL:	www.climate-pb.com
Represented by:	
Title:	Managing Partner
Salutation:	Mr
Last name:	Khalabuzar
Middle name:	Valentinovitch
First name:	Viktor
Department:	
Phone (direct):	+38 067 4090881
Fax (direct):	+38 044 2941495
Mobile:	+38 067 4090881
Personal e-mail:	fin@climate-pb.com

Potential purchaser

Organisation:	CF Partners (Lithuania), UAB
Street/P.O.Box:	Jogailos
Building:	9
City:	Vilnius
State/Region:	Vilnius
Postal code:	LT-01116
Country:	Republic Lithuania
Phone:	
Fax:	
E-mail:	b.atanasov@cf-funds.com
URL:	
Represented by:	Bogomil Atanasov
Title:	General director
Salutation:	Mr
Last name:	Atanasov
Middle name:	
First name:	Bogomil
Department:	
Phone (direct):	+356 2777 2461
Fax (direct):	
Mobile:	
Personal e-mail:	

Annex 2

BASELINE INFORMATION

The baseline for this project was chosen according to the GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03), the choice of the baseline was established on the specific approach, applied only for this particular joint implementation project. The description and justification of the baseline scenario are provided in the section B.1 of this document.

The current situation at PJSC "ROSAVA" was taken as the baseline without any modernization activity according to the project.

CO_2 emissions are the main baseline emissions which are generated in the result of electricity and heat consumption for PJSC "ROSAVA" production and heating needs. Emissions are caused by burning fossil fuel for electricity and heat generation by power engineering enterprises of Ukraine.

Under the baseline chosen, emissions were calculated according to the formula, given in the section D.1.1.4 of this document.

Annex 3

MONITORING PLAN

The monitoring plan for this project was chosen according to the GUIDANCE ON CRITERIA FOR BASELINE SETTING AND MONITORING (version 03). The choice of the monitoring plan was based on the specific approach, applied only for this particular joint implementation project.

The monitoring plan is described in the section D of this document.

Data (parameters) that are subject to monitoring are given in the following tables.

Data/Parameter	$EC_{main\ site,\ PC}$
Data unit	MWh
Description	Project electricity consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Distribution of the received energy recourses"
Value of data applied (for ex ante calculations/determinations)	Expected amount of electricity is calculated according to estimated production data of the enterprise

Year	MWh
2004	160 457.565
2005	164 291.949
2006	147 333.235
2007	142 845.102
2008	125 332.751
2009	83 262.903
2010	79 270.827
2011	71 141.562
2012	78 356.800
2013	86 048.900
2014	90 351.400
2015	94 868.900
2016	99 612.300
2017	104 592.900
2018	109 822.600
2019	115 313.700
2020	121 079.200

Justification of the choice of data or description of measurement methods and procedures (to be) applied	Amount of electricity is measured by the relevant measurement equipment
QA/QC procedures (to be) applied	The measurement equipment used is subject to periodic calibration
Any comment	-

Data/Parameter	$EF_{co2,elec}$
Data unit	t $CO_{2\ e}$/MWh
Description	Indirect specific CO_2 emission factor for electricity consumption by the 1 class of consumers
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	2004-2005 –"Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 1: General guidelines" (Version 2.3); 2006-2007– Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5); 2008 – The order # 62 dated 15/04/2011, issued by the National Environmental Investment Agency of Ukraine; 2009 – The order # 63 dated 15/04/2011, issued by the National Environmental Investment Agency of Ukraine; 2010 –The order # 43 dated 28/03/2011, issued by the National Environmental Investment Agency of Ukraine; 2011-2020 – The order # 75dated 12/05/2011, issued by the National Environmental Investment Agency of Ukraine
Value of data applied (for ex ante calculations/determinations)	0.916 – year 2004; 0.896 – years 2005-2007; 1.082 – year 2008; 1.096 – year 2009; 1.093 – year 2010; 1.090 – 2011-2020
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Studies to determine this factor for 2004-2005 was held by the Ministry of Economic Affairs of the Netherlands, for 2006-2007 was held by the Global Carbon B.V. company and determined by the TÜV SÜD company, the further research was held under the control of the National Environmental Investment Agency of Ukraine
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter	$HC_{main\ site,\ PC}$
Data unit	Tcal
Description	Project heat consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Distribution of the received energy recourses"
Value of data applied (for ex ante calculations/determinations)	Estimated amount of heat energy is calculated on the basis of estimated data on plant production
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Amount of heat is measured by the relevant measurement equipment
QA/QC procedures (to be) applied	The measurement equipment used is subject to periodic calibration
Any comment	-

Year	Tcal
2004	413.202
2005	391.072
2006	313.307
2007	218.689
2008	225.612
2009	145.438
2010	137.093
2011	118.320
2012	130.450
2013	143.256
2014	150.419
2015	157.940
2016	165.837
2017	174.129
2018	182.835
2019	191.977
2020	201.576

Data/Parameter	η
Data unit	std units
Description	Heat generation energy efficiency (CEE)
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" (version 01), table 1
Value of data applied (for ex ante calculations/determinations)	0.92
Justification of the choice of data or description of measurement methods and procedures (to be) applied	"Tool to determine the baseline efficiency of thermal or electric energy generation systems" is subject to periodic revision and submission of relevant corrective data
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter	$OXID_{NG}$
Data unit	std units
Description	Carbon oxidation factor during natural gas combustion
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	National Inventory Report of Ukraine, table П 2.30, table П 2.36, table П 2.42
Value of data applied (for ex ante calculations/determinations)	0.995
Justification of the choice of data or description of measurement methods and procedures (to be) applied	National Inventory Report of Ukraine is subject to periodic revision and submission of relevant corrective data
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter	W_{NG}		
Data unit	t C/TJ		
Description	Carbon emission factor during natural gas combustion		
Time of determination/monitoring	Annually. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units		
Source of data (to be) used	National Inventory Report of Ukraine, table П 2.8		
Value of data applied (for ex ante calculations/determinations)		Year	t C/TJ
		2004	15.18
		2005	15.19
		2006	15.22
		2007	15.16
		2008	15.17
		2009	15.20
		2010	15.17
		2011	15.17
		2012	15.17
		2013	15.17
		2014	15.17
		2015	15.17
		2016	15.17
		2017	15.17
		2018	15.17
		2019	15.17
		2020	15.17
Justification of the choice of data or description of measurement methods and procedures (to be) applied	National Inventory Report of Ukraine is subject to periodic revision and submission of relevant corrective data		
QA/QC procedures (to be) applied	-		
Any comment	-		

<table>
<tr><td>Data/Parameter</td><td>$EC_{heavy\ tyres,\ PC}$</td></tr>
<tr><td>Data unit</td><td>MWh</td></tr>
<tr><td>Description</td><td>Project electricity consumption in rubber compounds processing in heavy tyres production</td></tr>
<tr><td>Time of determination/monitoring</td><td>Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units</td></tr>
<tr><td>Source of data (to be) used</td><td>“Distribution of the received energy recourses”</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>Estimated amount of electricity, calculated on the basis of estimated data on plant production

<table><tr><td>Year</td><td>MWh</td></tr><tr><td>2008</td><td>18 357,632</td></tr><tr><td>2009</td><td>12 694,358</td></tr><tr><td>2010</td><td>15 374,362</td></tr><tr><td>2011</td><td>17 236,429</td></tr><tr><td>2012</td><td>27 841,828</td></tr><tr><td>2013</td><td>30 641,709</td></tr><tr><td>2014</td><td>32 173,793</td></tr><tr><td>2015</td><td>33 782,484</td></tr><tr><td>2016</td><td>35 471,607</td></tr><tr><td>2017</td><td>37 245,187</td></tr><tr><td>2018</td><td>39 107,446</td></tr><tr><td>2019</td><td>41 062,818</td></tr><tr><td>2020</td><td>43 115,960</td></tr></table></td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>Amount of electricity is measured by the relevant measurement equipment</td></tr>
<tr><td>QA/QC procedures (to be) applied</td><td>The measurement equipment used is subject to periodic calibration</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Data/Parameter	$HC_{heavy\ tyres,\ PC}$
Data unit	Tcal
Description	Project heat consumption in rubber compounds processing in heavy tyres production
Time of determination/monitoring	Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	"Distribution of the received energy recourses"
Value of data applied (for ex ante calculations/determinations)	Estimated amount of heat energy, calculated on the basis of estimated data on plant production
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Amount of heat energy is measured by the relevant measurement equipment
QA/QC procedures (to be) applied	The measurement equipment used is subject to periodic calibration
Any comment	-

Year	Tcal
2008	44.110
2009	27.975
2010	44.112
2011	53.272
2012	86.206
2013	94.876
2014	99.620
2015	104.601
2016	109.831
2017	115.322
2018	121.088
2019	127.143
2020	133.500

Data/Parameter	$SEC_{elec\ main\ site}$
Data unit	MWh/t
Description	Baseline specific electricity consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological production data on the main production site within 3 years before subproject activity implementation, i. e. from 2001 till 2003. Data source for this parameter is "Report on production and economic activity of the preparation shop" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	3.841
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) applied	-
Any comment	-

<table>
<tr><td>Data/Parameter</td><td>$P_{main\ site,\ y}$</td></tr>
<tr><td>Data unit</td><td>tonne</td></tr>
<tr><td>Description</td><td>Project amount of processed rubber compounds on the main production site in a year y</td></tr>
<tr><td>Time of determination/monitoring</td><td>Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units</td></tr>
<tr><td>Source of data (to be) used</td><td>“Report on production and economic activity of the preparation shop”</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>The expected amount of processed rubber compounds is calculated based on the estimated production data of the enterprise
<table>
<tr><td>Year</td><td>tonne</td></tr>
<tr><td>2004</td><td>54394.200</td></tr>
<tr><td>2005</td><td>59980.076</td></tr>
<tr><td>2006</td><td>57448.875</td></tr>
<tr><td>2007</td><td>55368.644</td></tr>
<tr><td>2008</td><td>51761.821</td></tr>
<tr><td>2009</td><td>29745.513</td></tr>
<tr><td>2010</td><td>27973.752</td></tr>
<tr><td>2011</td><td>26171.738</td></tr>
<tr><td>2012</td><td>28860.700</td></tr>
<tr><td>2013</td><td>31693.900</td></tr>
<tr><td>2014</td><td>33278.600</td></tr>
<tr><td>2015</td><td>34942.500</td></tr>
<tr><td>2016</td><td>36689.600</td></tr>
<tr><td>2017</td><td>38524.100</td></tr>
<tr><td>2018</td><td>40450.300</td></tr>
<tr><td>2019</td><td>42472.800</td></tr>
<tr><td>2020</td><td>44596.400</td></tr>
</table></td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains</td></tr>
<tr><td>QA/QC procedures (to be) applied</td><td>Checkweighing scales used for rubber compound weight control are subject to periodic calibration</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Data/Parameter	$SEC_{heat\ main\ site}$
Data unit	Tcal/t
Description	Baseline specific heat consumption in rubber compounds processing on the main production site
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological production data on the main production site within 3 years before subproject activity implementation, i. e. from 2001 till 2003. Data source for this parameter is "Report on production and economic activity of the preparation shop" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	0.009593
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) applied	-
Any comment	-

Data/Parameter	$SEC_{elec\ heavy\ tyres}$
Data unit	MWh/t
Description	Baseline specific electricity consumption in rubber compounds processing in heavy tyres production
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological data on heavy tyres production within 3 years before subproject activity implementation, i. e. from 2005 till 2007. Data source for this parameter is "Report on production and economic activity of the preparation shop at heavy tyres production site" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	4.466
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) applied	-
Any comment	-

<table>
<tr><td>Data/Parameter</td><td>$P_{heavy\ tyres,\ y}$</td></tr>
<tr><td>Data unit</td><td>tonne</td></tr>
<tr><td>Description</td><td>Project amount of processed rubber compounds for the year y in heavy tyres production</td></tr>
<tr><td>Time of determination/monitoring</td><td>Monthly. Data must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units</td></tr>
<tr><td>Source of data (to be) used</td><td>“Report on production and economic activity of the preparation shop at heavy tyres production site”</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>The expected amount of processed rubber compounds is calculated based on the estimated production data of the enterprise
<table><tr><td>Year</td><td>ton</td></tr><tr><td>2008</td><td>5 568.774</td></tr><tr><td>2009</td><td>4 653.580</td></tr><tr><td>2010</td><td>6 866.838</td></tr><tr><td>2011</td><td>8 491.125</td></tr><tr><td>2012</td><td>13 749.051</td></tr><tr><td>2013</td><td>15 131.708</td></tr><tr><td>2014</td><td>15 888.293</td></tr><tr><td>2015</td><td>16 682.708</td></tr><tr><td>2016</td><td>17 516.843</td></tr><tr><td>2017</td><td>18 392.685</td></tr><tr><td>2018</td><td>19 312.319</td></tr><tr><td>2019</td><td>20 277.935</td></tr><tr><td>2020</td><td>21 291.832</td></tr></table></td></tr>
<tr><td>Justification of the choice of data or description of measurement methods and procedures (to be) applied</td><td>Amount of processed rubber compounds for a certain period is calculated based on the amount of fillings (measuring containers in which rubber compound according to the relevant formulation is prepared) filled within the period. Checkweighing scales control the rubber compound weight that one filling contains</td></tr>
<tr><td>QA/QC procedures (to be) applied</td><td>Checkweighing scales used for rubber compound weight control are subject to periodic calibration</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Data/Parameter	$SEC_{heat\ heavy\ tyres}$
Data unit	Gcal/t
Description	Baseline specific heat consumption in rubber compounds processing in heavy tyres production
Time of determination/monitoring	Fixed data. They must be stored during the whole crediting period and 2 years after the last transfer of emission reduction units
Source of data (to be) used	The fixed value for this parameter is based on the chronological data on heavy tyres production within 3 years before subproject activity implementation, i. e. from 2005 till 2007. Data source for this parameter is "Report on production and economic activity of the preparation shop at heavy tyres production site" (data on the amount of processed rubber compounds) and "Distribution of the received energy recourses" (data on electricity consumption needed for rubber compounds processing)
Value of data applied (for ex ante calculations/determinations)	0.015068
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Fixed data
QA/QC procedures (to be) applied	-
Any comment	-