



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

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**SECTION A. General description of the project****A.1. Title of the project:**

Reduction of Process Losses in Power Lines Zakarpattyaoblenergo PJSC.

Sector: (2) Power distribution.

Version 4.0.

Date of the document: 04/05/2012.

**A.2. Description of the project:**

**The main purpose** of the Joint Implementation project “Reduction of Process Losses in Power Lines Zakarpattyaoblenergo PJSC” is the realization of the technical reconstruction of power grid and equipment program, implementation of the advanced technologies, improvement of organizational structure, transition to a higher level of organization of transmission and distribution of electric energy.

Implementation of the measures under the Project will allow for improvement of the reliability and effectiveness of the electric power distributive network in Uzhgorod city and Zakarpattya region, as well as enhancing the quality of consumer service. Furthermore, realization of the measures envisaged by the Project will help to reduce the amount of power losses at Zakarpattyaoblenergo PJSC power distribution and transmission grids. Therefore in its turn it will enable to reduce the amount of power generated and, consequently, the respective emissions of greenhouse gases into the atmosphere.

**Situation at the beginning of the project activity**

Public Joint Stock Company Zakarpattyaoblenergo (Zakarpattyaoblenergo PJSC) is an integral part of the Unified Energy System (UES) of Ukraine, which ensures continuous and reliable electric energy supply to the consumers from Zakarpattya region under the regulated tariffs.

At the beginning of the project, (in 2002) Zakarpattyaoblenergo PJSC has been carrying out only the measures aimed at the maintaining of power grid in good working order. Generally, these measures included repair works on eliminations of breakdowns occurring during the operation of power grid. That resulted in 30.58% power losses at Zakarpattyaoblenergo PJSC grids out of the total amount of the power transmitted to the network as of 2002.

Most of the equipment that has been in operation in the grids of Zakarpattyaoblenergo PJSC at that time was already physically obsolete, but because of the insufficient financing and operating reserves of existing equipment, it could be operated further. Besides, changing of the existing situation could be possible not only in the case of engineering networks modification, but also through the improvement of Company’s organizational structure, which also required additional financing and human resources.

Possibility of selling emission reduction units became one of the key factors to start the realization of the program aimed at the reduction of power losses in the Zakarpattyaoblenergo PJSC power grid.

**Project scenario**

Joint Implementation project is based on the implementation of “Reduction of Process Losses in Power Lines Zakarpattyaoblenergo PJSC” Program, introduced and financed since 2003, which includes a set of measures aimed at the preventing of excess power losses.



Measures taken within this Program (see Section A.4.2 below), as well as implementation and performance of regular monitoring of possible sources of power losses and their prevention, let Zakarpattyaoblenergo PJSC reduce losses in the grid up to 20.23% out of the total amount of electric energy, that had come into the company's distributive network.

### Baseline scenario

Baseline scenario assumes further use of existing equipment along with performing of routine maintenance and repair works without significant investment. Justification of baseline scenario is provided in Section B.

### History of a project

01/07/2003 – “Zakarpattyaoblenergo PJSC Executive Board Resolution on the development and implementation of the TPL Reduction Program” (Protocol 14). This date is considered to be the date of qualifying this project as JI Project.

January 2003 - start of the works on the program of TPL reduction in the power grid of Zakarpattyaoblenergo PJSC.

24/02/2011 - signing of a contract for PDD preparation.

### Benefits of the project

Besides the reduction of greenhouse gas emissions, implementation of “Reduction of Process Losses in Power Lines Zakarpattyaoblenergo PJSC” Program under the project has the following benefits:

- Increase of employment opportunities in relation to the introduction of new equipment into service, construction and renovation of enterprise's facilities;
- Reduction of hazardous pollutants emissions due to the electric energy generation cut down as a result of electric power losses reduction in the grid;
- Production cost reduction.

Realization of Joint Implementation project will ensure the greenhouse gas emissions reduction by cutting back on electric power generation supplied to the Zakarpattyaoblenergo PJSC networks. In such a way, project realization will result in the greenhouses gas emissions reduction and prevention of their further atmospheric concentration, which, in its turn, will speed down climate changes.

### A.3. Project participants:

<u>Party involved</u>	<u>Legal entity project participant</u> (as applicable)	Please indicate if the <u>Party involved</u> wishes to be considered as <u>project participant</u> (Yes/No)
Ukraine (Host Party)	Zakarpattyaoblenergo PJSC	No
Switzerland	Carbon Management Company GmbH	No

**Public Joint Stock Company Zakarpattyaoblenergo power distribution company** (Zakarpattyaoblenergo PJSC, ERDPOU code 00131529), is an integral part of the Unified Energy System (UES) of Ukraine, which ensures continuous and reliable electric energy supply to the consumers from Zakarpattya region under the regulated tariffs.

Production activity after Classification of economic activities (KVED in Ukrainian transcription):

- 40.11.0 Power generation;

- 40.13.0 Power distribution and supply;
- 40.30.0 Supply of steam and hot water.

**Carbon Management Company GmbH (Carbon Management Company)** was established in Switzerland to provide complete package of services related to JI mechanism starting from carbon audit of the possible project and finishing by provision of the brokerage services on emission reduction units. Carbon Management Company is a potential buyer of emissions reduction units generated under current project.

**A.4. Technical description of the project:****A.4.1. Location of the project:**

The project is being implemented at the site of Zakarpattyaoblenergo PJSC situated in Uzhgorod and Zakarpattya region, in the west of Ukraine. Area of the region is 12.777 mil sq. km. Population – 1.244 mil people (as of January 1, 2010).

**A.4.1.1. Host Party(ies):**

Ukraine

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

Zakarpattya region

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

Uzhgorod

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

Figure 1. Location of Zakarpattya region (•) on the map of Ukraine



Figure 2. Uzhgorod city (•) on the map of Ukraine

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

«Reduction of Process Losses in Power Lines Zakarpattiaoblenergo PJSC» project consist of the implementation of the investment program (TPL program), aimed at reduction of technological power losses in the Zakarpattiaoblenergo PJSC power grid. This involves a set of measures and actions aiming at reduction of extraordinary power consumption.

Technological Power Losses reduction in the Zakarpattiaoblenergo PJSC electricity grid investment program includes:

- providing of technical support to increase the operating lifetime of working equipment over the estimated one, installation of system for equipment diagnostics and its residual operating time forecast;
- implementation of organizational and technical measures for technological power losses reduction;
- reconstruction and renovation of power grids and replacement of outdated equipment;
- attraction of investments for the development and achievement of high technical and economical level of the Company;
- increase of power supply reliability level for consumers of the region;
- installation of automatic system for commercial accounting of power consumption (ASCAPS) across the territory of power supply company, consumers and substations;
- realization of complex technical power losses reduction Program;



- modernization of working equipment within the framework of power grids development investment programs.

The Project envisages the development of TPL control system (*energy rating, energy audit and energy management*) in the Company in order to implement a number of organizational and technical measures, as well as measures aimed at development and improvement of methodological support for TPL reduction during realization of licensable types of activity in terms of power distribution and supply, namely:

## **1. For processes of power transmission:**

### **1.1. Organizational measures of methodological support.**

- 1.1.1. External audit and organization of regular internal audit of power transmission (power grid systems, power accounting and power current and electric energy balances control).
- 1.1.2. Creation of a technical database (a list and specifications of all components and charts of normal operation modes) of the Company's power grid conforming to annual and monthly operation reports.
- 1.1.3. Implementation of a software system of feeder-wise (component-wise) calculation and analysis, and optimization of TPL in 110-35 and 10-6-0.38 kV grid components for localization of inadmissible TPL.
- 1.1.4. Development of a planning, organization and control (monitoring) system to precede organizational and technical activities aimed at reduction of TPL during power supply process.
- 1.1.5. Setting up and operation of a separate departments within the Company which would specialize in carrying out the work related to the control and implementation of measures directed at the reduction of TPL while power transmission processes (energy audit and accounting department, measuring laboratory, etc.).
- 1.1.6. The introduction of institutional mechanisms of collective and personal responsibility of the Company's employees for the reduction of TPL in the company's grid on the objective basis.
- 1.1.7. The introduction of motivation mechanisms for economic and moral stimulation of the Company's employees to perform tasks on reduction of the technical component of TPL.
- 1.1.8. Other actions aimed at improvement of TPL control while power transmission processes.

### **1.2. Organizational and technical measures:**

- 1.2.1. Switching off the transformers during low load operation mode for PS-110/35/10 kV and TP/RP-10/6 0.4 kV substations.
- 1.2.2. Switching off the transformers at PS-110/35/10 kV and TP/RP-10/6 0.4 kV substations with seasonally changing load.
- 1.2.3. Regular monitoring and phase load balancing in 0.38 kV power grids.
- 1.2.4. Modernization of engineering software tools of real-time operations control automatization – operative-information complex (OIC), telemetry link measurement system, t remote signal system in the Company's control centre – in 110-35 and 10-6- 0.38 kV power grids.
- 1.2.5. Optimization of power grid normal operation modes.
- 1.2.6. Reduction of inefficient distribution and supply system operation time by reducing the duration of maintenance and repair works.
- 1.2.7. Reduction of power consumption to the Company's departments needs.
- 1.2.8. Reduction of power consumption to the needs of PS-110/35 kV and TP/RP-10/6 0.38 kV.
- 1.2.9. Other actions aimed at reduction of TPL while power transmission processes.



### **1.3. Technical measures:**

- 1.3.1. Wire replacement on overloaded power lines PL-110-35 kV and PL-10-6-0.38 kV.
- 1.3.2. Replacement of over- and underloaded 110/35/10 kV and 10/6/0.38 kV transformers.
- 1.3.3. Installation of new transformers at the working PS 110/35 kV and TP-RP 10/6/0.38 kV.
- 1.3.4. Replacement of 110/35/10 kV and 10/6/0.38 kV obsolete transformers with high losses.
- 1.3.5. Optimization of 110-35 kV and 10/6/0.38 kV power grid loading within reconstruction.
- 1.3.6. Reconstruction and disaggregating of PL-110/35 kV and PL 10-0.38 kV;
- 1.3.7. Cleaning of PL-110/35 kV and PL 10/6/0.38 kV path flow.
- 1.3.8. Replacement of wiring at PL-110/35 kV and PL 10/6/0.38 kV.
- 1.3.9. Reinforcement of insulators, replacement of bindings at PL-110/35 kV and PL 10/6/0.38 kV.
- 1.3.10. Replacement of twisting by clipping at PL-110/35 kV and PL 10/6/0.38 kV.
- 1.3.11. Installation of 10/6/0.38 kV PTS lead caps.
- 1.3.12. Installation of RLND apparatus clips.
- 1.3.13. Insulation cleaning at PL-110/35 kV and PL 10/6/0.38 kV.
- 1.3.14. Checking and improvement of grounding devices at PL-110/35 kV and PL 10-0.38 kV.
- 1.3.15. Checking and improvement of grounding devices at TP/RP-10/6/0.38kV.
- 1.3.16. Shortening of PL-110/35 kV and PL 10-0.38 kV.
- 1.3.17. Replacement of taps (input) from PL-0.38 kV to buildings.
- 1.3.18. Measurement of short-circuit current, replacement of switching units and fuses, which don't correspond to the present regulations.
- 1.3.19. Optimization of contact joints, remote temperature control of contact joints and insulation using thermal imagers and pyrometers.
- 1.3.20. Installation of reactive power cross compensation device in 110-35-10-6-0.38 kV power grids and reduction of higher harmonics.

### **2. Organizational measures for power supply processes:**

#### **2.1. Organizational measures of methodological support:**

- 2.1.1. External audit and organization of continuous internal audit of power supply processes (power grid systems, power accounting and power current and electric energy balances control).
- 2.1.2. Development of a planning, organization and control (monitoring) system to proceed organizational and technical activities aimed at reduction of TPL during power supply process.

#### **2.2. Organizational and technical measures:**

- 2.2.1. Complete accounting of technological power losses in the grids components, which are located between the measuring points and the line of the independent balanced grids with the participants of the Wholesale Energy Market (WEM) and the customers of the Company.
- 2.2.2. Stimulating the consumers (citizens and legal entities) of the Company to switch to the tariffs based on the time zones differences, in order to balance the power consumption schedules during the peak loads.



### 2.3. Technical measures:

2.3.1. Installation of insulated lead-ins in dwelling houses.

2.3.2. Improvement of inner networks in a multistoried houses (fastening the contacts grounding devices, replacement of wire with cross-section inconsistent with the actual flows of power supply).

2.3.3. Replacement of electric meters with transformer connection to the direct-flow meters with removing of the measuring transformers out of the power accounting units.

2.3.4. Installation of ASCAPS to legal entities.

2.3.5. Implementation of SMART-system of power supply accounting automatization to individual customers.

2.3.6. Introduction of ASCAPS on the at the boundary point of networks to WEM participants.

All mentioned above measures together with ongoing monitoring of possible sources of power losses and their prevention allowed Zakarpattyaoblenergo PJSC reduce technical power losses in their own electric grids from 30.58% (in 2002) to 20.23% (in 2010) out of the total amount of power that has been transferred into the network.

Technological power losses reduction in the grids allowed the Company reduce CO<sub>2</sub> emissions, which were caused by the electric power generation that was lost.

Duration of the project is unlimited, since the measures taken to identify and eliminate inadmissible TPL in the components and feeders of power grids, power sites and electric networks districts, as well as to reduce the total amount of report technological power losses in the Zakarpattyaoblenergo PJSC electric networks, are considered to be ongoing and continual process. CO<sub>2</sub>e emissions reduction is affirmed to last one crediting period (22 years) according to the modalities and procedures of the JI Mechanism (3).

**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:**

Project implementation will ensure the greenhouse gas emissions reduction through the power generation cut down in the national network.

At the start of the Project realization (in 2003), there were a number of regulations (the Law on Energy saving) aimed at the stimulation of power generating and power supplying companies to implement the power conservation activities. However, these regulations mostly had formal character and were ineffective.

Implementation of the proposed project requires significant funding. At present, project financing on the domestic market is available on a short-term conditions (up to three years) including high interest rates. In turn, low international ratings of Ukraine make significant complications for Ukrainian companies to receive a funding on the international finance market. Possibility to receive an additional income due to the ERUs sale has become one of the main factors for the enterprise owners in taking the decision to invest the proposed project. ERUs generation has been already taken into consideration before the decision on investing the project was approved at the stage of project master plan development.

Additional income generated by JI mechanism use will positively influence the Project's economic indexes. JI project implementation will raise internal rate on profitability and reduce the project payback period.

Most of the equipment that has been in operation in the grids of Zakarpattyaoblenergo PJSC at that time was already physically obsolete, but because of the insufficient financing and operating reserves of existing equipment, it could be operated further. Besides, changing of the existing situation could be possible not only



in the case of engineering networks modification, but also through the improvement of Company's organizational structure, which also required additional financing and human resources.

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

Emission reduction calculations are provided in the Excel file *20120504\_ZOE\_ER.xls*.

*Table 1. Emissions reduction over the crediting period 2004–2007*

	Years
Length of the <u>crediting period</u>	4
Year	<b>Estimate of annual emission reductions in tonnes of CO<sub>2</sub> equivalent</b>
2004	5 856
2005	43 283
2006	107 189
2007	126 112
<b>Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>282 440</b>
<b>Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>70 610</b>

*Table 2. Emissions reduction for the crediting period 2008 – 2012*

	Years
Length of the <u>crediting period</u>	5
Year	<b>Estimate of annual emission reductions in tonnes of CO<sub>2</sub> equivalent</b>
2008	185 217
2009	181 748
2010	177 638
2011	181 497
2012	181 497
<b>Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>907 597</b>
<b>Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>181 519</b>



Table 3. Emissions reduction for the crediting period 2013 - 2025

	Years
Length of the <u>crediting period</u>	5
Year	<b>Estimate of annual emission reductions in tonnes of CO<sub>2</sub> equivalent</b>
2013	181 497
2014	181 497
2015	181 497
2016	181 497
2017	181 497
2018	181 497
2019	181 497
2020	181 497
2021	181 497
2022	181 497
2023	181 497
2024	181 497
2025	181 497
<b>Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>2 359 461</b>
<b>Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO<sub>2</sub> equivalent)</b>	<b>181 497</b>

**A.5. Project approval by the Parties involved:**

The project has been officially approved by the Ukrainian and Switzerland authorities. Letter of Approval for the project #3699/23/7 from 21/12/2011 has been issued by the State Environmental Investment Agency of Ukraine. The Letter of Approval #J294-0485 from 27/04/2012 has been issued by Federal Department of the Environment, Transport, Energy and Communications of Switzerland.

**SECTION B. Baseline****B.1. Description and justification of the baseline chosen:**

According to the JI Guidance on criteria for baseline setting and monitoring, version 03 (Thereafter JI guidelines) PP can choose between 3 options to determine the baseline. According to the guidelines, PP of this project choose to apply point 9(a) (JI specific approach): An approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines.

According to the point 11 of the JI guidelines, PP choose to use selected elements of approaches for baseline setting already taken in comparable JI cases.

PP chose as reference and comparable case, already registered JI project: “Modernization of electric power distribution system at PJSC “PC “Zhytomyroblenergo”:

<http://ji.unfccc.int/JIITLProject/DB/OC5PW9IDOPWUJK555TUOV1T0VEIZ8X/details>

According to point 12 of the tool following conditions are met:

**(a) GHG mitigation measure.**

The project Modernization of electric power distribution system at PJSC «PC «Zhytomyroblenergo» reduces GHG via implementation of the program on the technical improvement of electrical networks and equipment, advanced technologies implementation, the transition to a higher level of organisation of transmission and distribution of electric energy. This approach is exactly the same as the one chosen by PP in Zakarpattiaoblenergo PJSC power distribution system modernization project. The boundaries of both projects are limited to power grid of distribution companies: Zhytomyroblenergo and Zakarpattiaoblenergo PJSC.

**(b) Geography and Time.**

Both projects are hosted by Ukraine.

Starting date of Modernization of electric power distribution system at PJSC «PC «Zhytomyroblenergo» project is 22/12/2002.

Starting date of Reduction of Process Losses in Power Lines Zakarpattiaoblenergo PJSC project is 01/07/2003.

Therefore the period of time between starting dates of these 2 projects is less than 5 years.

**(c) Scale.**

Based on similar mitigation measures, the difference between the proposed project and the Modernization of electric power distribution system at PJSC «PC «Zhytomyroblenergo» project is less than 50 per cent in terms of the projects output and output be considered as average annual emission reduction over the crediting period of 2008-2012.

In case of Modernization of electric power distribution system at PJSC «PC «Zhytomyroblenergo» project, annual average of estimated emission reductions over the crediting period of 2008-2012 (tonnes of CO<sub>2</sub> equivalent) amounts to 199 606 and in case of Reduction of Process Losses in Power Lines Zakarpattiaoblenergo PJSC project it is 181 519 t CO<sub>2</sub>. Therefore the difference between projects outputs is less than 50%.

**(d) Regulatory framework.**

There is only 7 months between starting dates of the two projects and no change in regulatory framework that could affect the baseline of the projects were introduced in this time.

***Application of the approach chosen*****Step 1. Identification and description of the approach to establishing the baseline.**

The baseline is determined by the choice of the most plausible scenario from a list and by description of plausible future scenarios based on conservative assumptions.

The following steps were applied to determine the most plausible baseline scenario:

1. Identification of possible alternatives that could be a baseline scenario
2. Justification of exclusion from consideration of alternatives, that are unlikely to take place from a technical and / or economic points of view

PP described and analyzed all alternatives and selected the most plausible one as the baseline scenario.

To establish the baseline and to further justify additionality PP took into account:

- a) State policy and applicable law in the energy sector;
- b) Economic situation in the energy sector of Ukraine;
- c) Technical aspects of management and operation of electrical grids;
- d) Availability of capital (including investment barriers), that are typical for PJSC «PC «Zhytomyroblenergo»;
- e) Local availability of technology / equipment;
- f) Price and availability of fuel.

**Step 2. Application of the chosen approach**

Choosing the plausible baseline scenario is based on an assessment of alternative options for distribution of power, which potentially could have occurred at the time of implementation of the project.

PP identified following alternatives:

- Alternative 1: Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems.
- Alternative 2: The proposed project activity undertaken without being registered as JI project activity.
- Alternative.3: Partial implementation of project activity without registration as Joint Implementation project activity.

Above identified alternatives do comply with current legislation in Ukraine.

The detailed analysis of each alternative is stated below.

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### *Alternative 1*

Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems.

As demonstrated below, this alternative is completely viable in Ukraine given the fact that due to current power market regulation and state control over electricity pricing (tariffs) there aren't incentives for distribution companies to invest in energy saving projects as this would not result in any financial benefit for them but only in reducing price for the final clients. What is more, given the fact that such an alternative is in accordance with current legislation no company take that kind of undertakings without counting on income from ER sale.

#### The state of the energy sector of Ukraine.

The state and tendencies of development of the energy sector of Ukraine were quite unsatisfactory. This was due to unsound principle of pricing for services ("Retail electricity tariffs for consumers"<sup>1</sup>) that does not ensure the development of business in power sector and inflow of investments into the sector (lack of cost-effective modernization)<sup>2</sup>. To improve this situation the National security and defence council of Ukraine analysed the situation and issued the decision of June 5, 2009 "On the energy resources market development within the Energy Strategy of Ukraine till 2030"<sup>3</sup>, in this decision it described in detail the status of the State support of the development of the power sector.

The introduction of a new model of the competitive power market in Ukraine is slower than it was provided for by the Concept of functioning and development of the wholesale power market of Ukraine, approved by the Cabinet of Ministers of Ukraine of November 16, 2002 # 1789, because the main efforts of the executive authorities and market players during 2003-2006, were aimed at creating certain pre-conditions stipulated by the Concept for transition to market of bilateral power sales contracts – ensuring of settlement payments for the consumed power in full, partial solution to the problem of debt, implementing appropriate information systems, accounting systems and so on.

Under the existing model the power market could not fully ensure effective competition among producers and suppliers of power and formation of power prices that would encourage energy companies to increase efficiency and increase investment in the energy sector. Neither existing market mechanisms, nor direct administrative measures would ensure the necessary modernization and upgrading of existing production facilities and power supply companies. A limited number of projects on upgrading and reconstruction of power plants and power grids was taken for execution. The situation is especially critical given the growth in the near future of the need for shutting facilities, lack of which threatens the safe operation of the power system of Ukraine.

In recent years, the practice to solve the current economic problems by supporting certain categories of consumers and certain segments by means of the power industry through the mechanisms of cross-subsidies and benefits became popular. Unreasonable restraint of low tariffs for certain consumer groups, including the population, resulted in increased cross-subsidization of some consumers by consumers in other regions. In particular, the share of grant certificates in the wholesale power price today is more than 25 percent and it continues to grow, that becomes an obstacle for introduction of economic instruments that would regulate power market.

Introduced in connection with the Order of the Cabinet of Ministers of Ukraine of August 15, 2005 № 745 "On the transition to unified tariffs on power sold to consumers and deepen cross-subsidization with subsidy certificates are the economic impediments to implementation of the new model of the power market.

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<sup>1</sup> <http://www.nerc.gov.ua>

<sup>2</sup> <http://www.er.energy.gov.ua/doc.php?p=1041>

<sup>3</sup> <http://www.rainbow.gov.ua/documents/243.html?PrintVersion>



Imperfect tariff policy also leads to increases in accounts payable of power generating companies, causing their bankruptcy or non-transparent privatization. State investment programs in most cases are directed at the administrative and organizational implementations<sup>4</sup>.

All described above leads to the situation where any investment to diminish energy losses in the grid would not result in any financial benefit for undertaking company as this in turn would reduce tariff price of power sold to the final user. Therefore there is no incentive - and additionally no legal obligation – for proliferation of such projects.

As described in National Electricity Regulation Commission of Ukraine (hereinafter - NERC ) Order of 03.25.2002, № 289 "On approval of the report on the activities of NERC in 2001", the main causes of increased energy losses during its transportation to consumers are:

- low technical condition of grids;
- inconformity of electrical grids with existing levels of load;
- inconformity of a number of parameters of electricity with applicable standards of quality;
- shortcomings in the existing metering of power supplied to the electric grid and power consumed.

Addressing the negative effects that cause energy losses in electric grids, requires considerable investments to modernize electrical systems and change existing metering systems of power consumed, practical implementation of which will help reduce both process and above standard power losses. Debt issues of the wholesale electricity market (WEM) subjects and issues of their imbalance arise when implementing measures on reduction of process power losses<sup>5</sup>. There is a lack of conditions for the inflow of investments from both domestic and foreign investors.

This alternative is the most plausible baseline scenario as it:

- Allows project proponent to carry out current situation that is to say, transport of power by means of existing facilities;
- Does not require investment in new equipment;
- Is not prevented by any barrier;
- Comply with current legal situation in Ukraine.

Accordingly, Alternative 1 can be viewed as the most plausible baseline.

### ***Alternative 2***

The proposed project activity undertaken without being registered as JI project activity.

Two barriers can be identified:

1. Financial barrier, and
2. Legal barrier.

### **Financial barrier.**

Implementation of the projects requires huge financial resources and additionally has very long payback period. Investment sentiment in Ukraine and in particular project finance is virtually inexistent. Private investors associate the country with elevated risk, corruption and bureaucracy. The access to the financial resources on the international level is extremely difficult in particular for the state influenced companies such

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<sup>4</sup> [http://www.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/archive?&cat\\_id=33495&stind=1](http://www.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/archive?&cat_id=33495&stind=1)

<sup>5</sup> [http://www.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/archive?cat\\_id=35046](http://www.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/archive?cat_id=35046)



as PP. The confirmation of this is the sovereign rating of Ukraine according to the S&P records in comparison with some neighbor countries of the Eastern Europe.

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

Taking into account the considerable volume of capital investments needed for the realization of the proposed project, obtaining the funding from the international institutions may be rather difficult. Funding possibilities on the national level are also quite limited. At the time of the Project starting, commercial banks of Ukraine grant project financing at about 30% annually in the national currency on a three-year term. Example of the largest bank institutions of Ukraine is: Raiffaizen Bank Aval ([www.aval.ua](http://www.aval.ua)), Pryvatbank ([www.privatbank.com.ua](http://www.privatbank.com.ua)), Pravex Bank ([www.pravex.com.ua](http://www.pravex.com.ua)).

Private investment in virtually state owned (before the start of the project) companies as PP is impossible given the high investment risks. As exposed above, tariffication and electricity pricing system in Ukraine does not encourage private investment as one cannot expect sound business practice to be pursued and long term business stability guarantees. The current system of electric power tariff formation shifts the financial burden of power losses on the final consumers and does not allow PP receiving the income from improvement of current power distribution system.

Taking into consideration all that is mentioned above, the funding of the project is possible only under the condition of funds attraction from the sale of greenhouse gas emissions reduction units.

#### **Legal barrier.**

As it is shown above, current Ukrainian legal framework regarding power distribution and more specifically, current system of electric power tariff formation shifts the financial burden of power losses on the final consumers. This fact does not allow distribution companies receive the income from activities aimed at improvement of current power distribution system. This fact, together with no legal obligation of reducing system losses does not encourage power distribution companies to any such activity. With no incentives and no financial repercussion for the company, power consumption reduction projects in Ukraine can count only for one source of income which is ER sale.

*Alternative.2* cannot be regarded as the plausible baseline.

#### ***Alternative 3***

Partial implementation of project activity without registration as Joint Implementation project activity.

Alternative 3 provides for elimination from the project boundary any not key measures under the project, such as exclusion of new energy efficient equipment implementation, etc. However, the partial implementation of the measures will not achieve a comparable reduction in power losses in the distribution electrical grids, additionally; this alternative implies financial expenses in form of investment in new technological equipment which is once again a barrier itself. Additionally Financial barrier and Legal barrier as described above, fully apply to this alternative and prevent it from being implemented therefore:

*Alternative.3* cannot be considered a plausible baseline.

Analysis of the alternatives described above shows that Alternative 1 Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems, is the most plausible baseline scenario and only remaining alternative, and Alternative 2 as well as Alternative.3 are the least plausible ones.



Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems is considered a baseline. This complies additionally with the “Combined tool to identify the baseline scenario and demonstrate additionality” Version 03.0.1 as there is only one alternative scenario that is not prevented by any barrier, and this alternative scenario is not the proposed project activity undertaken without being registered as a JI project activity, then this alternative scenario can be identified as the baseline scenario.

### Description of the baseline scenario

The base scenario to the project is a continuation of existing practice with the introduction of minimum repairs on the background of the overall deterioration of power supply systems focused mainly of current maintenance of working order. In this scenario the proposed project is not implemented and electrical energy will still be transported with considerable losses in the grid and therefore enforce additional power generation and thus additional emission of GHG.

As it is shown above, baseline scenario is completely viable alternative to the project given the fact that due to current power market regulation and state control over electricity pricing (tariffs) there aren't incentives for distribution companies to invest in energy saving projects as this would not result in any financial benefit for them but only in reducing price for the final clients. What is more, given the fact that such an alternative is in accordance with current legislation no company take that kind of undertakings without counting on income from ER sale which is exactly the case of project proponent. Only income from ER sale encourages it to take an investment effort.

Power losses in the baseline scenario will be determined for each year when monitoring activity takes place. These losses will be calculated basing on the official data according to the monitoring plan.

Detailed information of baseline calculation is given in Section D.1. Key baseline indicators are provided below:

### Key information and data used to establish the baseline:

<b>Data/Parameter:</b>	$V_y$
Data unit	MWh
Description	Total reduction of technical power losses in the distribution power grid over the period y of the project scenario compared to the baseline scenario
Time of determination/monitoring	Annually
Source of data (to be) used	Estimate by EES Ltd based on the statistical data of Zakarpattyaoblenergo PJSC using the approach similar to one used in the registered (ITL UA1000316) PDD “Khmelnyskoblennergo PJSC Power Distribution System Modernization” in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03. Calculations, made according to the methodology, are shown as an Excel file <i>20120504_ZOE_ER.xls</i> .
Value of data applied (for ex ante calculations/determinations)	166 511 MWh (for emission reduction estimate after 2010 the average value for 2008-2010 has been taken. See Excel file <i>20120504_ZOE_ER.xls</i> ).
Justification of the choice of data or description of measurement methods and procedures (to be) applied	This parameter is an objective quantitative representation of the project implementation results.
QA/QC procedures (to be)	This parameter is identified according to the available



applied	regulations, rules and approved methodology based on the company's statistical data.
Any comment	

<b>Data/Parameter:</b>	<i>GEF<sub>y</sub></i>
Data unit	tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh)
Description	Carbon dioxide emission factor for projects of power loss reduction in power supply networks of Ukraine
Time of determination/monitoring	Annually
Source of data (to be) used	Reference data
Value of data applied (for ex ante calculations/determinations)	For 2003 <sup>6</sup> – 0.770 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2004 <sup>7</sup> – 0.755 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2005 <sup>8</sup> – 0.740 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2006-2007 <sup>9</sup> – 0.807 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2008 <sup>10</sup> - 1.082 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2009 <sup>11</sup> - 1.096 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) For 2010 <sup>12</sup> - 1.093 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh) (See Appendix 2) For 2011-2025 <sup>13</sup> - 1.090 tCO <sub>2</sub> e/MWh (kgCO <sub>2</sub> e/kWh)
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Using such factors is a common practice when estimating JI projects.
QA/QC procedures (to be) applied	Only officially approved factors have been used for estimation.
Any comment	

Parameters required to be monitored are given in the tables D.1.1.1. and D.1.1.3 Section D.

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

In the absence of the Project, the most likely scenario is that the power would be produced by the existing cohort of coal power plants. The project has 0 emissions and using the published official Emission Factors for power loss reduction projects in power transport grid of Ukraine, in the absence of the project 181 497 tonnes of CO<sub>2</sub>e on average per year for the same power output would be released to the atmosphere. Due to the implementation of the project and reduction of the losses, equivalent electricity will not be produced in existing co-hort of coal power plants and thus GHG emission is reduced.

This step is completed accordance with the “Tool for the demonstration and assessment of additionality” v.0.5.2

<sup>6</sup> <http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html>

<sup>7</sup> <http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html>

<sup>8</sup> <http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html>

<sup>9</sup> <http://ji.unfccc.int/UserManagement/FileStorage/46JW2KL36KM0GEMIOPHDTQF6DVI514>

<sup>10</sup> <http://www.neia.gov.ua/nature/doccatalog/document?id=127171>

<sup>11</sup> <http://www.neia.gov.ua/nature/doccatalog/document?id=127172>

<sup>12</sup> <http://www.neia.gov.ua/nature/doccatalog/document?id=126006>

<sup>13</sup> <http://www.neia.gov.ua/nature/doccatalog/document?id=127498>



STEP 1 – Identification of alternatives scenarios

STEP 2 – Investment Analysis – Not performed

STEP 3 – Barrier Analysis

STEP 4 – Common Practice Analysis

***Step 1: Identification of alternatives to the project activity consistent with current laws and regulations***

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

PP identified following alternatives:

- Alternative 1: Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems.
- Alternative 2: The proposed project activity undertaken without being registered as JI project activity.
- Alternative 3: Partial implementation of project activity without registration as Joint Implementation project activity.

Conclusion of Step 1a: Three realistic alternatives to the project activity were identified.

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

All 3 above mentioned alternatives comply with mandatory laws and regulations. Existing legal documents do not obligate Zakarpattiaoblenergo PJSC to pursue the modernization of power grid. According to the Law of Ukraine "On Electric Energy Sector"<sup>14</sup>, Article 5. State policy in the energy sector is based on following principles:

- State regulation of activities in the energy sector;
- Creating conditions for safe operation of power facilities;
- Safeguard efficient consumption of fuel and energy;
- Adherence to homogeneous state regulations and standards by all subjects related to the production, transmission, supply and use of energy;
- Creating conditions for development and improvement of the technical level of energy sector;
- Improvement of the environmental safety of energy facilities;
- Protection of the rights and interests of energy consumers;
- Maintaining the integrity and safeguarding of the safe and efficient operation of unified power system of Ukraine, unified dispatch control (operational and technological) thereof;
- Promotion of a competitive power market;
- Providing training to prepare qualified specialists for energy sector;
- Creating conditions for prospective scientific research;
- Safeguarding a stable financial state of energy sector;
- Guaranteeing of accountability of energy suppliers and consumers.

The current practice of reducing power losses in the distribution electrical grid complies with all applicable laws and regulations of Ukraine. The legislation allows for the losses in the electrical grids. Standards are set only for the frequency with which energy supplying organizations must carry out calculation of regulatory power losses in the electrical grid. Monitoring of compliance with regulations is made by the calculation of normative losses once a year.

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<sup>14</sup> <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=575%2F97-%E2%F0>



Conclusion of Step 1b: All identified alternatives comply with mandatory laws and regulations

## **STEP 2. Investment Analysis – not performed**

## **STEP 3. Barrier Analysis.**

### ***Sub-step 3a: Identify barriers that would prevent the implementation of the proposed JI project activity:***

PP identified following barriers preventing the proposed project activity from being implemented.

#### **Financial barrier.**

Implementation of the projects requires huge financial resources and additionally has very long payback period. Investment sentiment in Ukraine and in particular project finance is virtually inexistent. Private investors associate the country with elevated risk, corruption and bureaucracy. The access to the financial resources on the international level is extremely difficult in particular for the state influenced (in reality – owned) companies such as PP. The confirmation of this is the sovereign rating of Ukraine according to the Fitch records in comparison with some neighbor countries of the Eastern Europe.

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

Due to the considerable volume of capital investments, needed for the accomplishment of the project, the obtaining funds from any international financial institutions is difficult. On national level funding is also highly limited. Nowadays commercial banks of Ukraine grant financing for projects at about 30% Lear interest rate and in the national currency. It is difficult to get long term loan (above 5 years). Examples of the largest bank institutions of Ukraine are: Raiffaizen Bank Aval ([www.aval.ua](http://www.aval.ua)), Pryvatbank ([www.privatbank.com.ua](http://www.privatbank.com.ua)), Pravex Bank ([www.pravex.com.ua](http://www.pravex.com.ua)).

Private investment in virtually state owned companies as PP is impossible given the high investment risks. As exposed above, tariffication and electricity pricing system in Ukraine does not encourage private investment as one cannot expect sound business practice to be pursued and long term business stability guarantees. The current system of electric power tariff formation shifts the financial burden of power losses on the final consumers and dos not allow PP receiving (retaining) the income from improvement of current power distribution system. These facts result in financial results of this kind of projects are unattractive as do not guarantee repayment of the debt to potential lenders this without taking into consideration the risk inherited in investing in stated owned companies in Ukraine.

#### **Legal barrier.**

Current legal framework does not create favorable atmosphere for implementations of energy efficiency projects and taking into consideration that all energy transporting and distribution companies are state owned. As exposed in B.1, current Ukrainian legal framework regarding power distribution and more specifically, current system of electricity tariffication shifts the financial burden of power losses on the final consumers. This fact does not allow distribution companies receive the income from activities aimed at improvement of current power distribution system. This fact, together with no legal obligation of reducing system losses does not encourage power distribution companies to any such activity. With no legal framework that encourage the promoters by the means of incentives and no financial repercussion for the firm, power losses reduction projects in Ukraine are not executed.

#### **Technological barrier,**



Given the fact that proposed project activity implies installing and operating modern equipment and technology, relevant new staff hiring plan and training plan for the technical staff has been included. Before the implementation of the project activity, Zakarpattiaoblenergo PJSC did not possess qualified and properly trained staff to carry out all necessary operation and maintenance works so the risk of failure and equipment disrepair due to improper O&M was very high. Lack of qualified engineers who are familiar with modern technology and properly trained technicians will put a project at risk due to following factors:

- lack of proper procedures and correct decision related to technical solutions applied, its implementations and equipment installation;
- Impossibility to carry out credible feasibility studies;
- lack of correct operating and maintenance of facilities and equipment.

All the above, results for Zakarpattiaoblenergo PJSC impossible to implement the project as lack of qualified personnel does not allow carrying out credible feasibility studies and preliminary designs. Even if this argument is discarded, implementation of the project would have been impossible as there won't be personnel to operate and maintain the equipment. This is of vital importance as improper proceedings in this kind of projects/facilities can easily results in long lasting black outs.

***Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):***

Alternative 1: Continuation of the current situation, without JI project implementation and with the introduction of minimum repairs on the background of the overall deterioration in power supply systems.

This alternative do not require financial investment of comparable size neither external source of financing such as loans, grants etc. Thus is not prevented by financial barrier. Neither is prevented by Legal Barrier as in fact this barrier favors this alternative to occur. Know how barrier does not apply as in this alternative the Zakarpattiaoblenergo PJSC uses its actual staff and capabilities.

Alternative 2: The proposed project activity undertaken without being registered as JI project activity.

This alternative is prevented by the 3 previously identified barriers as project activity implies high financial investment unavailable at Zakarpattiaoblenergo PJSC local bank market. Investing in Ukraine – and in particular in state owned companies – is perceived as risky and there aren't loans available on reasonable conditions. Additionally , as demonstrated before, Ukrainian power market and its legal framework do not encourage investment in this kind of project as system does not allows for creating profits for the investor.

That is why, proposed project activity without income from ER sale, is first of all unlikely to take place and second perceived as completely unfeasible, the ER sale income alleviate the 3 identified barriers as:

1. Diminish the risk inherited in the project – however this solely would definitely not be enough for private investor to go ahead with the investment.
2. In case of Zakarpattiaoblenergo PJSC, it encourages the company to go ahead with the investment decision as the money constitute direct income from the investment.
3. Allows hiring of new engineering personnel and technicians necessary for the proper execution of the whole project.

Identified barriers would prevent this alternative from being implemented.

Alternative 3: Partial implementation of project activity without registration as Joint Implementation project activity.

This alternative would not provide comparable output. However even if we omit this argument, 3 previously identified barriers apply to this alternative only at different investment level.



Identified barriers would prevent this alternative from being implemented.

***Step 4: Common practice analysis***

***Sub-step 4a: Analyze other activities similar to the proposed project activity:***

At the beginning of the project activity, that is to say in 2002 there were no similar projects implemented. At the moment in Ukraine this kind of project are implemented however all of them are registered as Joint Implementation or have accomplished Determination process<sup>15</sup>. As in this kind of projects is not to be included in this analysis then, similar project activities to the proposed project activity are not observed

***Sub-step 4b: Discuss any similar Options that are occurring:***

No similar options are occurring.

According to Tool for the demonstration and assessment of additionality (Version 06.0.0), if Sub-steps 4a and 4b are satisfied, i.e.

- (i) similar activities cannot be observed or
- (ii) similar activities are observed, but essential distinctions between the project activity and similar activities can reasonably be explained,

then the proposed project activity is additional. Thus it can be concluded that Zakarpattyaoblenergo PJSC power distribution system modernization project is additional.

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<sup>15</sup> <http://www.carbonunitsregistry.gov.ua/en/258.htm> and

[http://www.bureauveritas.com.ua/wps/wcm/connect/bv\\_comua/local/home/our-services/training/psorv2](http://www.bureauveritas.com.ua/wps/wcm/connect/bv_comua/local/home/our-services/training/psorv2)

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

The approach applied to the emission calculation takes into consideration only the CO<sub>2</sub> emissions occurred as a result of the electric power generation, required for the compensation of the power losses in the grid and in the distributing transformer stations, and in the substations of Zakarpattyaoblenergo PJSC. The boundaries of the project scenario are shown at the Figure 3 (outlined with dotted line).

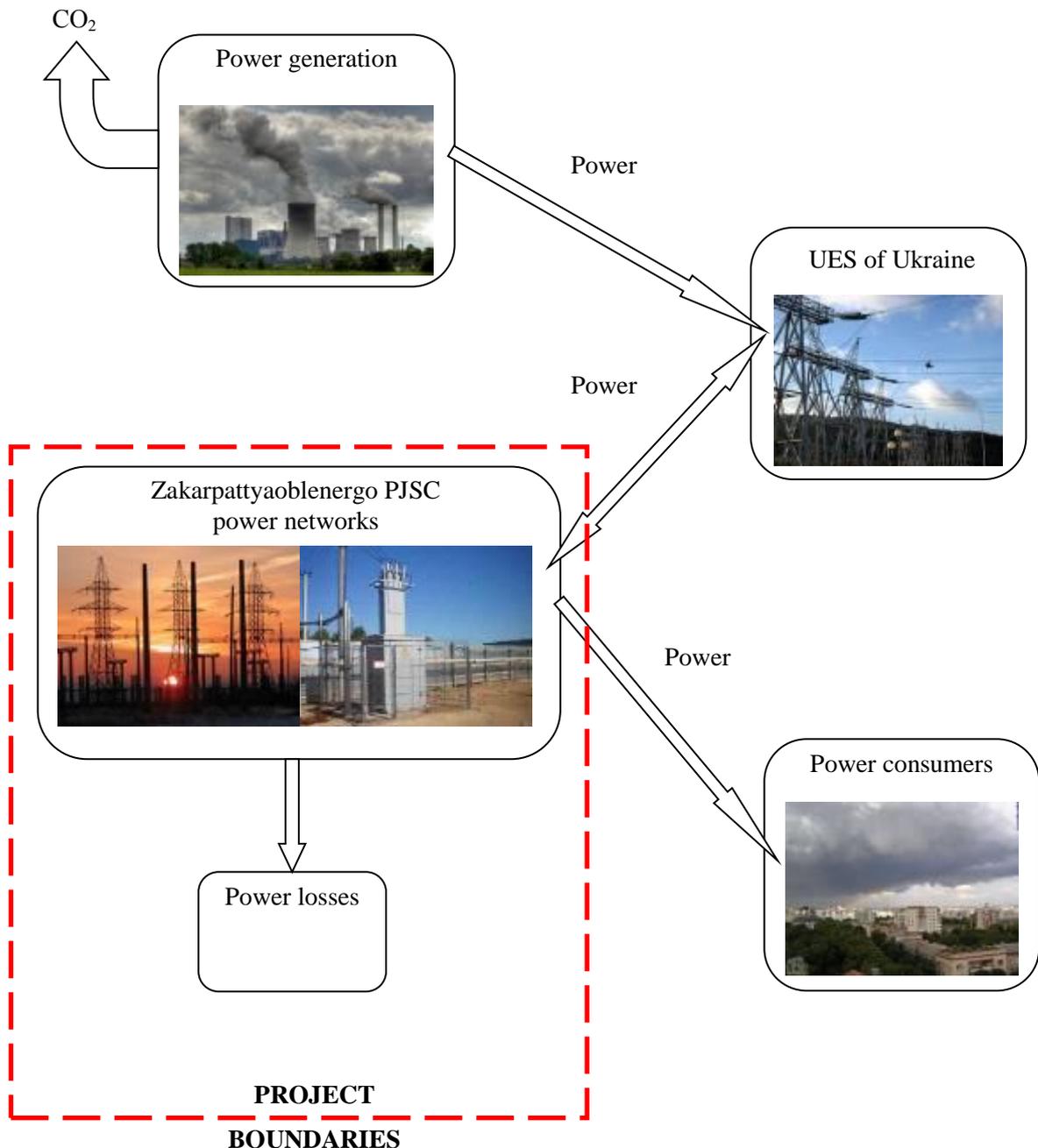


Figure 3. Project boundaries

The boundaries of the project and baseline are the same

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Equipment within the project boundaries is given in the table below:

Designation	Unit	Quantity	Capacity MVA
<b>Power grid total length, incl.:</b>			
<b>air:</b>	<b>km</b>	<b>16921.1</b>	<b>---</b>
220 kV		81.4	—
110 kV	km	1014.8	—
35 kV	km	1146.4	—
10 kV	km	4982.2	—
6 kV	km	524.4	—
0.38 kV	km	9171.9	—
<b>cable:</b>	<b>km</b>	<b>1058.9</b>	<b>---</b>
10 kV	km	402.1	—
6 kV		501.0	—
0.38 kV	km	155.8	—
<b>Substation total number:</b>			
<b>110/35 kV</b>	<b>pcs</b>	<b>123</b>	<b>1587.3</b>
220 kV		1	125.0
110 kV	pcs	38	929.6
35 kV	pcs	84	532.70
<b>Transformer total number:</b>			
<b>110/35 kV</b>	<b>pcs</b>	<b>201</b>	<b>1587.3</b>
220 kV		1	125.0
110 kV	pcs	63	929.6
35 kV	pcs	137	532.70
<b>Substation total number:</b>			
<b>SCTP,KTP,ZTP 6-10/0.38 kV</b>	<b>pcs</b>	<b>4513</b>	<b>1109.60</b>
Single-transformer SCTP	pcs	53	8.2
KTP	pcs	3325	562.2
No transformers	pcs	0	0
One transformer	pcs	3320	558.3
Two transformers	pcs	5	3.9
ZTP	pcs	1135	539.2
No transformers	pcs	0	0
One transformer	pcs	790	284.0
Two transformers	pcs	345	255.2
<b>Transformer total number:</b>			
<b>10 kV</b>	<b>pcs</b>	<b>4868</b>	<b>1109.60</b>
<b>Distribution plant total number 10kV:</b>	<b>pcs</b>	<b>39</b>	<b>19.1</b>
No transformers	pcs	2	0
One transformer	pcs	16	6.3
Two transformers	pcs	21	12.8

The list of the sources and the greenhouse gases that were included into the project boundaries is provided in Table 4.



Table 4. Sources of emissions and greenhouse gases included or excluded from the project boundary

	Source	Gas	Included/ Excluded	Justification/Explanation	
<b>Baseline emissions</b>	Ukrainian UES electric power stations that consume fossil fuel.	CO <sub>2</sub>	Included	Emission caused by combustion of the fossil fuel by the Ukrainian UES electric power stations for generation of power which is necessary to compensate the power losses in the power grids of Zakarpattiaoblenergo PJSC under the baseline scenario.	
		CH <sub>4</sub>	Excluded	Excluded for simplification	
		N <sub>2</sub> O	Excluded	Excluded for simplification	
<b>Project emissions</b>	Emissions related to the equipment installed in the project.	SF <sub>6</sub>	Excluded	Electronegative gas (SF <sub>6</sub> ) used in circuit breakers and other equipment of Zakarpattiaoblenergo PJSC is toxic and is listed as a gas, circulation and utilization of which is under the control of state environment organizations. Equipment containing electronegative gas is hermetically sealed and prevents leakage of gas into the atmosphere. In the case of its failure or decommissioning SF <sub>6</sub> will be collected and reused by filling in new similar equipment. Potential emissions do not exceed 1 tCO <sub>2</sub> e per year. In connection with all the mentioned above, SF <sub>6</sub> emissions were excluded from the calculations.	
		Ukrainian UES electric power stations that consume fossil fuel.	CO <sub>2</sub>	Included	Emission is caused by combustion of the fossil fuel by the Ukrainian ECO electric power stations for generation of power which is required to compensate power losses in the electric grids of Zakarpattiaoblenergo PJSC after the reduction of the technological power consumption as a result of the project activity.
			CH <sub>4</sub>	Excluded	Excluded for simplification
			N <sub>2</sub> O	Excluded	Excluded for simplification

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

**Date of completion of the baseline setting** - 25/10/2010.

Baseline was set by EES Ltd.

**SECTION C. Duration of the project / crediting period****C.1. Starting date of the project:**

Starting date of the project is 01/07/2003.

The investment program was approved on the basis of the Zakarpattyaoblenergo PJSC Executive Board resolution dtd. 01/07/2003 (Protocol 14).

**C.2. Expected operational lifetime of the project:**

25 years (300 months) – the program includes regular realization of the measures aimed at the reduction of power losses in the power grid of Zakarpattyaoblenergo PJSC.

**C.3. Length of the crediting period:**

Duration period is 22 years (264 months):

- 2004-2007 – early credits period (the project foresees the utilization of emissions reductions achieved over the period before 2008 according to the Article 17 of the Kyoto protocol);
- 2008-2012 – crediting period (the first commitment period);
- 2013-2025 – the period after the first commitment period (extension of the crediting period after the 2012 requires the resolution of the Host Party).

ERUs generation period will start at 01/01/2008 and will not exceed the project operation period.

Crediting period start date - January 1<sup>st</sup>, 2004. The period ends on December 31<sup>st</sup>, 2025.

**SECTION D. Monitoring plan****D.1. Description of monitoring plan chosen:**

Data collected for monitoring will be archived electronically and/or in paper form. All measurements are being carried out with calibrated measuring equipment according to relevant industry standards.

The main parameter that objectively reflects CO<sub>2</sub> emissions reduction is an amount of reducing of technological power losses in power grid of Zakarpattyaoblenergo PJSC.

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

**The monitoring project emission includes such parameters:**

Not applicable.

**Parameters for the project emission calculated only once for the entire crediting period:**

Not applicable.

**Parameters for the project emission calculated only once for the entire crediting period:**

Not applicable.

**Parameters for the baseline emission monitoring:**

$V_y$  = Total reduction of technical power losses in the distribution power grid over the period  $y$  of the project scenario compared to the baseline scenario, MWh.

This parameter is defined according to the present regulations, rules and approved methodology based on the company's statistical data. This parameter is an objective quantitative representation of the project implementation results.

$GEF_y$  = Carbon dioxide emission factor for projects of power loss reduction in power supply networks of Ukraine, tCO<sub>2</sub>e/MWh.



This factor reflects objectively the specific carbon dioxide emissions associated with the power losses while its transmission. The use of such factors is common practice applied when calculating the projects associated with the generation, delivery or consumption of electric energy. In the calculations will be used only officially approved or determined factors.

**Parameters for project emissions calculated only once for the entire crediting period:**

Not applicable.

Scheme of data collection and data management is provided in Section D.3.

Verification of emission reduction units will be carried out on the basis of annual data. Carbon Management Company is responsible for preparation of documents and their submission to Accredited Independent Entities (AIEs).

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

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

ID number (Please use numbers to ease cross-referencing to D.2.)	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. $PE_y$	Project emission	Greenhouse gases emission monitoring	tCO <sub>2</sub> e	c	annually	100 %	Electronic and paper	

**D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO<sub>2</sub> equivalent):**

GHG emissions reduction will be achieved by reducing power losses in the Company's power grids, which in its turn will be achieved due to the project implementation.

Since the baseline emissions are calculated based on the difference between of power loss before and after the project implementation, consequently the project emission will equal to zero.  $PE_y = 0$



<b>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:</b>								
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
2. $BE_y$	Baseline emissions	Greenhouse gases emission monitoring	tCO <sub>2</sub> e	c	annually	100 %	Electronic and paper	
3. $V_y$	Power loss reduction in power distributive network over the period y	Greenhouse gas emission monitoring	MWh	c	annually	100 %	Electronic and paper	
4. $GEF_y$	tCO <sub>2</sub> e emission factor in UES of Ukraine for the power replacement projects in the year y	Default value	tCO <sub>2</sub> e/MWh	e	annually	100%	Electronic and paper	

**D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO<sub>2</sub> equivalent):**

Therefore, the baseline emissions are:

$$BE_y = V_y \cdot GEF_y, \quad (1)$$



where

$BE_y$  = Baseline emissions, tCO<sub>2</sub>e;

$V_y$  = Total technological power losses reduction in the power distributive network over the period y under the project scenario compared to the baseline, MWh;

$GEF_y$  = CO<sub>2</sub> emission factor in UES of Ukraine for the power replacement projects in year y, tCO<sub>2</sub>e/MWh;

y = Year in which calculations are made.

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

Not applicable

**D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:**

ID number <i>(Please use numbers to ease cross-referencing to D.2.)</i>	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	Comment

**D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO<sub>2</sub> equivalent):**

Not applicable

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

Increase of the greenhouse gas emission outside the project, which may be caused by the project is not anticipated.

**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 <i>(Please use numbers to ease cross-referencing to D.2.)</i>	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

**D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO<sub>2</sub> equivalent):**

The project does not envisage any activity, which would result in leakages.

**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<sub>2</sub> equivalent):**

Emissions reductions are calculated as follows:

$$ER_y = BE_y - (PE_y + LE_y), \quad (2)$$

where

- $ER_y$  = Emission reduction during the year y, tCO<sub>2</sub>e;
- $BE_y$  = Baseline emission of the greenhouse gases in the year y, tCO<sub>2</sub>e;
- $PE_y$  = Greenhouse gases emission caused by the project activity in the year y, tCO<sub>2</sub>e;
- $LE_y$  = Leakages emission in the year y, tCO<sub>2</sub>e.



**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:**

The project implementation does not require collection of information in terms of the influence on the environment in excess of information collected at the company prior to the project.

**D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:**

Data (Indicate table and ID number)	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data or why such procedures are not necessary.
Table D.1.1.3. #3	low	Defined on the basis of the company's statistical data and using the approach similar to one used in the registered (ITL UA1000316) PDD "Khmelnyskoblenenergo PJSC Power Distribution System Modernization" in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03.
Table D.1.1.3. #4	low	Only officially approved factors are used for calculations.

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

The monitoring plan does not anticipate any additional measures, neither of any measuring equipment installation, nor of any additional parameters collection, except for those that are being taken in the Company.

Data collection scheme according to the monitoring plan is shown on the Figure 4.

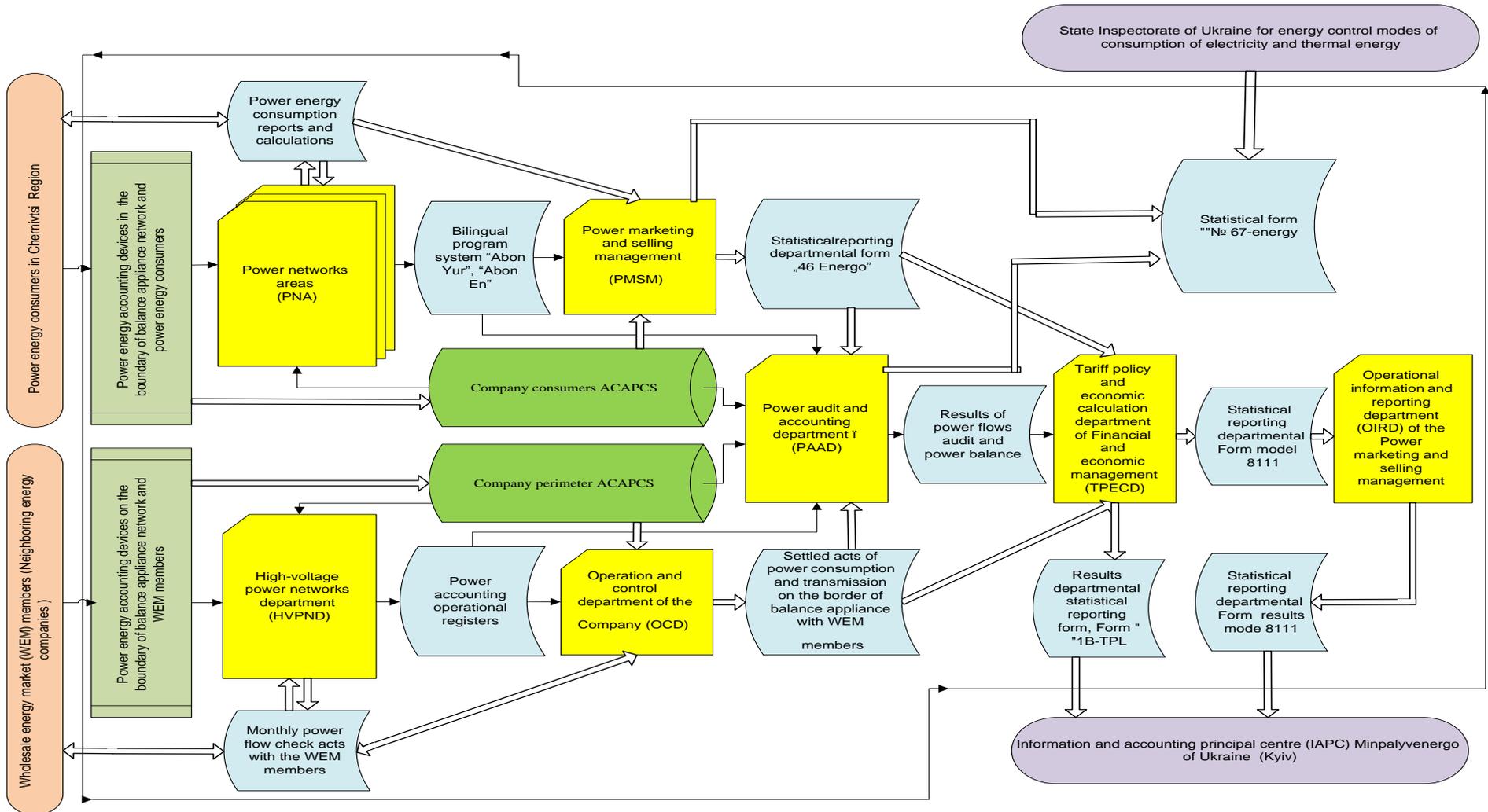


Figure 4. Scheme of data collection for the monitoring of the project parameters



Reduction of power losses in the grids of Zakarpattiaoblenergo PJSC is calculated on annual basis by the specialists of the technical consultant (Carbon Management Company), on the basis of statistical data of the company and using the approach similar to one used in the registered (ITL UA1000316) PDD “Khmelnyskoblenenergo PJSC Power Distribution System Modernization” in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03.

To calculate the monthly balance of power in Zakarpattiaoblenergo PJSC such steps are taken:

- during the whole billing month the structural units of Zakarpattiaoblenergo PJSC measure the amount of power consumed by the customers (on the basis of readings of the calculation meters - this information of the readings from the power meters is the data provided by the consumers, control readings taken by the company workers, who take the readings from the power meters, ASCAPS data). After the end of billing month, the monthly amount of productive supply is being calculated and then transmitted to the power accounting and sale service of the Company’s management apparatus;
- during the entire billing month Zakarpattiaoblenergo PJSC on the basis of ASCAPC data taken within the Company controls the power bought on the Wholesale Energy Market of Ukraine (WPM) per day;
- every first day of a month following the billing one, the Company workers record the readings of the meters for WPM onsite, as well as the readings of the meters which measure the flows in the company grids; the readings of the meters for WPM which the Company workers compare with the perimeter data of ASCAPC;
- on the basis of the readings taken, the amount of flows through the structural departments of the Company is calculated;
- according to the amount of flows and to the annual productive supply, the report form 1B-TPL is drafted for a structural department, which is submitted to the Management apparatus of Zakarpattiaoblenergo PJSC (balance and regime department);
- the report forms 1B-TPL and 2-NKRE are formed on the basis of 1B-TPL in the management apparatus.
- the data collected are submitted to Carbon Management Company for Monitoring Reports preparation.

All data that will be collected during the monitoring must be kept in paper and electronic form in the archives of Zakarpattiaoblenergo PJSC for at least 2 years after period of ERU transfer to the Client together with the issue of an appropriate regional power distribution company decree and appointing the persons that will be responsible for data achieving.

Relevance of the carbon dioxide specific indirect emissions factor connected with the power losses whole the power transmission to the power grids of Ukraine will be yearly checked by the representatives of the technical consultant (Carbon Management Company). If necessary, the factor will be updated.



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

**Zakarpattyaoblenergo PJSC (Project Participant):**

Please refer to Annex 1 for detailed contact information.

**Carbon Management Company GmbH (Project Participant):**

Please refer to Annex 1 for detailed contact information.

**SECTION E. Estimation of greenhouse gas emission reductions****E.1. Estimated project emissions:**

Project emissions are equal to 0 (see D.1.1.2).

$$PE_y = 0$$

**E.2. Estimated leakage:**

Leakages are not expected as a result of project realization.

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

Since the leakage emissions  $LE_y = 0$  and the project emission  $PE_y = 0$ , the sum of the leakage emissions and the project emissions is equal to 0.

**E.4. Estimated baseline emissions:**

Estimate of the baseline emissions was carried out according to the formulae shown in Section D.1.1.4.

Results of the calculation are provided in the table below. The calculations are presented in *20120504\_ZOE\_ER.xls* file, which is attached to PDD.

In Tables 5, 6 and 7 estimated baseline emissions are shown.

*Table 5. Baseline emissions over the period from 01/01/2004 till 31/12/2007*

Year	Estimated baseline emissions (tCO <sub>2</sub> e)
2004	5 856
2005	43 283
2006	107 189
2007	126 112
<b>Total for the period:</b>	<b>282 440</b>

*Table 6. Baseline emissions over the period from 01/01/2008 till 31/12/2012*

Year	Estimated baseline emissions (tCO <sub>2</sub> e)
2008	185 217
2009	181 748
2010	177 638
2011	181 497
2012	181 497
<b>Total for the period:</b>	<b>907 597</b>

Table 7. Baseline emissions over the period from 01/01/2013 till 31/12/2025

Year	Estimated baseline emissions (tCO <sub>2</sub> e)
2013	181 497
2014	181 497
2015	181 497
2016	181 497
2017	181 497
2018	181 497
2019	181 497
2020	181 497
2021	181 497
2022	181 497
2023	181 497
2024	181 497
2025	181 497
<b>Total for the period:</b>	<b>2 359 461</b>

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

Emission reductions are calculated according to the formula (2) hereinbefore. The results are presented in the tables 8, 9 and 10 below.

Table 8. Emission reductions over the period from 01/01/2004 till 31/12/2007

Year	Sum of the project leakage and emissions (tCO <sub>2</sub> e)	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated emission reductions (tCO <sub>2</sub> e)
2004	0	5 856	5 856
2005	0	43 283	43 283
2006	0	107 189	107 189
2007	0	126 112	126 112
<b>Total for the period:</b>	<b>0</b>	<b>282 440</b>	<b>282 440</b>

Table 9. Emission reductions over the period from 01/01/2008 till 31/12/2012

Year	Sum of the project leakage and emissions (tCO <sub>2</sub> e)	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated emission reductions (tCO <sub>2</sub> e)
2008	0	185 217	185 217
2009	0	181 748	181 748
2010	0	177 638	177 638
2011	0	181 497	181 497
2012	0	181 497	181 497
<b>Total for the period:</b>	<b>0</b>	<b>907 597</b>	<b>907 597</b>



Table 10. Emission reductions over the period from 01/01/2013 till 31/12/2025

Year	Sum of the project leakage and emissions (tCO <sub>2</sub> e)	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated emission reductions (tCO <sub>2</sub> e)
2013	0	181 497	181 497
2014	0	181 497	181 497
2015	0	181 497	181 497
2016	0	181 497	181 497
2017	0	181 497	181 497
2018	0	181 497	181 497
2019	0	181 497	181 497
2020	0	181 497	181 497
2021	0	181 497	181 497
2022	0	181 497	181 497
2023	0	181 497	181 497
2024	0	181 497	181 497
2025	0	181 497	181 497
<b>Total for the period:</b>	<b>0</b>	<b>2 359 461</b>	<b>2 359 461</b>

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

Table 11. Emission reductions over the period from 01/01/2004 till 31/12/2007

Year	Estimated project emissions (tCO <sub>2</sub> e)	Estimated leakage (tCO <sub>2</sub> e)	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated emission reductions (tCO <sub>2</sub> e)
2004	0	0	5 856	5 856
2005	0	0	43 283	43 283
2006	0	0	107 189	107 189
2007	0	0	126 112	126 112
<b>Total for the period (tCO<sub>2</sub>e)</b>	<b>0</b>	<b>0</b>	<b>282 440</b>	<b>282 440</b>

Table 12 Emission reductions over the period from 01/01/2008 till 31/12/2012

Year	Estimated project emissions (tCO <sub>2</sub> e)	Estimated leakage (tCO <sub>2</sub> e)	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated emission reductions (tCO <sub>2</sub> e)
2008	0	0	185 217	185 217
2009	0	0	181 748	181 748
2010	0	0	177 638	177 638
2011	0	0	181 497	181 497
2012	0	0	181 497	181 497
<b>Total for the period (tCO<sub>2</sub>e)</b>	<b>0</b>	<b>0</b>	<b>907 597</b>	<b>907 597</b>



Table 13. Emission reductions over the period from 01/01/2013 till 31/12/2025

<b>Year</b>	<b>Estimated project emissions (tCO<sub>2</sub>e)</b>	<b>Estimated leakage (tCO<sub>2</sub>e)</b>	<b>Estimated baseline emissions (tCO<sub>2</sub>e)</b>	<b>Estimated emission reductions (tCO<sub>2</sub>e)</b>
2013	0	0	181 497	181 497
2014	0	0	181 497	181 497
2015	0	0	181 497	181 497
2016	0	0	181 497	181 497
2017	0	0	181 497	181 497
2018	0	0	181 497	181 497
2019	0	0	181 497	181 497
2020	0	0	181 497	181 497
2021	0	0	181 497	181 497
2022	0	0	181 497	181 497
2023	0	0	181 497	181 497
2024	0	0	181 497	181 497
2025	0	0	181 497	181 497
<b>Total for the period (tCO<sub>2</sub>e)</b>	<b>0</b>	<b>0</b>	<b>2 359 461</b>	<b>2 359 461</b>

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

No EIA was specifically developed for this project that complies with the applicable legislation.

The common review is carried out by the State Environmental Inspectorate of Zakarpattia region.

The company provides the following reports: Form 2TP (water services), Form 1 (hazardous wastes), Form 1 (environmental costs).

**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:**

According to the standard mass threshold for identification of hazardous substances of high-risk determined by the Resolution of CMU №956 of 11<sup>th</sup> of July, 2002, the specialized organization has defined the categories of equipment having characteristics that refer them to the hazardous substances (Form SHR-1). These are toxic substances of the 3<sup>rd</sup> group (harmful for people and the environment), namely: nickel compounds (fine-dispersed powder), quicksilver and its compounds, lead and its compounds, sulfuric acid, which can be found in fluorescent lamps and storage batteries; and of the 1<sup>st</sup> group (explosive substances), namely: combustible gasses and highly inflammable substances, that can be found in machinery and pipelines of the 2 warehouses of fuels and lubricants and gas boiler houses.

Within the project activities there were installed electrical equipment containing in its composition insulating gas (SF<sub>6</sub>) which is a toxic gas. In the operation insulating gas dose not lose its properties, so after the life of the equipment or in case of its decommission for other reasons, insulating gas is disposed by pumping-out and then re-used in new equipment. To prevent unauthorized leaks of insulating gas at all the sites where relevant equipment is present the sensors of insulating gas leaks are installed.

There are specially equipped places on the enterprise for storage of such equipment, which are inspected and adjusted by the appropriate resolutions of the sanitary-and-epidemiological control and environmental protection bodies.

Measures preventing harmful environmental impact of carbon oxide and nitric oxide escaping from boiler houses:

- exploitation of boilers according to the regime map;
- prohibition to regulate units and blocks of the equipment on one's own;
- timely carrying out of the technical inspection according to the recommendations of the equipment manufacturer;
- periodical quality control of the combustion materials to detect the exceeding limits of emissions;
- control and registration of gross emissions.

Measures preventing harmful environmental impact of fumes of highly inflammable substances from fuels and lubricants namely:

- timely carrying out of the technical inspection according to the recommendations of the equipment manufacturer;
- intensification of the control over the technological regime of the equipment, evolving emissions;
- reducing the equipment's loads.



According the enterprise is one of the waste generation objects and according to the permission it temporarily holds the wastes within the set limits (before their utilization or removal) by the specialized enterprises. The enterprise does not utilize any wastes apart from processed engine oils, which are used in tractors hydraulic systems and hoisting apparatus.

The main part of scrap metal is formed by exploitation of transformer substation, a part of which after refitment and regeneration of transformer oil is put into operation again and other part which is beyond repair and its regenerated oil is unfit, is discharged and submitted for utilization to the specialized enterprises according to concluded agreements.

Utilization agreements:

- „Eko laif”, ltd – fluorescent lamps;
- „Zakarpattvornmet” SOE – scrap metal, storage batteries, electrodes;
- KATP 072801 – hard household wastes.

The project will make a positive influence on the environment comparing with the current state, as the reconstructions will improve the effectiveness of the power recourses usage and will reduce the emission of the pollutants into the air. In such a way the influence from the reconstruction is insignificant.

No transboundary effects are foreseen due to the Project implementation.

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

The stakeholders are the citizens of Zakarpattya Region who were informed about the project implementation through the mass-media.

The program of power losses reduction was discussed on the meetings of the representatives of the regional State Administration, Ministry of Energy and Coal Industry of Ukraine, NJSC "Energy Company of Ukraine", Derzhenerhonahlyad; the main principles of the project were announced by the regional radio and local mass media (Novyny Zakarpattya», local newspaper).

Annex 1**CONTACT INFORMATION ON PROJECT PARTICIPANTS****Project owner:**

Organisation:	Zakarpattyaoblenergo PJSC
Street/P.O.Box:	Golovna
Building:	57
City:	Uzhorod district, village Onokivtsi
State/Region:	Zakarpattya region
Postal code:	89412
Country:	Ukraine
Phone:	+380312619859
Fax:	+380312619859
URL:	<a href="http://www.energo.uz.ua">http://www.energo.uz.ua</a>
Represented by:	
Title:	Important documents department manager
Salutation:	Mr
Last name:	Hodanych
Middle name:	Fedorovych
First name:	Vasyl
Department:	Important documents department
Fax (direct):	+380312619861
Phone (direct):	+380312619861
Mobile:	+380504320456
Personal e-mail:	<a href="mailto:cp01@uz.energy.gov.ua">cp01@uz.energy.gov.ua</a>

**Project partner:**

Organisation:	Carbon Management Company GmbH
Street/P.O.Box:	Sonnenbergstrasse
Building:	18
City:	Sarnen
State/Region:	Kanton Obwalden
Postal code:	6060
Country:	Switzerland
Phone:	+ 41 41 544 07 71
Fax:	+ 41 41 544 07 72
URL:	<a href="http://www.carbonmc.com">http://www.carbonmc.com</a>
Represented by:	
Title:	Director General
Salutation:	
Last name:	Girardet
Middle name:	
First name:	Alain
Department:	
Fax (direct):	+41 79 691 33 13
Phone (direct):	+41 41 544 07 72
Mobile:	
Personal e-mail:	<a href="mailto:Girardet@carbonmc.com">Girardet@carbonmc.com</a>

Annex 2**BASELINE INFORMATION**

See Section B

**1. Key information and data used for baseline setting**

<b>ID number</b>	<b>Description</b>	<b>Data variable</b>
<i>Table D.1.1.3. ID #3</i>	Total reduction of technical power losses in the distribution power grid over the period $y$ of the project scenario compared to the baseline scenario.	$V_y$
<i>Table D.1.1.3. ID #4</i>	Carbon dioxide emission factor for projects of power loss reduction in power supply networks of Ukraine .	$GEF_y$

**2. Coefficient of tCO<sub>2</sub>e emission in the Ukrainian UES in 2010.****NATIONAL ECOLOGICAL INVESTMENTS  
AGENCY OF UKRAINE****DECREE**

Kyiv

28/03/2010# 43

*About indices confirmation,  
of carbon dioxide specific emissions in 2010*

In order to execute clause 2.1 of the decree dated March 21, 2011 # 39 “On the confirmation of the Methodology of the carbon dioxide specific emissions calculation during power production at thermal electric power stations and its consumption” and to normalize the calculation of carbon dioxide specific emissions during power production at thermal electric power stations and its consumption,

Hereby I decree:

1. To establish the following indices of carbon dioxide specific emissions in 2010:
  - carbon dioxide specific emissions, during power production at the thermal electric power stations, that are connected to the Unified Energy System of Ukraine - 1.067 kg CO<sub>2</sub>/kWh;
  - indirect specific carbon dioxide emissions from power consumption by the 1st class power consumers according to the Procedure for determining the class of consumers, approved by the National Electricity Regulatory Commission of Ukraine dtd. August 13, 1998 # 1052 - 1.093 kg CO<sub>2</sub>/kWh\*h;
  - indirect specific carbon dioxide emissions from power consumption by 2<sup>nd</sup> class power consumers in accordance with Procedure for determining the class of consumers, adopted by Resolution of National Electricity Regulatory Commission of Ukraine dtd. August 13, 1998 #1052 - 1.225 kg CO<sub>2</sub>/kWh;
  - indirect specific carbon dioxide emissions related to the power losses during its transmission by the local networks - 1.093 kg CO<sub>2</sub>/kWh.

2. Carbon dioxide specific emissions indices for 2010 indicated in the clause 1 of the given decree are recommended to be used during the preparation of:

- project proposal on the justification of anthropological GHG emissions reduction, project technical documentation, emissions reduction scopes annual reports, that are drafted according to “Procedure of development, review, approval and implementation of the projects aimed at the anthropological GHG emissions reduction” approved by the Cabinet of Ministers of Ukraine decree dtd. 22/02/2006 # 206 ;
- GHG planned emissions reduction calculation that are developed according to the Procedure of review, approval and realization of projects aimed at green investment scheme and proposals on the realization of measures related to the implementation of such projects and fulfillment of commitments by the parties of Kyoto protocol to the UN Framework Convention on Climate Change, sanctioned by the Cabinet of Ministers of Ukraine decree dtd. 22/02/2008 # 221, and actual GHG emissions as the result of suchlike projects realization, reduction calculation.



3. Kyoto protocol flexible mechanisms administration (Shevchenko O.V.) and Ecological investments and market development scheme administration (Yermakov V.M.) to follow this decree while verifying the JI and ecological investments projects documents.

4. GHG national accounting system administration (Khabatiuk O.P.) to follow this decree while reviewing the JI projects documents, that are being verified according the Instruction about the procedures concerning JI documents review and arrangement, approves by the National Ecological Investment Agency decree dtd. 08/12/2010 #184.

5. Public relations and mass media department (Zaets I.V.) to ensure this decree being uploaded to the National Ecological Investment Agency web site.

**Reorganization commission chairman**

*(signature)*

**I.Varga**

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Annex 3

**MONITORING PLAN**

Detailed description of the monitoring plan presented in Section D of this PDD.