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:

Power distribution system modernization of PJSC "AES Rivneoblenergo".

Sector: (2) Power distribution.

Version 2.0.

Date of the document: 20/06/2012.

A.2. Description of the project:

The main purpose of the Joint Implementation project "Power distribution system modernization of PJSC "AES Rivneoblenergo" 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 power.

Implementation of the measures under the Project will allow for improvement of the reliability and effectiveness of the power distributive network in Rivne city and its 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 "AES Rivneoblenergo" 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 "AES Rivneoblenergo" ("AES Rivneoblenergo" PJSC) is an integral part of the Unified Energy System (UES) of Ukraine, which ensures continuous and reliable power supply to the consumers from Rivne region under the regulated tariffs.

At the beginning of the project, (in 2002) "AES Rivneoblenergo" 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 18.10% power losses at "AES Rivneoblenergo" 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 "AES Rivneoblenergo" 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 "AES Rivneoblenergo" PJSC power grid.

Project scenario

Joint Implementation project is based on the implementation of investment plans, introduced and financed since the period end of 2003 - beginning of 2004, 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 "AES Rivneoblenergo" PJSC reduce losses in the grid up to 12.54% out of the total amount of power, 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

Chronologically, the history of the project can be represented by the following dates:

20/12/2002 – Minutes of general meeting of shareholders of OJSC "A.E.S Rivneenergo" regarding development and implementation of investment plans aimed at reducing of TPL (Protocol number 12). This date can be considered to be the date of qualifying this project as a JI Project.

31/12/2003 - recording the first results from a reduction TPL by the results of this investment plan.

01/01/2004 – 31/12/2011 - gradual reduction TPL, according to investment plans, along with the preparation and study of the situation regarding the implementation of JI projects in Ukraine (the order of execution of projects, research precedents JI projects in Ukraine, the tax legislation, the choice of developer project , etc.)

13/06/2011 - signing of a contract for PDD preparation with Carbon Management Company GmbH.

Benefits of the project

Besides the reduction of greenhouse gas emissions, implementation of measures described in the investments plans 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 power generation cut down as a result of 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 power generation supplied to the "AES Rivneoblenergo" 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:

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)	"AES Rivneoblenergo" PJSC	No
Switzerland	Carbon Management Company GmbH	No

Public Joint Stock Company "AES Rivneoblenergo" ("AES Rivneoblenergo" PJSC), EDRPOU code 05424874 - is an integral part of the Unified Energy System (UES) of Ukraine, which ensures continuous and reliable power supply to the consumers from Rivne region under the regulated tariffs.

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

- 35.12 Transmission of power;
- 85.32 Professional Technical Education;
- 71.12 The activity in the field of engineering, geology, geodesy technical consulting services in these areas;
- 35.13 Distribution of power;
- 35.14 Trade of electricity;
- 42.22 Construction of buildings electricity and telecommunications.

Public supply companies "Rivneoblenergo" was established according to Decree of the President of Ukraine "On restructuring in the power sector of Ukraine" dated April 4, 1995 № 282/95 and Decree of the Ministry of Power of Ukraine on July 31, 1995 № 137, having acquired the status of open joint stock company.

Subsequently, 14 November 2001, at a general meeting of shareholders of the company changed its name to "Open Joint Stock Company" NPP Rivneoblenergo" because of the change in shareholders of the company - May 15, 2001 the world famous global company AES bought a package of ordinary shares. More than two years the company at a general meeting of shareholders has been reorganized into closed joint stock company.

In connection with the bringing of the Company in accordance with the Law of Ukraine "About Joint Stock Companies" April 7, 2011 general meeting of shareholders of "A.E.S Rivneenergo" decided to change the name of the Society of Public Joint Stock Company "NPP Rivneoblenergo".

April 12, 2011 amendments to the Unified State Register of Enterprises and Organizations of Ukraine on the name of the Company and received a new certificate of registration. PJSC "AES Rivneoblenergo" - power supply company that has licenses for transmission and power supply.

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 «AES Rivneoblenergo" PJSC situated in city Rivne, Rivne region, in the west of Ukraine. Area of the region is 20 047 thousand sq. km (3.32% of the territory of Ukraine). Population – 1.137 mil people (as of January 1, 2006).

A.4.1.1. Host Party(ies):

Ukraine

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

Rivne region

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

Rivne region

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

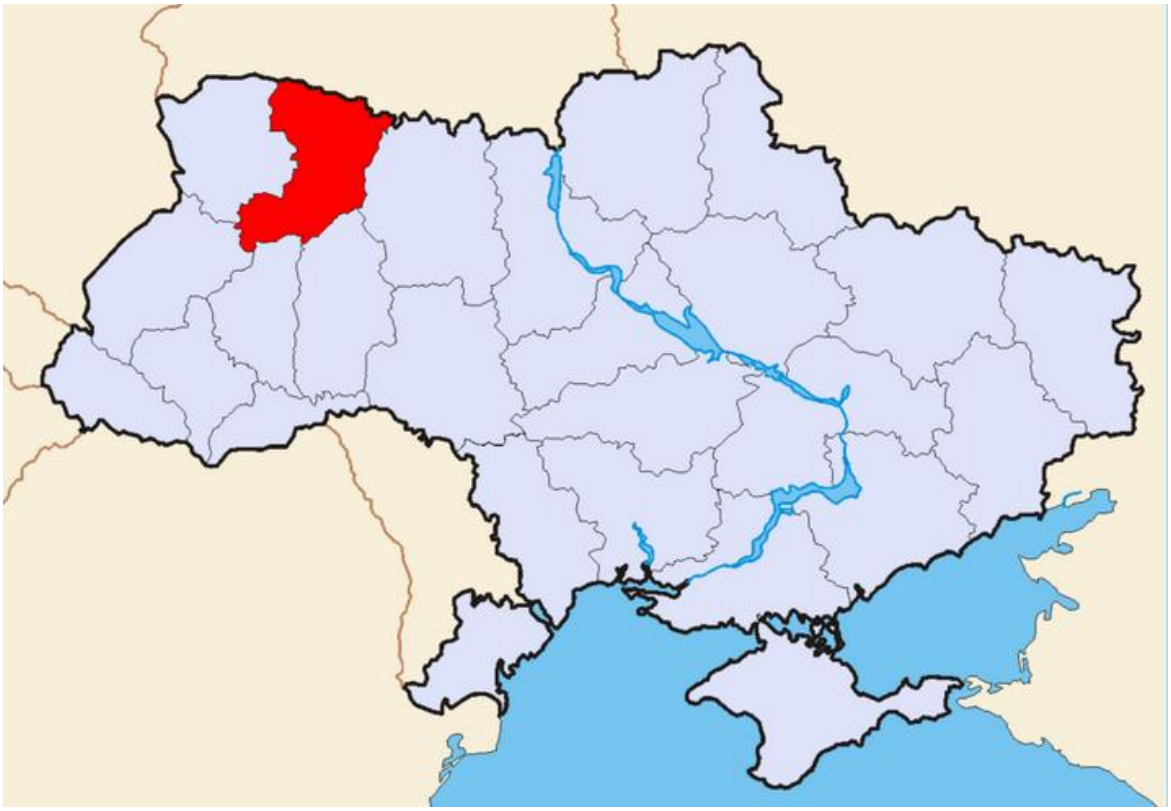

Figure 1. Location of Rivne region on the map of Ukraine

Geographical coordinates of the project (head office) are 50° 37′ 11″ N, 26° 15′ 5″ E.

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

"AES Rivneoblenergo" PJSC is an integral part of the Unified Energy System (UES) of Ukraine, which ensures continuous and reliable power supply to the consumers from Rivne region under the regulated tariffs.

At the beginning of the project (in 2002), "AES Rivneoblenergo" 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 18.10% power losses at "AES Rivneoblenergo" PJSC grids out of the total amount of the power that was coming to the network as of 2002.

The main purpose of the Joint Implementation project at "AES Rivneoblenergo" PJSC is the realization of the program of the technical reconstruction described in investment plans through the introduction of advanced technologies for production process, improvement of organizational structure, transition to a higher level of organization of transmission and distribution of power by attraction of investments.

Joint Implementation project is based on the implementation of investment plans to achieve maximum effect in reducing TPL.

Measures under the proposed project includes:

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

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 power balances control).

1.1.2. Implementation of a software system of feederwise (componentwise) calculation and analysis, and optimization of TPL in 110-35 and 10-6-0.38 kV grid components for localization of inadmissible TPL.

1.1.3. Development of a planning, organization and control (monitoring) system to proceed organizational and technical activities aimed at reduction of TPL during power supply process.

1.1.4. 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 balance analysis department, Department of Metrology and exploitation of electricity meters, etc.).

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 fuzes, which don't correspond to the present regulations.

1.3.19. 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 power 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 power 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. 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 "AES Rivneoblenergo" PJSC reduce technical power losses in their own power grids from 18.10% (in 2002) to 12.54% (in 2011) 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_2 emissions, caused by the 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 power networks districts, as well as to reduce the total amount of report technological power losses in the "AES Rivneoblenergo" PJSC power networks, are considered to be ongoing and continual process. CO_2e emissions reduction is affirmed to last one crediting period (25 years) according to the modalities and procedures of the JI Mechanism.

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 2002), 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 investment plans development.

Additional income generated by the JI mechanism use will alleviate the investment barriers created by the Ukrainian economic circumstances. JI project implementation will create the risk coverage expected by an international energy sector investor in Ukraine.

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

Emission reduction calculations are provided in the Excel file *20120726_ROE_ER.xls.*

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

	Years
Length of the **crediting period**	4
Year	**Estimate of annual emission reductions in tonnes of CO_2 equivalent**
2004	58 546
2005	66 397
2006	133 660
2007	109 675
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**368 278**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**92 070**

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

	Years
Length of the crediting period	5
Year	**Estimate of annual emission reductions in tonnes of CO_2 equivalent**
2008	177 077
2009	158 345
2010	156 240
2011	216 290
2012	302 805
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**1 010 757**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**202 151**

Table 3. Emissions reduction for the crediting period 2013 - 2028

	Years
Length of the **crediting period**	16
Year	**Estimate of annual emission reductions in tonnes of CO_2 equivalent**
2013	302 805
2014	302 805
2015	302 805
2016	302 805
2017	302 805
2018	302 805
2019	302 805
2020	302 805
2021	302 805
2022	302 805
2023	302 805
2024	302 805
2025	302 805
2026	302 805
2027	302 805
2028	302 805
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**4 844 880**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**302 805**

A.5. Project approval by the Parties involved:

Approvals from the Investor Party (Federal Department of the Environment, Transport, Energy and Communications of Switzerland) and Host Party (State Environmental Investment Agency of Ukraine) will be received after successful completion of determination.

SECTION B. Baseline

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

The methodology used to determine the baseline and the corresponding calculations based on the JI specific approach, according to the Guidelines on criteria for baseline setting and monitoring (version 03), paragraph 9a. Also, methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality"[1] (Version 03.0.1)[2] was used for setting of the baseline scenario and demonstration of additionality.

Baseline scenario assumes further use of existing equipment along with performing of routine maintenance and repair works without significant investment. This scenario is fully in accordance with Ukrainian legislation. Emissions level will be the same as for period before the starting date of the project. Please see bellow details regarding choosing and justification of the baseline.

Baseline was identified on the basis of the following four Steps:
STEP 1: Identification of alternative scenarios
STEP 2: Barrier analysis
STEP 3: Investment analysis (if applicable)
STEP 4: Common practice analysis

Step 1: Identification of alternative scenarios
Sub-step 1a: Define alternative scenarios to the proposed JI project activity
There are only two alternatives, which are considered as the most plausible for the proposed project activity.
Alternative A: Continuation of the existing situation.
Alternative B: Implementation of the proposed project activity without the project registration as JI project.

Partial implementation of the Power losses reduction program within the "AES Rivneoblenergo" PJSC networks will considerably decrease the outcome effect of the project. Therefore, this scenario cannot be considered as an alternative to the proposed project activity.

Outcome of Sub-step 1a: There were two plausible alternatives identified. The list of the alternatives is presented above.

Sub-step 1b: Consistency with mandatory applicable laws and regulations
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 the power generating and power supplying companies to implement the power conservation activities. However, these regulations mostly had formal character and were ineffective. This fact is proved by the constant increase of power losses that were observed in the network of "AES Rivneoblenergo" PJSC before the start of the project.

Outcome of Sub-step 1b: All proposed alternatives are in compliance with applicable laws and regulations.

Step 2: Barrier analysis
Sub-step 2a: Identifying the barriers that would prevent the implementation of alternative scenarios
Alternative A: Continuation of the existing situation. This scenario does not face any barriers.
Alternative B: Implementation of the proposed project activity without its registration as JI project.

[1] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v3.0.1.pdf
[2] At the start of the determination of the project, the latest version of "Combined tool to identify the baseline scenario and demonstrate additionality" is version 04.0.0, dated from March 2, 2012. In this project, the project participants using a previous version of this tool, according to "Guidelines on criteria for baseline setting and monitoring" (version 03), paragraph (10), page 3: http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

By the identification of barriers that would prevent the implementation of alternative scenarios, we will evaluate in details the existing barriers related to the Alternative B, the implementation of the proposed project without the registration of the JI project. In our analysis, we will focus on investment barriers other than insufficient financial returns. We executed the preliminary check of the possible barriers connected to the Alternative B and we realized the technological barriers and the lack of prevailing practice are not relevant by this Alternative.

During the analysis of the lack of capital for the Alternative B, we will analyse the following factors:

- The cost of capital for investment
- The country risk of Ukraine
- The economical factors of Ukraine influencing the foreign investment tendency
- Review of the other grid efficiency development project in Ukraine, in aspects of financing and use of additional financial sources during the project implementation

The cost of capital for the project owner

AES Rivneoblenergo (ROE) is owned by the U.S. Based public listed company AES Corp. The AES Corporation is a global power company with generation and distribution businesses. Through its diverse portfolio of thermal and renewable fuel sources, the company provides affordable and sustainable energy in 27 countries and has a workforce of 27,000 people.

By the financing of the project, the ROE has the chance to finance the project on domestic and international financial markets equally, therefore we analyse every available financial source domestically and internationally as well.

The Ukrainian credit market offers UAH and foreign currency debt service for companies based in Ukraine. The interest rates level were very high in the last seven years for UAH and USD credits, the following table shows the interest rates on long term credits for company.

Table 4: Interest rates on long term debts[3]

Parameter	Currency	2007	2008	2009	2010	2011	2012
Debt interest rates	UAH	14.40%	17.80%	20.90%	15.70%	16.00%	14.52%
	USD	11.30%	11.60%	10.00%	10.50%	9.20%	7.59%

The tables contains two digit percentages for the credits in local and foreign currency as well. The lowest interest rates for UAH was at 14.4 % and the highest is 20.9 %, these interest rate levels request a very high return expectation on the investment. According to the local regulation on the power distributors, the additional revenue generated by the elimination of power losses, the earnings do not belong to the investor, it will decrease the costumers electricity bill, so can reach the government lower electricity price for households. In Ukraine, the grid efficiency improvement investment is long term compensated by the NERC (Ukrainian Electricity Supervision Authority) on fix UAH basis without annual inflation adjustment. The level of the financial return paid on the investment by the NERC does not cover the long term financing cost on the above mentioned UAH credit interest rates and it is not feasible to get financing from financial institution on the proposed project.

The foreign currency debts are more attractive in aspect of interest rate level, but the currency risk is a valid risk on the project financing, that the ROE has to consider by the evaluation, because the revenue will be generated in UAH. The condition of the Ukrainian economy includes the chance the high volatility of the

[3] Source:Ukrainian National Bank Bulletin Nr. 159 p.135.

local currency to the major international currencies as it happened in 2009 during the global credit crisis. According to the currency risk and the relative high interest rates on the foreign currency loans in Ukraine the generated UAH based revenue of the project does not secure the payback of the credit and it cause an unattractive project from financial institution point of view.

The analysis of the domestic financial sources shows the project owner would have not any chance to finance the project from domestic financial sources on UAH or USD based equally, because of the lack of financial cover for the long term debt service. In this case the project have to be financed by international financial source. The most evident way of international financing is the credit provided by the owner of the company, in this case by the AES Corp. The AES can reach easily the financial markets with corporate bond issuance to cover the financial needs of the company international acquisitions and project developments. This is a common way of collecting relative cheap financing on the market for listed US companies and it is a practice in the AES business model as well. In case of the proposed project, this solution can easily solve the international financing of the project the most cost-effective way, since the pricing of the AES corporate bonds is based on the overall performance and investments of the whole corporation. The AES can collect USD based capital by 7.75 – 8%[4] fixed rate coupon level on the market. The cost of the capital is about 300-350 bps cheaper than the domestic foreign currency based loans can offer. This level sounds financial reasonable if we do not taking into account the risk level of the financial investments and the general economic climate in the last decade in Ukraine. The evaluation have to take into account the following factors:

- The risk premium of the Ukrainian Euro-bond over the US treasury bill on the same maturity
- The credit rating of the Ukrainian foreign currency based government debts
- The volatility of the UAH against the USD
- The yield of the Ukrainian Euro-bonds

The yield is 9.34 % for the Ukrainian government issued USD denominated 5 year Euro-bonds in 2012. The yield of the Euro-bonds is 755 bps higher than the US Treasury 10 years 1.79% yield in the same year, that represents a significant level of country risk for Ukraine. The 2012 yield is the highest level in the last 6 years, it is 44 bps higher than in 2011, 154 bps higher than in 2010 and 259 bps in 2007 on the same maturity Ukrainian Euro-bonds.

Table 5: Ukrainian Euro-bonds yield[5]

Parameter	Currency	2007	2008	2009	2010	2011	2012
Ukrainian Euro-bond yield	USD	6.75%	N/A	N/A	7.80%	8.90%	9.34%

Table 6: 10 years US Treasury yield[6]

Parameter	Currency	2007	2008	2009	2010	2011	2012
10 years US Treasury	USD	4.76%	3.74%	2.52%	3.73%	3.39%	1.79%

4 Source: AES CORPORATION: Recourse debt and trust preffed reference 31.03.2012
5 Source:Ukrainian National Bank
6 Source:http://www.multpl.com/interest-rate/table

The Ukrainian Euro-bond's risk premium were 551bps in 2011, 407 bps in 2010 and 199 bps in 2007 compared to the 10 years US Treasury. If we adjust the AES corporate bond rates with the above described risk premiums we get the following result.

- 2012: 15.3 %
- 2011: 13.26 %
- 2010: 11.82 %
- 2007: 9.74 %

The lowest risk-adjusted cost of financing was 9.74 % based on AES corporate bonds in 2007. Between 2008 and 2010, the Ukrainian government could not issue Euro-bonds because of the lack of interest on the financial markets caused by the global debt crisis initiated by the bankruptcy of Lehman Brothers. The UAH weakened from 5.17 UHA/USD more than 50 % in 2009 against the USD, it was one of the most important effect of the financial crisis for Ukraine. In 2010, the Ukrainian Government has signed the Stand by Arrangement with the IMF solving the financial difficulties of the country but the UAH cannot recover until now to the 2007 level. The UAH has been traded slightly over the 8 UAH/USD level in the last for years.

The credit rating of Ukraine moved downwards parallel with the escalation of the financial crisis and reached the CCC+ level in 2009 and stayed on that level until the successful IMF agreement. [7]

The financing of the Alternative B by AES corporate credit is not economically feasible as the result of the above explained evaluation shows. The risk adjusted cost of capital for AES credit is 10 % for USD in the best year of the last 6 year period. Neither this lowest interest rate level may not be covered by the fixed UAH based return on the invested money paid by the NERC. The other years shows much worst capital cost levels that make evident, the Alternative B is not viable to finance without other financial income.

The AES can consider more wider range of possible income sources and time line to cover the risks and the capital cost than the financial institutions. So AES decided to evaluate the carbon finance revenue as a potential additional financial source. The JI income can cover all-kind of risks related to the project and can positively influence the AES Corp. decision on the financing of the grid efficiency improvement project from own financial sources as an owner credit to the ROE. The preliminary calculation results a 60% cover of the total investment cost of the grid efficiency improvement by the JI revenue based 10 Euro ERU price, what is a reasonable argument to evaluate further the business opportunity. The AES Corp. had to consider the possible direct use of credits inside of the company and it was realized the AES Corp. has power generation facilities in EU countries and these are effected by the EU ETS where the generated ERU credits can be used for compliance purpose. It means the AES can utilize the part of the generated credits in its own facilities and the financial contribution of AES is no more simple credit, it could be an upfront purchase price for the ERUs. This financial structure and the cover ratio can alleviate the lack of access to capital and compensate the occurred risks related to long term persistent AES's FDI in Ukraine.

Analysis of similar activities

All grid efficiency improvement projects were developed with financial contribution of the JI registration in Ukraine, as the result of the analysis of the project with the same size as the ROE shows. This fact is confirming from an other aspect the availability of investment barriers by the realization of the grid efficiency projects in Ukraine[8].

Investment barriers: The project activity within the framework of the proposed Project is an ongoing process, which requires considerable annual investments and human resources.

7 Source: IMF Country report 11/52 p.6 (*www.imf.org/external/pubs/ft/scr/2011/cr1152.pdf)*
8 Source: ji.unfccc.int

This is connected with:

- annual update of electrotechnical equipment nomenclature represented in the Ukrainian market;
- need in ongoing monitoring of places of power losses, their elimination and prevention of their occurring;
- need in ongoing stuff training to work with the new equipment.

Constant funding in Ukraine is possible only in case of financial attractiveness of the project. The current system of power tariff formation shifts the financial burden of power losses to the final consumers and does not allow for receiving the income from their reduction.

The access to the financial resources on the international market is extremely limited for the proposed project. The investment environment of Ukraine is rather unattractive in comparison to the neighboring countries. Ukraine is considered to be a high risk country for doing business and investing in. Almost no private capital is available from domestic or international capital markets for mid to long term investments, and any capital that is available has high cost. The table below represents risks of doing business in Ukraine according to various international indexes and studies.

Table 7. International ratings of Ukraine[9]

Indicators	2008	Note
Corruption index of Transparency International	134 position from 180	Index of corruption
Rating of business practices of The World Bank (The Doing Business)	139 position from 178	Rating of conduct of business (ease of company opening, licensing, staff employment, registration of ownership, receipt of credit, defence of interests of investors)
The IMD World Competitiveness Yearbook	54 position from 55	Research of competitiveness (state of economy, efficiency of government, business efficiency and state of infrastructure)
Index of Economic Freedom of Heritage Foundation	133 position from 157	Determination of degrees of freedom of economy (business, auction, financial, monetary, investment, financial, labour freedom, freedom from Government, from a corruption, protection of ownership rights)
Global Competitiveness Index of World Economic Forum	72 position from 134	Competitiveness (quality of institutes, infrastructure, macroeconomic stability, education, development of financial market, technological level, innovative potential)

The data above shows that both real and perceived risks of investing in Ukraine are in place and influence the availability of capital in Ukraine both in terms of size of the investments and in terms of capital costs. The comparison of commercial lending rates in Ukraine and in Eurozone for the loans over 5 years in EUR is presented in a figure below:

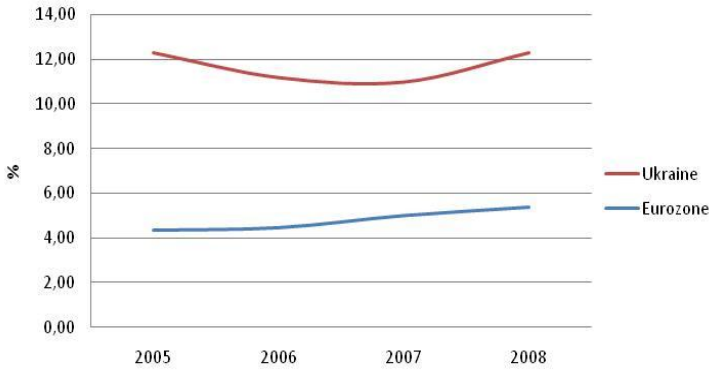

Figure 2. Commercial lending rates, EUR, over 5 years[10]

[9] Data by the State Agency of Ukraine for Investments and Innovations

Cost of debt financing in Ukraine is at least twice as high as in the Eurozone. The risks of investing into Ukraine are additionally confirmed by the country ratings provided by the Moody's international rating agency and the associated country risk premium. The table below compares country risk premiums for Russia and Ukraine[11]:

Table 8. Country risk premiums for Russia and Ukraine

Total Risk Premium, %	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Russia	7.0	7.02	6.6	6.64	6.52	8	6.9	7.25
Ukraine	11.57	11.59	10.8	10.16	10.04	14.75	12.75	12.5

As it is demonstrated by this table, Russia, while offering a comparable set of investment opportunities, is a significantly less risky country for investing in than Ukraine.

As stated at the OECD Roundtable on Enterprise Development and Investment Climate in Ukraine, the current legal basis is not only inadequate, but to a large extent it sabotages the development of market economy in Ukraine. Voices in the western press can basically be summarized as follows: The reforms in the tax and legal systems have improved considerably with the adoption of the commercial Code, Civil Code and Customs Code on 1 January 2004 but still contain unsatisfactory elements and pose a risk for foreign investors[12]. Ukraine is considered to be heading in the right direction with significant reforms having been put into action but still has a long way to go to realize its full potential. Frequent and unpredictable changes in the legal system along with conflicting and inconsistent Civil and Commercial Codes do not allow for a transparent and stable enforced legal business environment. This is perceived as a great source of uncertainty by international companies, which make future predictions of business goals and strategy risky.

The conclusion from the abovementioned is as follows: the investment climate of Ukraine is risky and unwelcoming, private capital is not available from domestic or international sources or available at prohibitively high cost due to real and perceived risks of doing business in Ukraine as shown by various sources. Alternatives markets, such as Russia, offer similar profile of investment opportunities with lower risk and better business environment.

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.

Technological barriers: At the time of the Project starting the organizational structure and the infrastructure of the Company did not allow the implementation of the project without its considerable reorganization. The introduction of the Project is connected with a considerable risk of failure, as it is impossible to calculate the precise effect from the realization of these or those measures, and its performance can be estimated only after some time following its introduction.

Outcome of Sub-step 2a: List of barriers is provided above. There is an investment barrier as described in the Sub-step 2a. This barrier can be alleviated by the JI registration and the additional financing source secured by the ERU generation.

Sub-step 2b: Elimination of alternative scenarios, which are prevented by the identified barriers

Only *Alternative A* is not prevented by the identified barriers.

[10] Data for Ukraine from National Bank of Ukraine http://www.bank.gov.ua/files/4-Financial_markets(4.1).xls
[11] Data from Aswath Damodaran, Ph.D., Stern School of Business NYU http://pages.stern.nyu.edu/~adamodar/
[12] Foreign Direct Investment in Ukraine – Donbass, Philip Burris, Problems of foreign economic relations development and attraction of foreign investments: regional aspect., ISSN 1991-3524, Donetsk, 2007. p. 507-510

Outcome of Step 2b: Only *Alternative A* is not prevented by the identified barriers.

Outcome of Step 2: Only Alternative A does not contradict any of the identified barriers and can be chosen as the baseline scenario.

Thus, the project without registering it as a JI project is unlikely alternative, as opposed to alternative A, which does not prevent any barriers. Instead, for the project scenario, JI component provides the following benefits:

- Formed the possibility of obtaining additional revenue from the sale of ERUs that will improve the profitability of the project and reduce the risk of investing that are involved;
- Climate component of the project is fully consistent with global environmental goals and commitments. Thus, the implementation of JI project will improve the environmental performance of the company as a whole, because the project does not include any negative impact on the environment, and moreover, its implementation leads to improvement of ecological situation in the region as a whole;
- Image advantages for companies operating in the international market.

Step 3: Investment analysis

For the justification of the baseline scenario and additionality demonstration barrier analysis was used.

Outcome of Step 3: Not applicable.

Step 4: Common practice analysis
Similar projects implemented in Ukraine, but they all use additional sources of financing - income from the sale of ERUs[13]. The generally accepted practice in Ukraine at the beginning of the project implementation was the operation of work performance in the volume necessary for maintaining the networks in a good working condition and activity focused on the reduction of power losses.

Outcome: Considering Alternative A mentioned above, it is the most plausible baseline scenario that does not face any barriers and is in consistency with Host Party common practice.

Key information and data used to establish the baseline:

Data/Parameter:	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 Carbon Management Company based on the statistical data of "AES Rivneoblenergo" PJSC using the approach similar to one used in the registered (ITL UA1000316) PDD "Khmelnytskoblenergo PJSC Power Distribution System Modernization"[14] in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03. Calculations, made on the base of MS Excel and presented in the file *20120726_ROE_ER.xls*.

[13] http://ji.unfccc.int/JIITLProject/DB/AAXF1NI4CKHNPH7NDK01ROQ5DEXH14/details
http://ji.unfccc.int/JIITLProject/DB/38BGYDLTLI5GWD36XDF62HOHV4EZBF/details
http://ji.unfccc.int/JIITLProject/DB/9XPAAоло2DW94BXE7X3I5KWZ6JNQ6K0L9/details
[14] http://ji.unfccc.int/JIITLProject/DB/9XPAA2DW94BXE7X3I5KWZ6JNQ6K0L9/details

Value of data applied (for ex ante calculations/determinations)	277 803 MWh (for emission reduction estimate after 2011 the value for 2011 multiplied by factor that reflects the trend of TPL reduction level increasing has been taken. Please see Excel file *20120726_ROE_ER.xls*).
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) applied	This parameter is identified according to the available regulations, rules and approved methodology based on the company's statistical data.
Any comment	Quality control is carried out in accordance with the current quality system ISO 9001

Data/Parameter:	GEF_y
Data unit	tCO_2e/MWh ($kgCO_2e/kWh$)
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[15] – 0.770 tCO_2e/MWh ($kgCO_2e/kWh$) For 2004[16] – 0.755 tCO_2e/MWh ($kgCO_2e/kWh$) For 2005[17] – 0.740 tCO_2e/MWh ($kgCO_2e/kWh$) For 2006-2007[18]– 0.807 tCO_2e/MWh ($kgCO_2e/kWh$) For 2008[19] - 1.082 tCO_2e/MWh ($kgCO_2e/kWh$) For 2009[20] - 1.096 tCO_2e/MWh ($kgCO_2e/kWh$) For 2010[21] - 1.093 tCO_2e/MWh ($kgCO_2e/kWh$) For 2011-2028[22] - 1.090 tCO_2e/MWh ($kgCO_2e/kWh$)
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.

[15] Operational Guidelines for Project Design Documents of Joint Implementation Projects, Volume 1: General guidelines (Version 2.3), Table B1, page 42: http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html
[16] Operational Guidelines for Project Design Documents of Joint Implementation Projects, Volume 1: General guidelines (Version 2.3), Table B1, page 42: http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html
[17] Operational Guidelines for Project Design Documents of Joint Implementation Projects, Volume 1: General guidelines (Version 2.3), Table B1, page 42: http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html
[18] Standardized emission factors for the Ukrainian electricity grid, Table 8, page 10: http://ji.unfccc.int/UserManagement/FileStorage/46JW2KL36KM0GEMI0PHDTQF6DVI514
[19] http://www.neia.gov.ua/nature/doccatalog/document?id=127171
[20] http://www.neia.gov.ua/nature/doccatalog/document?id=127172
[21] http://www.neia.gov.ua/nature/doccatalog/document?id=126006
[22] http://www.neia.gov.ua/nature/doccatalog/document?id=127498

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

To determine the baseline and demonstrate additionality and applicability of the proposed JI project implementation "Combined tool to identify the baseline scenario and demonstrate additionality" was used (Version 03.0.1)[23]. The given tool use during the JI project development is the common practice.

According to this tool for the additionality demonstration of the proposed project, the barrier and common practice analysis were used. As a result of analyses performed, it was demonstrated that the most plausible baseline scenario is the continuation of the existing situation at the moment of project starting (2002). Therefore, the proposed project is not the baseline scenario and meets the principles of additionality.

More detailed description of "Combined tool to identify the baseline scenario and demonstrate additionality" implementation (Version 03.0.1) and additionality demonstration is provided in Chapter B.1 hereinbefore.

[23] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v3.0.1.pdf

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_2 emissions occurred as a result of the power generation, required for the compensation of the power losses in the grid and in the distributing transformer stations, and in the substations of "AES Rivneoblenergo" PJSC. The boundaries of the project scenario are shown at the Figure 3 (outlined with dotted line).

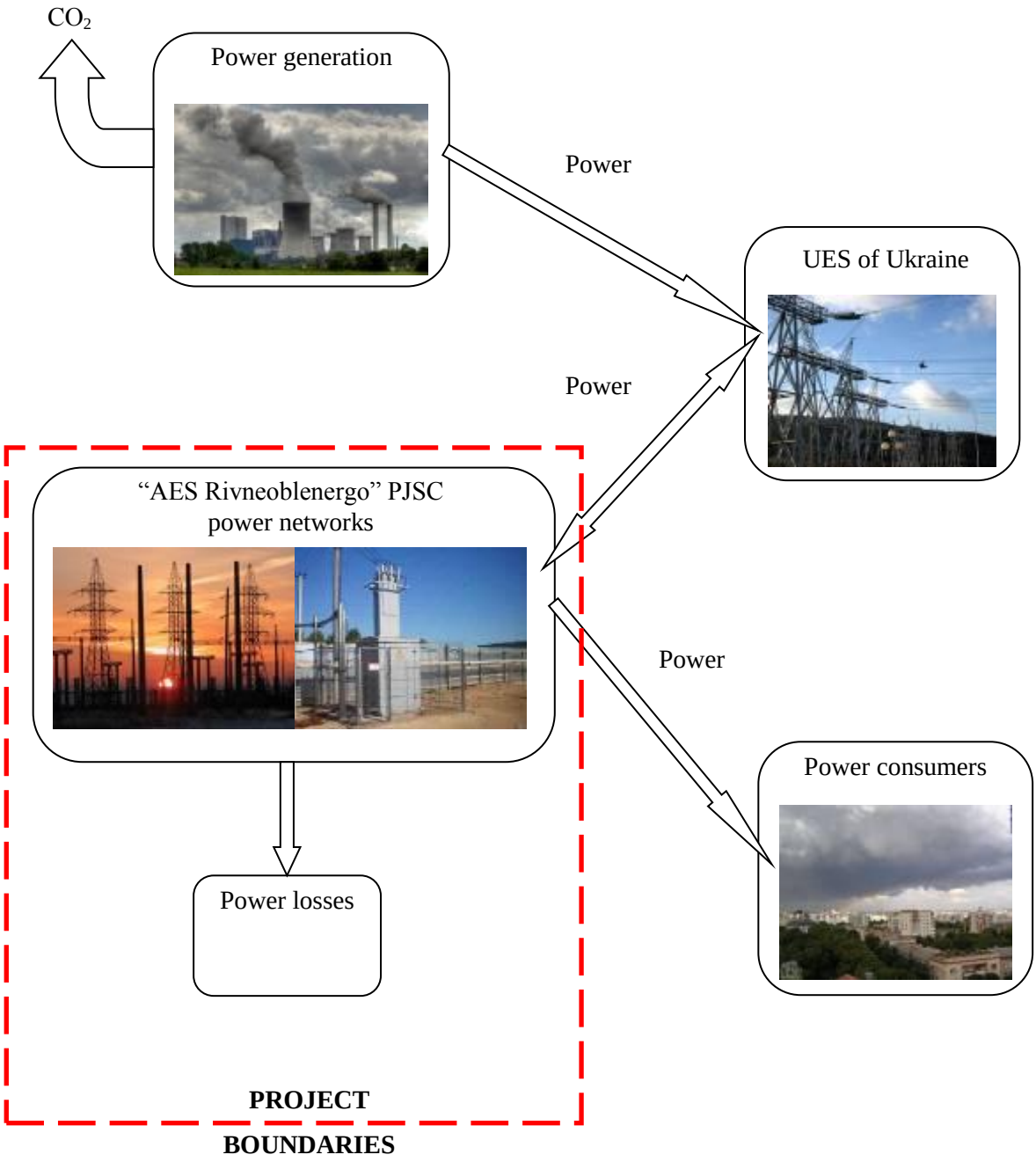

Figure 3. Project boundaries

The boundaries of the project and baseline are the same.

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

Table 9. Equipment within the project boundaries

Name	Unit	Quantity	Capacity MVA
Power grid total length, incl.:			
air:	**km**	**25617.9**	
110 kV	km	1264.2	---
35 kV	km	1500.5	---
10 kV	km	9359.9	---
6 kV	km	11.1	---
0.4 kV	km	13482.19	---
cable:	**km**	**1309.4**	
35 kV	km	2.3	---
10 kV	km	826.37	
6 kV	km	59.0	
0.4 kV	km	421.8	---
Substation total number:			
110/35 kV	**pcs**	**126**	**1206.6**
110 kV	pcs	35	784.6
35 kV	pcs	91	422
Transformer total number:			
110/35 kV	**pcs**	**182**	**1206.6**
110 kV	pcs	55	784.6
35 kV	pcs	127	422
Substation total number:			
SCHTP, KTP, ZTP 6-10/0.4 kV	**pcs**	**5827**	**1115.883**
Single-transformer SCHTP	pcs	5	0.05
KTP	pcs	4561	463.1
No transformers	*pcs*	*0*	*0*
One transformer	*pcs*	*4560*	*462.84*
Two transformers	*pcs*	*1*	*0.26*
ZTP	pcs	1261	652.733
No transformers	*pcs*	*0*	*0*
One transformer	*pcs*	*441*	*88.2*
Two transformers	*pcs*	*818*	*563.333*
Three transformers		*2*	*1.2*
Transformer total number:			
10-6 kV	**pcs**	**6597**	**1124.408**
Distribution plant total number 10kV:	**pcs**	**27**	**0**
No transformers	*pcs*	*27*	*0*
One transformer	*pcs*	*0*	*0*
Two transformers	*pcs*	*0*	*0*

The list of the sources and the greenhouse gases that were included into the project boundaries is provided in Table 10.

Table 10. Sources of emissions and greenhouse gases included or excluded from the project boundary

	Source	Gas	Included/ Excluded	Justification/Explanation
Baseline emissions	Ukrainian UES power stations that consume fossil fuel.	CO_2	Included	Emission caused by combustion of the fossil fuel by the Ukrainian UES power stations for generation of power which is necessary to compensate the power losses in the power grids of "AES Rivneoblenergo" PJSC under the baseline scenario.
		CH_4	Excluded	Excluded for simplification
		N_2O	Excluded	Excluded for simplification
Project emissions	Emissions related to the equipment installed in the project.	SF_6	Excluded	Electronegative gas (SF_6) used in circuit breakers and other equipment of "AES Rivneoblenergo" 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_6 will be collected and reused by filling in new similar equipment. Potential emissions do not exceed 1 tCO_2e per year. In connection with all the mentioned above, SF_6 emissions were excluded from the calculations.
	Ukrainian UES power stations that consume fossil fuel.	CO_2	Included	Emission is caused by combustion of the fossil fuel by the Ukrainian ECO power stations for generation of power which is required to compensate power losses in the power grids of "AES Rivneoblenergo" PJSC after the reduction of the technological power consumption as a result of the project activity.
		CH_4	Excluded	Excluded for simplification
		N_2O	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 - 22/03/2012.

Baseline was set by Carbon Management Company GmbH.

Carbon Management Company GmbH is a project participant. Please see Annex 1 for more details.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

20/12/2002.

C.2. Expected operational lifetime of the project:

25 years (300 months).

C.3. Length of the crediting period:

Duration period is 25 years (300 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);
- 2013-2028 – Status of emission reductions or increase net absorption created by JI projects after the first commitment period under the Kyoto Protocol (extension of the crediting period after 2012) can be determined in accordance with relevant agreements and procedures under the UNFCCC and host Party.

Crediting period for ERUs generation starts after the beginning of 2008 and continue throughout the project life cycle.

Crediting period start date - January 1st, 2004. The period ends on December 31st, 2028.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

Methodology used to monitor emission reductions for the project based on a JI specific approach, according to the Guidelines on criteria for baseline setting and monitoring (version 03), Article 9a. This approach is also foresees to use the approach similar to one used in the registered (ITL UA1000316) PDD "Khmelnytskoblenergo PJSC Power Distribution System Modernization"[24] in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03.

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_2 emissions reduction is an amount of reducing of technological power losses in power grid of "AES Rivneoblenergo" 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.

[24] http://ji.unfccc.int/JIITLProject/DB/9XPAA2DW94BXE7X3I5KWZ6JNQ6K0L9/details

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_2e/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 power. In the calculations will be used only officially approved or determined factors. Detailed description of this parameter is given in Section B.1.

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 and month-based 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 emissions over the period y	Greenhouse gases emission monitoring	tCO_2e	c	annually	100 %	Electronic and paper	$PE_y = 0$

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 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. $PE_y = 0$

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
2.	BE_y - Baseline emissions over the period y	Greenhouse gases emission monitoring	tCO_2e	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_2e emission factor in UES of Ukraine for the power replacement projects over the period *y*	Default value	tCO_2e/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_2 equivalent):

Therefore, the baseline emissions are:

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

where

BE_y = Baseline emissions over the period *y*, tCO_2e;

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

Calculation of this parameter is carried out according to the algorithm as shown in the registered (ITL UA1000316) PDD "Khmelnytskoblenergo PJSC Power Distribution System Modernization";

GEF_y = CO_2 emission factor in UES of Ukraine for the power replacement projects in year *y*, tCO_2e/MWh;

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

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

Not applicable

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

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 *(Please use*	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/	Comment

numbers to ease cross-referencing to D.2.)							paper)	

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 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_2 equivalent):

Emissions reductions are calculated as follows:

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

where
ER_y = Emission reduction during the period y, tCO_2e;
BE_y = Baseline emission of the greenhouse gases in the period y, tCO_2e;
PE_y = Greenhouse gases emission caused by the project activity in the period y, tCO_2e;
LE_y = Leakages emission in the period y, tCO_2e.

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:

Any negative impact on the environment as a result of project implementation is absent. Accordingly, the requirements of the country where the project is implemented cannot be applied.

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 "Khmelnytskoblenergo PJSC Power Distribution System Modernization"[25] 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. Detailed description of this parameter is given in Section B.1.

Quality control and quality assurance of all data used to monitor emission reductions made in the current system of quality ISO 9001, introduced by the company.

To calculate the monthly balance of power in "AES Rivneoblenergo" PJSC such steps are taken:

- during the whole billing month the structural units of "AES Rivneoblenergo" 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 "AES Rivneoblenergo" 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;

[25] http://ji.unfccc.int/JIITLProject/DB/9XPAA2DW94BXE7X3I5KWZ6JNQ6K0L9/details

- 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 "AES Rivneoblenergo" 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.

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.

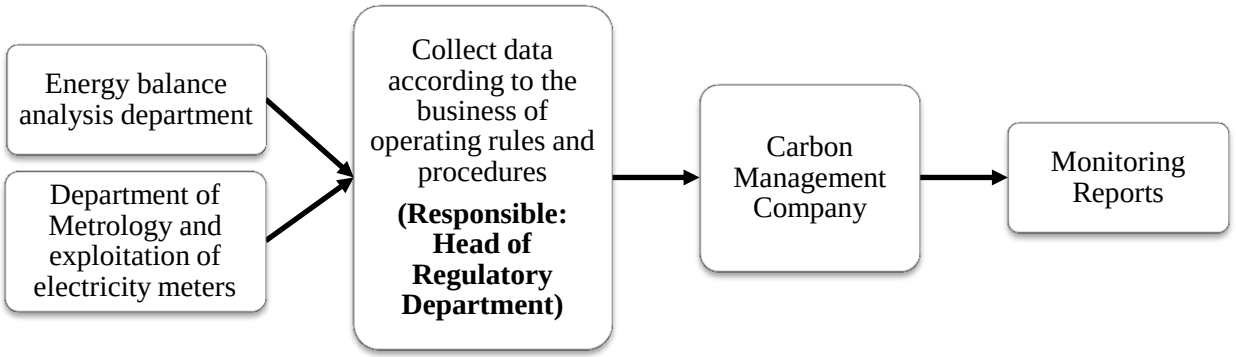

Figure 4. Scheme of data collection for the monitoring of the project parameters

Reduction of power losses in the grids of "AES Rivneoblenergo" PJSC is calculated on annual basis by the specialists of the technical consultant (Carbon Management Company), using the approach similar to one used in the registered (ITL UA1000316) PDD "Khmelnytskoblenergo PJSC Power Distribution System Modernization"[26] in accordance with the Article 9c of the Guidance On Criteria For Baseline Setting And Monitoring, Version 03, on the basis of statistical data of the company".

All data that will be collected during the monitoring must be kept in paper and electronic form in the archives of "AES Rivneoblenergo" 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:

Name of person / organization name, which established the monitoring plan:

Carbon Management Company GmbH

The person / organization that has established the monitoring plan is also a project participant. Contact details are presented in Annex 1.

[26] http://ji.unfccc.int/JIITLProject/DB/9XPAA2DW94BXE7X3I5KWZ6JNQ6K0L9/details

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 *20120726_ROE_ER.xls* file, which is attached to this PDD.

In Tables 11, 12 and 13 estimated baseline emissions are shown.

Table 11. Baseline emissions over the period from 01/01/2004 till 31/12/2007

Year	Estimated baseline emissions (tCO_2e)
2004	58 546
2005	66 397
2006	133 660
2007	109 675
Total for the period:	**368 278**

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

Year	Estimated baseline emissions (tCO_2e)
2008	177 077
2009	158 345
2010	156 240
2011	216 290
2012	302 805
Total for the period:	**1 010 757**

Table 13. Baseline emissions over the period from 01/01/2013 till 31/12/2028

Year	Estimated baseline emissions (tCO_2e)
2013	302 805
2014	302 805
2015	302 805
2016	302 805
2017	302 805
2018	302 805
2019	302 805
2020	302 805
2021	302 805
2022	302 805
2023	302 805
2024	302 805
2025	302 805
2026	302 805
2027	302 805
2028	302 805
Total for the period:	**4 844 880**

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 14, 15 and 16 below.

Table 14. Emission reductions over the period from 01/01/2004 till 31/12/2007

Year	Sum of the project leakage and emissions (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2004	0	58 546	58 546
2005	0	66 397	66 397
2006	0	133 660	133 660
2007	0	109 675	109 675
Total for the period:	**0**	**368 278**	**368 278**

Table 15. Emission reductions over the period from 01/01/2008 till 31/12/2012

Year	Sum of the project leakage and emissions (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2008	0	177 077	177 077
2009	0	158 345	158 345
2010	0	156 240	156 240
2011	0	216 290	216 290
2012	0	302 805	302 805
Total for the period:	**0**	**1 010 757**	**1 010 757**

Table 16. Emission reductions over the period from 01/01/2013 till 31/12/2028

Year	Sum of the project leakage and emissions (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2013	0	302 805	302 805
2014	0	302 805	302 805
2015	0	302 805	302 805
2016	0	302 805	302 805
2017	0	302 805	302 805
2018	0	302 805	302 805
2019	0	302 805	302 805
2020	0	302 805	302 805
2021	0	302 805	302 805
2022	0	302 805	302 805
2023	0	302 805	302 805
2024	0	302 805	302 805
2025	0	302 805	302 805
2026	0	302 805	302 805
2027	0	302 805	302 805
2028	0	302 805	302 805
Total for the period:	**0**	**4 844 880**	**4 844 880**

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

Table 17. Emission reductions over the period from 01/01/2004 till 31/12/2007

Year	Estimated project emissions (tCO_2e)	Estimated leakage (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2004	0	0	58 546	58 546
2005	0	0	66 397	66 397
2006	0	0	133 660	133 660
2007	0	0	109 675	109 675
Total for the period (tCO_2e)	**0**	**0**	**368 278**	**368 278**

Table 18 Emission reductions over the period from 01/01/2008 till 31/12/2012

Year	Estimated project emissions (tCO_2e)	Estimated leakage (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2008	0	0	177 077	177 077
2009	0	0	158 345	158 345
2010	0	0	156 240	156 240
2011	0	0	216 290	216 290
2012	0	0	302 805	302 805
Total for the period (tCO_2e)	**0**	**0**	**1 010 757**	**1 010 757**

Table 19. Emission reductions over the period from 01/01/2013 till 31/12/2028

Year	Estimated project emissions (tCO_2e)	Estimated leakage (tCO_2e)	Estimated baseline emissions (tCO_2e)	Estimated emission reductions (tCO_2e)
2013	0	0	302 805	302 805
2014	0	0	302 805	302 805
2015	0	0	302 805	302 805
2016	0	0	302 805	302 805
2017	0	0	302 805	302 805
2018	0	0	302 805	302 805
2019	0	0	302 805	302 805
2020	0	0	302 805	302 805
2021	0	0	302 805	302 805
2022	0	0	302 805	302 805
2023	0	0	302 805	302 805
2024	0	0	302 805	302 805
2025	0	0	302 805	302 805
2026	0	0	302 805	302 805
2027	0	0	302 805	302 805
2028	0	0	302 805	302 805
Total for the period (tCO_2e)	**0**	**0**	**4 844 880**	**4 844 880**

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:

All activities under the project do not connected with any negative impacts on the environment, therefore no EIA was specifically developed for this project.

Accordingly, the project also does not have any transboundary impact, as it is implemented in the Rivne region (Ukraine) and does not include any impact that may occur in another region or another country.

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 proposed project will have a positive influence on the environment comparing to the current state, since the reconstructions will improve the effectiveness of the power recourses use and will reduce the emission of the pollutants into the atmosphere. In such a way the influence from the reconstruction is insignificant.

SECTION G. Stakeholders' comments

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

The stakeholders are the citizens of Rivne 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 of Rivne state-owned TV and radio company, as well as in the printed media.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Project owner:

Organisation:	Public joint-stock company "AES Rivneoblenergo"
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Fax:	
URL:	http://www.aes-ukraine.com/rivne/
Represented by:	
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Annex 2

BASELINE INFORMATION

Please refer to Section B

Key information and data used for baseline setting

ID number	Description	Data variable
Table D.1.1.3. ID #3	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
Table D.1.1.3. ID #4	Carbon dioxide emission factor for projects of power loss reduction in power supply networks of Ukraine .	GEF_y

Annex 3

MONITORING PLAN

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