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Determination Report

ME «Kharkivski teplovi merezhi»

Determination of the JI Track-1 Project in the Ukraine:

«Rehabilitation of the District Heating System in Kharkiv City»

REPORT NO. 1201751

December 16, 2008

TÜV SÜD Industrie Service GmbH

Carbon Management Service
Westendstr. 199 - 80686 Munich – GERMANY

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Report No.	Date of first issue	Revision No.	Date of this revision	Certificate No.
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Subject: Determination of JI Track-1 Project	
Accredited TÜV SÜD Unit: TÜV SÜD Industrie Service GmbH Certification Body "climate and energy" Westendstr. 199, D-80686 Munich Federal Republic of Germany	**TÜV SÜD Contract Partner:** TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199, D-80686 Munich Federal Republic of Germany
Client: Municipal Enterprise "Kharkivski Teplovi Merezhi" Dobrokhotova str. 11 61037 Kharkiv, Ukraine	**Project Site(s):** Centralized heat supply system of Kharkiv City (CHP-4, heat distribution lines, etc.) Kharkiv City, Ukraine
Project Title: Rehabilitation of the District Heating System in Kharkiv City	
Applied Methodology / Version: project specific approach	**Scope(s):** 1, 2
First PDD Version: Date of issuance: 2008-07-15 Version No.: 01 Starting Date of GSP 2008-07-24	**Final PDD version:** Date of issuance: 2008-11-24 Version No.: 04
Estimated Annual (2008-2012) Emission Reduction: 200,268.5 tons CO_{2e}	
Assessment Team Leader: Thomas Kleiser	**Further Assessment Team Members:** Constantin Zaharia Anna Peretykina

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Summary of the Determination Opinion:

☒ The Certification Body "Climate and Energy" of TÜV SÜD Industrie Service GmbH has been ordered by the Municipal Enterprise "Kharkivski Teplovi Merezhi" (hereafter refer to ME "KTM") to validate the above mentioned JI Track-1 project in the Ukraine.

The determination of this JI project has been performed by assessment of the project design documentation and subsequent follow-up interviews. As a result of this procedure, it can be confirmed that the submitted JI project documentation is sufficient to determine the fulfillment of all stated criteria set by the Marrakech Accords and the Kyoto Protocol (as far as relevant for JI Track-1 procedure).

Project will meet the requirements as defined of in Ukrainian Order #718 from 10.08.2008 regulating Track-1 approval process [40]. Investor Party (the Netherlands) has been named, which is conform with the above mentioned governmental regulation. Thus, TÜV SÜD can recommend this JI project for acceptance as JI Track-1 project in the host country.

TÜV SÜD assessment team reviewed the estimation of the projected emission reductions. So, we can confirm that the indicated amount of emission reductions of 1,001,342.3 tons CO_{2e} (to be issued as ERUs) in the intended first crediting period from January 1, 2008 – December 31, 2012 (first Commitment Period of the Kyoto Protocol), resulting in annual average of estimated emission reductions of 200,268.5 tons CO_{2e}, represents a reasonable estimation using the assumptions provided in the JI project documentation.

☐ The review of the project design documentation and the subsequent follow-up interviews have not provided TÜV SÜD with sufficient evidence to determine the fulfilment of all stated criteria for JI Track-1 projects. Hence, TÜV SÜD will not recommend the project for registration and will inform the project participants on this decision.

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Abbreviations

ACM	Approved Consolidated Methodology
AIE	Accredited Independent Entity
BH	Boiler house
CAR	Corrective Action Request
CEF	Carbon Emission factor
CR	Clarification Request
DFP	Designated Focal Point
E-Energy	E-Energy B. V., authorized PP
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
IEE	Institute of Engineering Ecology, Project developer
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
KharkivOE	AK Kharkivoblenergo
KP	Kyoto Protocol
KTM	Municipal Enterprise “Kharkivski Teplovi Merezhi”
LoA	Letter of Approval
LoE	Letter of Endorsement
MP	Monitoring Plan
N/A	not applicable
NGO	Non-Governmental Organisation
PDD	Project Design Document
PIP	Project implementation plan
PP	Project Participant / Project Proponent
SICC	State Inspection on Commercial Controlling in Kharkiv Region
SVT	Europäisches Institut für Sanierung, Sicherheit, Versicherung und Umwelttechnik, project consultant
TÜV SÜD	TÜV SÜD Industrie Service LLC, Carbon Management Service
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

Industrie Service

Table of Contents

Page

Industrie Service

1 INTRODUCTION

1.1 Objective

The Determination objective is an independent assessment by a Third Party (Accredited Independent Entity or “AIE”) of a proposed project activity against all defined criteria set for the registration under the Joint Implementation (JI). In this particular case the assessment was conducted against JI Track-1 requirements set by the DFP of the host country (the Ukraine). Determination is part of a JI project cycle and will finally result in a conclusion by the executing AIE whether project documentation is sufficient and should be submitted for registration to the Designated Focal Point (DFP) of the host country. The National Environmental Investment Agency of Ukraine is the national DFP. The ultimate decision on the registration of a proposed project activity rests on the DFP of the Ukraine and other Party(s) involved.
The project activity as discussed in the Determination report has the title: “Rehabilitation of the District Heating System in Kharkiv City”.

Municipal Enterprise “Kharkivski Teplovi Merezhi has commissioned TÜV SÜD Industrie Service GmbH (Carbon Management Service) to conduct a determination of the above mentioned JI project. The project was initially designed as JI Track-2, but later was switched over to JI Track-1 path.

The only purpose of Determination is its use during the approval process as part of the JI Track-1 project cycle. Hence, TÜV SÜD cannot be held liable by any party for decisions made or not made based on the Determination opinion, which will go beyond that purpose. The Determination is also not meant to provide any consulting towards the client. However, stated requests for clarifications and / or corrective actions may provide input for the improvement of the project design.

The determination serves as a conformity test of the project design. In particular, the project baseline, the monitoring plan (MP) and the project compliance with host country criteria and relevant UNFCCC criteria – as far as relevant for JI Track-1 projects – have been validated in order to confirm, that the project design as documented is sound and reasonable, meets the stated requirements and identified criteria. Determination is considered necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reductions, in particular carbon credits (ERUs) within in the first commitment period under the Kyoto Protocol.

UNFCCC criteria refer to the Kyoto Protocol Article 6 criteria and the Guidelines for the implementation of Article 6 of the Kyoto Protocol as agreed in the Marrakech Accords.

1.2 Scope

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of JI project activities the scope is set by:

- The Kyoto Protocol, in particular § 6
- Decision 3/CMP.3, Decisions 2/CMP.2 and 3/CMP.2, Decision 9/CMP.1 and 10/CMP.1 (Marrakech Accords),
- Furthermore relevant aspects of Decisions 12/CMP.1 and 13/CMP.1
- specific guidance and decisions by the JISC published under http://ji.unfccc.int
- Guidelines for users of the JI PDD form
- applicable approved CDM methodology(s), e.g. AM0044, etc.
- technical environment of the project (technical scope)
- internal and national standards on monitoring and QA/QC
- technical guidelines and information on best practice,
- host county legislative requirements, incl. for JI Track-1 projects as set by the DFP.

The determination scope is defined as an independent and objective review of the project design documents (PDD) and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. The rules for JI Track-1 have to be defined finally by the DFP of the host country [40].

TÜV SÜD has, based on the recommendations in the Validation and Verification Manual – see http://ieta.org/ieta (2003) for further information – employed a risk-based approach in the determination, focusing on the identification of significant risks for project implementation and generation of emission reductions.

Initial version of the PDD document was made publicly available via TÜV SÜD own Internet platform www.netinform.de as well as on UNFCCC JISC webpage for a 30 day global stakeholder consultation process (GSP). According to CARs and CRs indicated within audit process the client decided to revise the PDD. The final PDD (version 04 from November 24, 2008) formed the basis for the final evaluation as presented by this report.

2 METHODOLOGY

The project assessment is a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see: http://ieta.org/ieta/www/pages/index.php?IdSitePage=392, 2003), an initiative of Designated and Applicant Entities, which argues for harmonization of the approach and quality of all such assessments.

In order to ensure transparency, a determination protocol was customised for the project. TÜV SÜD developed a "cook-book" for methodology-specific checklists and protocol based on templates presented by the VVM. The protocol shows in transparent manner criteria (requirements), the discussion of each criterion by the assessment team and results from validating of identified criteria. The Determination protocol serves the following purposes:

- It organizes, details and clarifies the requirements a JI project is expected to meet;
- It ensures a transparent Determination process where the validator will document how a particular requirement has been validated and the result of the Determination.

The Determination protocol consists of three tables. The different columns of these tables are described in the figure below. The completed Determination protocol is a part of this report (see Annex 1).

JI Determination Protocol Table 1: Mandatory Requirements for JI Project Activities				
Requirement / Checklist Question	***Reference***	***Comments***	***Draft Conclusion***	***Final Conclusion***
The checklist is organised in sections following the arrangement of the applied PDD version. Each section is then further subdivided. The lowest level constitutes a checklist question / criterion.	*Gives reference to documents where the answer to the checklist question or item is found in case the comment refers to documents other than the PDD.*	*The section is used to elaborate and discuss the checklist question and / or conformance to the question. It is further used to explain the conclusions reached. In some cases sub-checklist are applied indicating yes/no decisions on the compliance with the stated criterion. Any **Request** has to be substantiated within this column.*	*Conclusions are presented based on the assessment of the initial PDD version. This is either acceptable based on evidence provided (☑), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (see below). **Clarification Request (CR)** is used when the Determination team has identified a need for further clarification.*	*Conclusions are presented in the same manner based on the assessment of the final PDD version.*

Determination Protocol Table 2: Resolution of Corrective Action and Clarification Requests			
Clarifications and corrective action requests	***Ref. to table 1***	***Summary of project owner response***	***Determination team conclusion***
*If the conclusions from table 1 are either a **CAR** or a **CR**, these should be listed in this section.*	*Reference to the checklist question number in Table 1 where CAR or CR is explained.*	*The responses given by the client or other PPs during the communications with the Determination team should be summarized in this section.*	*This section should summarise the Determination team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final PDD".*

In case of a denial of the project activity more detailed information on this decision will be presented in table 3.

Determination Protocol Table 3: Unresolved Corrective Action and Clarification Requests		
Clarifications and corrective action requests	***Id. of CAR/CR 1***	***Explanation of the Conclusion for Denial***
If the final conclusions from table 2 results in a denial the referenced request should be listed in this section.	*Identifier of the Request.*	*This section should present a detail explanation, why the project is finally considered not to be in compliance with a criterion.*

2.1 Appointment of the Assessment Team

According to the technical scopes and experiences in the sectoral or national business environment TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV SÜD certification body "climate and energy". The composition of an assessment team has to be approved by the Certification Body ensuring that the required skills are covered by the team. The Certification Body TÜV SÜD operates four qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL)
- Greenhouse Gas Auditor (GHG-A)
- Greenhouse Gas Auditor Trainee (T)
- Experts (E)

It is required that the sectoral scope linked to the methodology has to be covered by the assessment team.

The Determination team was consisting of the following experts (the responsible Assessment Team Leader in written in bold letters):

Name	Qualification	Coverage of technical scope	Coverage of sectoral expertise	Host country experience
Thomas Kleiser	**ATL**	☑	☑	☑
Constantin Zaharia	T	☑	☑	☑
Anna Peretykina	T	☑	☑	☑

Thomas Kleiser is head of division CDM/JI by TÜV SÜD Industrie Service GmbH. In this position he is responsible for validation, verification and certifications processes for GHG mitigation projects as well as trainings for internal auditors. As assessment team leader he already conducted numerous validations and verifications of CDM and JI projects. Before entering this department he worked as expert on air quality measurements and emissions inventories as well as on environmental auditing within the environmental branch of the company. Reflecting on earlier projects he is familiar with political, economical and technical random conditions in the host country.

Constantin Zaharia is an environmental engineer and expert for projects in South-East Europe working as associate for TÜV SÜD Carbon Management Service. Being a trainee for qualifying as GHG-auditor, he has already been involved in several CDM/JI activities including the host country for this JI project. He is accredited for the following 5 UNFCCC scopes: 1, 4, 5, 10, and 13.

Anna Peretykina is an environmental engineer (M. Eng.) and expert for projects in Russian Federation and Commonwealth of Independent States in the department "TÜV SÜD Carbon Management Service" and is based in the TÜV SÜD Munich office. Being a trainee for qualifying as GHG-auditor she has already been involved in several CDM/JI activities, including the host country for this JI project. She assisted Mr. Kleiser and Mr. Zaharia by evaluating documents and data records, PDD review and final reporting.

2.2 Review of Documents

The first PDD version submitted by the client and additional background documents related to the project design and baseline were reviewed as initial step of the Determination process. A complete list of all documents and proofs reviewed is attached as Annex 2 to this report.

2.3 Follow-up Interviews

In the period of August 14-16, 2008 TÜV SÜD performed interviews on-site with project stakeholders to confirm selected information and to resolve issues identified in the first document review. The table below provides a list of all persons interviewed in the context of this on-site visit.

Name	Organization
Mr Sergey J. Andreev	Director, KTM
Mr Andrey P. Repin	JI project manager and coordinator, head of Technologic Department, KTM
Ms Tat'yana B. Gavriluk	Vice director in economics sector, KTM
Ms Tat'yana P. Zaporozhchenko	Chief accountant, KTM
Ms Galina A. Kuznetsova	Head of heat sales department, KTM
Mr Vladimir S. Borsch'	Head of metrological, tuning and testing department, KTM
Ms Natal'ya U. Bukhan	Head of law department, KTM
Mr Igor P. Fedorov	Chief metrologist, KTM
Ms Ludmila F. Chueva	Head of Ecology Group, KTM
Mr Andrey V. Dolzhenko	Engineer of Production and Technical Department, KTM
Dr. Dmitriy U. Paderno	Vice Director, IEE
Ms Tat'yana Grechko	Senior Engineer, IEE
Dr. Vladimir Gomon	Vice Director, SVT

2.4 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the Determination is to resolve the requests for corrective actions and clarifications and any other outstanding issues which needed to be clarified for TÜV SÜD positive conclusion on the project design. The Corrective Action Requests (CARs) and Clarification Requests (CRs) raised by TÜV SÜD were resolved during communication between the PPs and TÜV SÜD. To guarantee the transparency of the Determination process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the Determination protocol (hereafter refer to the Annex 1).

2.5 Internal Quality Control

As final step of a Determination the Determination report and the protocol have to undergo and internal quality control procedure by the Certification Body “climate and energy”, i.e. each report has to be approved either by the head of the Certification Body or his deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one.

It rests at the decision of TÜV SÜD’s Certification Body whether a project will be submitted for requesting approval as JI Track-1 project by the DFP of the host country or not.

It has to be stated here that for the approval of this project as JI Track-2 additional requirements would have to be fulfilled.

3 SUMMARY OF FINDINGS

As informed above all findings are summarized in Annex 1 (see Table 2) of the attached determination protocol. In total the assessment team expressed 32 Corrective Action Requests (CAR) and 10 Clarification Requests (CR).

History of the determination process

A first version of the PDD was submitted to the AIE in July of 2008. Based on this documentation, a document review and a fact finding mission in form of an on-site audit was performed in the Middle of August 2008. As a result of the determination process, the client revised the PDD according to the requests indicated during TÜV SÜD assessment work. The project also was switched from JI Track-2 to JI Track-1. The final PDD version provided on 24th November 2008 serves as the basis for the final assessment presented herewith.

Alterations undertaken are not considered to be significant with respect to the qualification of the project as a JI project based on the two main objectives of the JI, i.e. to achieve a reduction of anthropogenic GHG emissions and to contribute to a sustainable development.

Brief description of the project's main purpose

The project description as per the PDD (version 02) could be verified during the on-site audit. The project activity aims at rehabilitation of the district heating system (DHS) of Kharkiv City, Ukraine. Modernization measures are i.a. old boilers' replacement (efficiency increasing) and heat distribution network rehabilitation (re-organization, in parts even liquidation and reduction of heat losses), fuel switch (from coal to natural gas), installation of CHP units as well as of frequency controllers at electric drives of draught-blowing equipment and hot water pumps motors. As a result of the proposed project activity a sufficient reduction in fuel and electricity consumption can be achieved and energy efficiency is expected to be increased consequently.

Municipal Enterprise "Kharkivski Teplovi Merezhi" (hereafter ME "KTM") is one of the main producer and supplier of heat in Kharkiv City. The heat consumer is residential and public sector (ca. 80%). Heat supply is assured via district heating system. CHP-5 and CHP-3 plants are the other heat (and power) producer in the Kharkiv City. Without having their own distribution network, they forced to cooperate with ME "KTM".

Given that this JI project is implemented as designed, the project will obviously contribute to the sustainable development in the City and its surroundings. Ecological situation in the area, heat supply services for end consumers, etc. will be improved significantly. The anthropogenic emissions of GHG gases are to be reduced by significant lower consumption of fuel, implementing of a number of energy saving measures and using of natural gas with lower CO_2 emissions per unit of burned fuel energy instead of coal.

Project implementation status

Contract on development of the project design as JI activity was signed in September 2004 [11]. At the end of the year 2004 a Meeting on JI project realization in Kharkiv City took place and related Order Nr. 622 on implementation of Kyoto Protocol mechanisms at ME "KTM" was signed by the director of this Municipal Enterprise [12]. Evidently earlier start of the project implementation (purchasing of the relevant equipment, etc.) was only possible due to City Council decision prioritizing measures as indicated in the final PDD. Pre-condition for the extended financing in this

field was consideration of the proposed project activity as JI project and the final contract with potential ERUs buyer was signed in September 2007 [41]. See discussion on additionality issue below. To the date (End of November 2008) several measures should be already implemented (see Appendix 1 for proposed and already real dates).

To be in line with the CDM/JI glossary, the project starting date is therefore March 11, 2004 – first meeting at ME "KTM" within the project activity was considered as JI [12]. Hence, the timeline of the project is understandable and JI was seriously considered before the starting day of the project implementation on-site.

Project boundaries

Project activity (and baseline by reason of its ex-post re-calculation) encompasses 277 boiler-houses with 610 hot-water/steam boilers, CHP-4 plant and 1411,5 km of heat distributing network.

CAR3 requesting further clarification on total number of boilers included in the project boundaries was closed within the determination procedure. Sufficient information is provided, i.e. instead of the fact that in sum 284 boiler-houses existed in 2003 some of them were then switch to CHP or other boiler-houses and then have been liquidated. So, PP included only 277 of them in the project baseline. Appendix 1 provides detailed list incl. time schedule for respective work execution.

Requested information (see **CAR1**) and follow-up requests **CAR1.1** - **CAR1.5** with regard to the more transparent description of the project boundaries, incl. drawings showing the heat generation and delivery system of Khabarovsk City was provided to the full extent in chapter B.3. of the final PDD (see also Ref. [14]). Further information as requested per **CAR4** on exact location of the project sites (address), type of project equipment and description of all measures to be implemented incl. time schedule is also provided in the updated PDD (chapter A.4.2.) and via Appendix 1. In addition, technical specifications for the new equipment to be installed at several project sites were provided during on-site visit in August 2008 [25-28].

Combined heat and power plants (hereafter CHP-3 and CHP-5) belonging to the private enterprises OJSC "Kharkivska CHP-5" (with 7 installed boilers) and CJSC "Teploelectrosentral-3" (13 boilers), were constructed in 80s to cover the heat and power demand of new constructed industrial enterprises. These facilities are connected with their consumer via municipal heat networks. However, both these plants are not within project boundaries. Some heat load (approx. 120 Gkal/hour from 345 boilers) will be re-distributed to these high efficient (97-98%) CHP plants. Fuel consumption will be kept at the same level. Increasing of efficiency at these plants is not envisaged (s. Appendix 1). Total heat load output will be the same. Due to the re-load, CO_2 emissions at the other project sites will be avoided. Relevant proof in this case is [30].

Kharkiv City encompasses 9 administrative districts and project relevant sites are spread over this territory. There is no heat import from neighboring municipal energy systems (s. Figure 3 in final PDD). Hence, there is no need for monitoring outside the project boundaries. The monitoring provisions as described in the monitoring plan (MP) are consistent with the project boundaries.

Project implementation will result in reduced amount of fuel fired at boiler-houses, CHPs. Products (amount of heat and power) supplied to consumers or used for own purposes is assumed to be equal and stable in the region, but will be determined yearly during project crediting time. Anyway, PP confirms, that no substitution of other energy sources in the Kharkiv City and Region energy system will occur. Hence, there is no need for monitoring outside the project boundaries.

Project specific approach (JI)

First of all a sufficient assessment on the application of other related CDM methodologies, i.e. AM0044, AM0009 and AM0048, have been provided in chapter B.1. Applicability criteria were analyzed in detail. Due to lack of data for thermal energy output (no thermal energy meters are

installed at the most of boiler-houses), project design institutes have developed a new concept for evaluation of this JI project (hereafter ”Methodology”), which is though similar in major parts to AM0044. Such components as fuel switch and energy efficiency improvement via installation of new co-generation units not covered by the above mentioned CDM methodology, but relevant parameters as described in ”Methodology” were considered by the baseline setting and ER calculation. Special host country conditions, like dependency of the Ukraine on the fuel supply from foreign countries, qualitative not stable heat supply services are taken into account, too. This ”Methodology” was already tested within similar JI Track-1 project activities in Chernigiv, Donetsk and Crimea Regions of Ukraine and considered as sufficient in the Determination Reports issued by the AIE (accredited independent entity) for JI Track-1 [15-17].

Baseline

Baseline alternatives:

In chapter B.1 (PDD ver. 04) detailed analysis of possible alternatives to the proposed project activity is provided. The most plausible baseline scenario is the continuation of the present situation, i.e. execution of repairing works to minimal extent (heat network lines and obsolete boilers) and on annual basis to keep the municipal DHS system in operation and to minimize the risk of possible accidents. Without consideration of JI aspect only a very slow reconstruction activity can be expected. Minimal annual repairing will not lead to the significant reduction of GHG emissions because of ongoing degradation and efficiency drop at the remaining DHS objects. Data sets provided e.g. in Appendix 8 shows that the overall actual emissions would stay at approximately the same level or even higher during the next years (baseline scenario).

In response to **CAR7, CAR13** and **CAR29** PPs have provided the assessment team with additional explanation on how the increasing of energy efficiency related to the installation of new steam-boiler and CHP units will be assessed. The efficiency of the boilers is calculated in accordance with Ukrainian internal methodology (s. [20] in Reference list – part of the final PDD).

CR8 refers to load re-distribution measures and availability of free capacities at relevant CHPs and boiler houses. PP provided necessary clarifications how this measure will influence the baseline calculations, too. Explanations provided clarify the special project circumstances and reasonability of assumptions made within the PDD.

Reasonability of some baseline assumptions and possible project scenario within crediting time has to be clarified (or corrected, when it comes to); for instance, national requirements concerning domestic hot water supply schedule (see **CAR9**). So-called “Rules of rendering of heat and hot water supply service to population” № 1497 (1997) determine hot water delivery schedule, which is to be approved by local authorities.

Information about local deficit of heating consumption and on local regulations with regard to the normative inside temperature in the buildings was not clearly described in the initial PDD. Relative link to these calculations was missing, too. Thus, with **CAR7** TÜV SÜD assessment team had to request for data sources relevant for baseline setting and its more detailed and transparent illustration in the PDD and calculation spread sheets. In the revised PDD (ver. 04) PP provides a reference to so-called “Rules of rendering of heat and hot water supply service to population № 1497” [18]. The unit is checking the compliance with this regulation based on consumer’s complaints. In spite of such quite uncertain and not really transparent approach (also in terms of ongoing verifications) this issue can be considered as closed now. From assessment team point of view, there are still some concerns on this point. For example, the residents are used to utilize the electric heater at home, instead of claiming their money back for non-satisfactory heat supply, etc. Anyway, such procedural method seems to be common practice in the host country.

Also **CAR7.1** is referenced to the above mentioned topic. An official proof stating that the total amount of heat delivered to consumers in baseline was enough to ensure inside temperature of 18°C was requested. PP confirms that the residential sector is sometimes "sub-heated". As a result, temperature inside the buildings is much lower than normative one, and hot water supply is insufficient or absent. Heat delivery less than necessary amount of heat and hot water are especially characteristic for Ukrainian municipalities. Similar situation in the other Regions is also described in the other JI Track-1 projects aiming at rehabilitation of the municipal DHS [15, 16, and 17].

Local population is protected by the relevant legislation [18] and heat suppliers have to refund the heat fees of its heat consumer on monthly/yearly basis. "Underheating" costs for further refund were equal to ca. 3% in baseline year 2003. Thus, the total amount of heat delivered by ME "KTM" in baseline was enough to ensure the normative inside temperature of 18°C.

In opinion of TÜV SÜD, repayments for less than 3% of the total payment for heat energy could be seen as a specific local problem regarding heat distribution or as a specific problem regarding insulation of the buildings and not as a general issue regarding Kharkov district heating. The assumption of compliance with the local requirements [18] is considered as correct.

CR2 and **CAR14** should be raised because of poor information on calculation of losses in distribution network. Reference to the Methodological Instructions, so-called «МУ 34-70-080-84» [31], which are commonly applied in the host country and were used to estimate emission reductions was given. These "Instructions" though do not consider efficiency of the distribution networks. Evidences on heat losses in distribution network have been provided during the on-site audit [24]. Explanations on how to check these values during verification process were provided as well. For monitoring of real emission reductions, incl. those achieved due to reduction of losses in the distribution network, in each reported year, the developed "Methodology" will be applied, and that do not contains efficiency of the distribution networks, too. To view of TÜV SÜD assessment team, this approach is not absolutely plausible and could lead to blurred ER estimation. Anyway the "Methodology" is based on the "Methodological Instructions..." [31], which have obtained an acceptance in the host country as technical standard and could therefore be a sufficient basis for the evaluation of real heat losses.

Outcome: Generally, the baseline emissions are generated emissions representing the historic, state-of-the-art technology.

Baseline calculation (incl. calculation of the baseline emissions and the emission reductions)

In spite of stable heat supply market in the region, it's though difficult to predict the real heat demand already at this stage of project implementation. Therefore, the "Methodology" base on the ex-post re-calculation of baseline emissions: so-called "dynamic baseline".

In order to clarify (or when it comes to correct) the mathematical rationale in the "Methodology", TÜV SÜD expert team has to request for more transparent description of all formulae applied and its clear linking (For example, there were values without any links/explanations in Appendix 1 "Boilers").

Clarifying the issue raised per **CAR11,** PP highlights that "Methodology" differs formulae *for estimation* of baseline emissions as presented in chapters D.1.4. and formulae indicated in other chapters D.1.1.-D.1.3. The latter will be used in annual Monitoring Reports *for calculation of real emission reductions* due to project implementation. Such factors as e.g. weather conditions, varying fuel heat value, etc. will be taken into account. Appendix 1 "Boilers" contains calculations which are made with using of formulae from D.1.4 (estimation). These forecasting calculations consider also efficiency increasing component. Appendix 1 of the revised PDD contains now (red colored) links to the relevant formulae in PDD (chapter D.1.4).

CAR19 and **CAR31** also refer to poor description of formulae applied, e.g. in Appendix 4 "Liquidation", column K (heat energy saving), etc. Due to liquidation of Heat Distribution Stations

(HDS) and construction of Individual Heating Points (IHP) close to consumer (usually in basements) heat operation will be adjusted, i.e. lower-temperature regime from 100-130°C to ca. 90-95°C. Due to replacing of 4-pipe lines by 2-pipes network (incl. shortened pipelines from main pipelines straight to IHPs), heat networks system organization will be improved significantly and heat energy will be saved consequently. Calculation of heat energy saving was made again in accordance with «Methodical instructions…» [31]. This is clearly described in the final PDD, necessary links to relevant formulae are provided for more traceability.

Taking into account the diversity of proposed measures, a short summary was requested with regard to the huge amount of information and related calculation as illustrated via Appendixes 1 to 9 (see **CAR28** and client response obtained).

In response to **CAR13**, PPs have emphasized ones again, that the baseline is ”dynamic” and will be re-calculated ex-post. The increase in heat supply under the project and the relation to the baseline scenario would be traceable and verifiable due to monitoring of such parameters as the number of heat consumers and the total heated surface.

Baseline emissions were calculated without taking into account the real values for electricity / heat supplied during e.g. 3 or even 5 most recent historical years prior to the implementation of the project activity (such approach is very common for CDM methodologies). Hence, baseline calculation is just a result of application of formulas and thus, a level of uncertainty could be considerably high.

PP chose the other than ”average annual” approach consciously. Fuel consumption is the only reliable parameter in the host country measured with the high level of accuracy. In contrast, there is no heat output accounting system. Boiler efficiency and fuel’s LHV are varying greatly. For instance, boiler’s load will often be adjusted manually and in the heat supply system - within a day and within a year. Averaging of such values without having a secure monitoring system would lead to the too uncertain baseline picture. PP’s response is reasonable and assessment team has to agree, accept this approach and close the issue raised per **CAR19**.

Several clarification requests were raised in order to clarify the new conditions for electricity production under the project scenario. **CR5** asked e.g. for realistic estimate of future electricity demand in the area, as proposed power output of new CHP units at boiler house of Salkivskiy Living Area (s. Appendix 6). In fact, statement was just misunderstood (s. **CR5**). Real average electricity demand equals to approx. 2 MW. It corresponds to 3 CHP units from “Pervomaiskdieselmash” (1890 kW in total) or 2 CHP units from „Caterpillar” (1060 kW x 2). Hence, issue could be closed.

Further issues (see **CR1**) with regard to the same project site (Salkivskiy Living Area) asked for demonstration of reasons on: why the installing of new CHP units instead of HOBs (heat only boilers) and electricity from CHP-3 and CHP-5 produce less GHG emissions. It was requested for compare the relative costs (per unit of energy produced), too. In case the proposed solution should appear more efficient, why not installing CHP units at all boiler houses where boilers are replaced. Aloud to PPs, installing of CHP’s is economically profitable only if the boiler house (where they installed) can consume produced electricity for own needs. The boiler house KSZHM is sufficiently big and could use electricity from new CHP units to meet own needs.

Actually CHP-4 doesn’t produce electricity at all since 1983. After the project implementation at this project site, the heat load here will be though enhanced (re-switched from other boiler houses) and frequency controllers at feeding water pumps are going to be installed. Also during the on-site visit in August 2008, TÜV SÜD team could close this issue by auditing of the PPs. More detailed information on this issue (see **CAR2**) was provided in Appendixes 1, 2 and 5.

Additional clarifications (or corrections, when it comes to) have to be requested via **CAR8**. The calculation rationale for CEF (electricity generation) was not clear enough. In opinion of AIE’s expert

team, it has to be calculated taking into account the electricity supplied also by CHP-3 and CHP-5 (Kharkiv City area).

On the one hand, during the summer CHP-3 and CHP-5 are not running or load is decreased significantly comparing to the heating season. It was also checked during on-site visit in August 2008 [30]. So, these CHP units could be seen as must-run units for heat production, and electricity generated is only a secondary product. Information on (decreased) load during non-heating period at CHP-3 and CHP-5 is provided in Appendix 1. Hence, the issue **CAR8** can be closed.

On the other hand, the Ukraine has united state power grid. In principle, new Carbon Emission factors (CEF) for 2006-2012 [32] could be used in the project calculations. Following more conservative approach and in order to avoid overestimations, PP uses ERUPT values for CEF, which are also varying and, hence reflect survey results. See [33] and clarifications in chapter B.1 of final PDD (v.04). In fact, emission reductions associated with electricity represent a negligible part of total project emission reductions, and the difference due to such calculations will be about 1 %. Thus, PP reasonable argumentation based on the conservative approach was accepted and issue solved.

Request for clarification **CR9** was settled within the determination process. The parameter BBEi (boilers efficiency in baseline %) was calculated according to Ukraine national methodology (see Ref. 20 from Reference list in the PDD). That' why, it was not possible to apply AM0044, in particular formulae (1). In spite of pretty similar conditions in Mongolia (ACM0044 was actually developed for a project in this country), PP has to consider and would like to avoid a lot of uncertainties by calculation of real ER. Boiler efficiency changes greatly depending on load, which also changes significantly within a day and within a year. Load manual adjustment is fraught with serious discrepancies. Further uncertainties by ER calculation (see **CAR30**) are clearly referenced in Annex 3 "MP".

Sufficient evidences (see **CAR29**) in terms of the prospected efficiency of the new equipment for heat (and electricity) generation are provided to AIE during on-site visit [34] as well as via list of web-pages linked to technical specifications from potential equipment supplier.

With approving of JI Track-1 procedures [40], host country has committed itself to consider also post Kyoto credits, i.e. carbon credits generated after the end of 2012. As the project lifetime is longer than 2012 (namely at least 20 years), PP has provided an extended ER estimations, i.e. until 2024. These AAUs – firstly reserved by the Ukrainian government - can then be transferred to PPs after the "post-2012" emission reductions have been monitored and verified, baseline re-determined and if a post-Kyoto JI Track-1 system will be agreed by COP/MOP.

Outcome: In opinion of the assessment team, all revisions were undertaken following the most conservative approach and are acceptable. GHG calculations are documented in a complete and transparent manner. Calculation of baseline emissions and the emission reductions can be considered as correct.

Additionality

"Tool for the demonstration and assessment of additionality" (version 05.2) – which is the most recent version – is applied to prove the additionality of the project.

Step 1. Legal framework of the host country

Ukraine has claimed district heating and municipal energy sector as a priority of the national energy-saving development. This trend is reflected for example in the Law of Ukraine "On energy saving" (latest amendment on 22.12.2005). But this and other relevant regulations in the host country have

Industrie Service

only a recommendatory character and do neither restrain the facility from further operation nor required the installation of the best available techniques for heat generation and distribution. Also for ME “KTM” to overhaul of the whole heating system is not economically attractive.

Step 3. Barrier analysis

Investment Barrier is the main proof of the project’s additionality. Lack of the own investment funds coupled with economic uncertainties prevents the implementation of JI project to the proposed extent and in a timely manner, i.e. to specify this project activity as JI project and to be able to gain carbon credits.

Outcome of international surveys’ analysis (s. relevant links in chapter B.2., step 3.a) demonstrates that, in spite of seemingly economic attractiveness and technical feasibility of such projects, essential financial barrier caused by the unclear pricing policy, unregulated management and ownership conditions and accumulated debt of heat producers still exists.

Analysis of the dynamic of heat tariffs was necessary (see **CR3.1)**. Evidences for the low and unrealistic tariff were provided to the AIE [20, 21]. Extract form the Austrian study portrays the situation like this: *”Non cost-covering tariffs cannot meet the revenue requirements and subsidy payments are too small to cover all costs and are often delayed. In addition, collection rates are going in line with increasing tariffs*” [Market Potential for District Heating Projects in the Ukraine and their Modernization with Austrian Technology, Vienna, 2004, p.3]. So, heat tariffs are fixed, low and unrealistic.

In response to **CR3.1**, whether bank loan is might available, PPs argue with, on principal, non-reasonability of such option to get an additional financing. ME "KTM" is a communal ownership enterprise and will not be able to give bank any proper guarantees. All its funds belong to territorial population. For this reason the property of enterprise cannot be a credit mortgage. Moreover, the calculated IRR values are very much lower than typical values of deposit interest rate in Ukrainian banks (up to 18 % in Ukrainian Hryvnas). Relevant link proving the statements provided on this issue are given directly in the PDD (chapter B.2, sub-step 3.a). Using of JI mechanism enables to slightly improve project attractiveness.

So, the proposed financing structure is a combination of own resources of ME “KTM” – whereas the financing rate is fixed according to the annual decisions of Kharkiv City Council [20] – and ERUs sales proceeds enhanced by carbon credit commitment. Thus, the project is not financial attractive without consideration of the ERUs revenues, as shown in a transparent manner in the financial analysis corroborated by the sufficient hard proofs submitted to the AIE (s. Appendix 9). Hence, instead of a long project pre-history till these days existing financial barrier is still realistic and credible, and this proofs the project additionality. So, only given that the project is implemented as JI project, the existing financial barrier would be really overcome and the project can be realized.

The investment analysis (Step 2) of the additionality tool is not applied. The barrier analysis (step 3) already demonstrates the additionality of the project to the full extent.

Anyway, calculation spread sheets (relevant Appendixes 7 and 9) were provided to the AIE for review and were analyzed carefully. ERUs revenues (2008-2012) build up approx. 5% of total investment cost and not affect IRR significantly. Theoretically, carbon credits could not be considered as reasonable source of project financing; and this project (as demonstrated per graphic **Figure 1**) is financially pretty attractive also without consideration of JI component (refer also to **CAR15**).

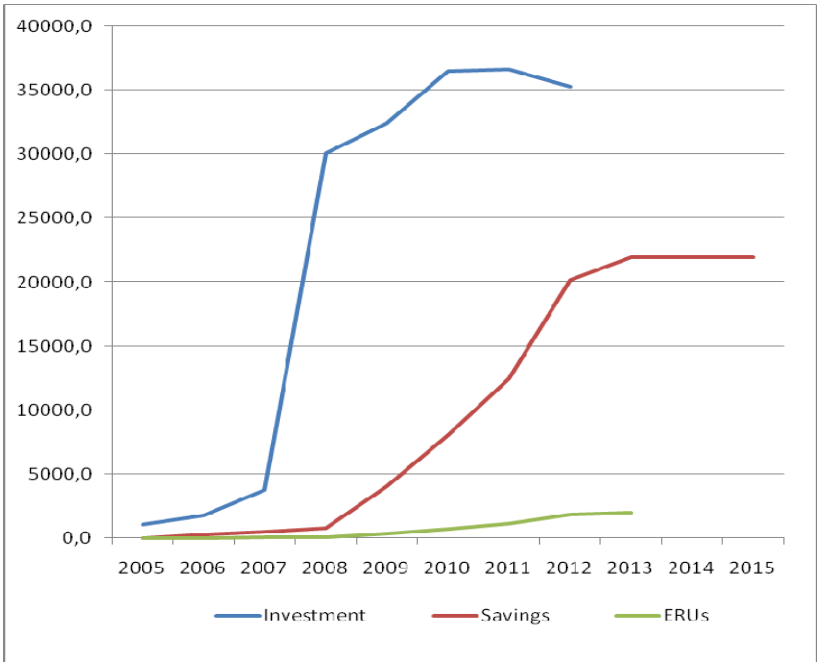

Fig. 1 Investment and return on Investment (fuel / power savings and ERUs revenues), in ths. EUR

Real benefits are saving of fuel and power, efficiency increasing (new burner and CHP units) and just because of higher heat calorific value of natural gas (for fuel switch measurements at some boilers). Further information on exact figures is provided in Appendix 9.

CR3 was referred to the outcome of the investment analysis as demonstrated in Appendix 9 "IRR-NPV": Net Present Value (NPV) without JI Project is: - 33 216 655 € and with JI Project is – 30 539 349 €. PP pointed out that NPV and Internal Rate of Return (IRR) were calculated for 2018 year (11 years from the project start). Thus, because of pretty long discounted payback period - more than 20 years (s. Appendix 9 for more detailed information on this point) - and relatively low return characteristic for this kind of investment projects, the financing from the third parties is very problematic. In order to minimize the obvious risk connected with above mentioned uncertainties the City Council had to require the ERUs consideration from the project owner.

The AIE though didn't received any documents clearly proving the transparency of the decision making process by local authorities and with clear regard to this particular project activity. But it looks like that at the time when the decision on rehabilitation of Kharkiv DHS system was taken, simply the hypothetical consideration of this investment project as JI was sufficient to start the extended project financing from City Budget. Local self-governing bodies (City Councils) are authorized to prioritize financing for projects of different kind [19].

Of course, repairing works to minimal extent (heat network lines and obsolete boilers) will and shall be executed by ME "KTM" to keep City's DHS in operation. But without JI consideration only a very slow reconstruction activity can be expected. Such annual repairing will not lead to any reduction in CO_2 emissions because of the ongoing degradation and efficiency drop at remaining DHS objects.

Contract with potential ERUs buyer was signed in September 2007 [41], i.e. ca. 3,5 years later after the "starting date of the project implementation" postulated in the final PDD (ver. 04). Anyway PPs highlighted in its response to CR3.1 that actually the fact of signing of this external economic contract contributed to the ongoing non-interrupted self-financing as approved by City Council. Thus, it's a matter of governmental/municipal funding. Letter of Endorsement signed by the representative of the Ukrainian Ministry of Environmental Protection confirms the recognized status of this project as JI and preliminary conformity with domestic requirements on the state level.

Step 4. Common practice analyse

In step 4, comparable activities proposed or partly implemented in other Ukrainian regions were analyzed.

In the past the most of investment projects in DHS sector were carried out at expenses of large depreciation charges included into energy tariffs. The investment situation and principles of the financial decision making changed completely after the breakup of Soviet Union. Nowadays, the depreciation charges are not included into energy tariffs and, therefore, such obviously economically attractive projects couldn't be implemented until now. Significant investment uncertainty in the host country is further reason of current situation, i.e. permanent liquidity problems, obsolete and low efficient equipment, necessity for the replacement of heat distribution pipelines (fabrication and commissioning dates are from 50s, heat losses up to 30%), etc. Similar projects [15-17] could also be initiated only due to municipal funds and under the precondition, that all these activities would have a JI status.

In order to clarify quite uncertain and even speculative character of projected course of action, IEE has submitted a letter of endorsement for this JI project issued in March 2008 and signed by the head of Housing, Public Utilities and Energy Department (Kharkiv City Council) [38]. This hard proof could be seen as a sufficient evidence of seriousness of the PP's intentions supported by the local authorities (s. also Appendix 12, LoE in Ukrainian language).

Determination team is of the opinion that the common practice analysis applied in the final PDD is complete and appropriate.

Outcome of the additionality assessment

In opinion of the TÜV SÜD assessment team this project could be considered as an economically attractive course of action. Also, PPs confirm this fact in the PDD. But taking into account all above mentioned facts, implementation of the JI project to the proposed extent and within the crediting time (first commitment period 2008-2012) would not lead to the GHG emissions reduction or contribute to the sustainable development in the project area (s. further arguments on this point below). Financial barrier is the main reason for it. Hence, the proposed project activity is additional.

Operational lifetime of the project / Estimation of the remaining lifetime

Aspect of the operational ability of the project equipment at least during the crediting period (remaining lifetime) was not described clearly enough and had to be requested (see **CR6**). It's true, that boilers and other project relevant equipment is obsolete and outdated (commissioning years 40s-70s). Anyway, PP argues that minimal repairing works of Kharkiv DHS will be executed on annual basis. Particularly, ME "KTM" executes repairing of network's parts and boilers that might cause accidents. After the so called "prolongation" regularly performed by the technical expertise entity "Derzhnagliadohoronpratsi" and in accordance with domestic standard - "DNAOP 0.00.-1.26-96" - operational lifetime of old boilers can be extended for the duration of at least 5 years (crediting period) or even for the whole period with minimal repairing if necessary.

These and further clarifications on reasonability of the remaining lifetime and specified for the different type of equipment within project boundaries are provided by the PP. (See PP response to **CR6**). Reference to the national standard used for the estimation of the remaining lifetime of the existing facilities of ME "KTM" in the absence of the project activity is provided. Plant license with validity until Middle of June 2012 can be considered as a sufficient evidence confirming the operational ability of the project equipment at least during the crediting period. As reference, see Appendix 11: Plant operational license issued by Ministry of Housing and Municipal Economy of Ukraine (provided only in Ukrainian language).

Industrie Service

Monitoring plan

Monitoring Parameters

Similar to the baseline assessment the PP uses own “Methodology”.

Only GHG emissions directly associated with heat production and distribution will be monitored as shown in the MP provided (PDD ver. 04, Annex 3). As per “Methodology”, the project doesn’t consider leakage emission source. It’s assumed that possible leakages are negligible, i.e. less than 1 % in total of direct emissions. Hence, leakage effect is taken to be “0”. In opinion of TÜV SÜD assessment team members, this approach is reasonable and conservative at the same time. Fuel supply to ME “KTM” includes gas pipeline, compressor- and gas distribution stations; coal is delivered by railway transport and lorries. But all these systems are not controlled by PPs and therefore considered as leakages.

In line with the suggested “Methodology”, the parameters which need to be monitored ex-post are fuel consumption as well as connection or disconnection of heat consumers, varying fuel heat value (LHV), and weather conditions during the heating period, ratio of the heat consumption for heating and for hot water supply, etc. For more detailed information refer to section D and Annex 3 (Monitoring plan). In the opinion of the AIE, list of the monitoring parameters is correct and complete.

Monitoring equipment and organizational structure

Envisaged reporting structure within crediting period is clearly described in relevant chapter of final PDD as well as in Annex 3 (s. related requests **CAR22** and **CAR23**). Specification on what records to keep, justification of storage area of those records and how to process documentation is provided to the full extent. For instance, only fuel consumption will be monitored permanently and recorded monthly. Fuel counters will be calibrated in accordance with the Law of Ukraine “About metrology and metrology activity” and National standard “Metrology. Calibration of measuring devises. Organizing and carrying out procedure” Different types of fuel counters have varying calibration interval. It is defined in “Guide 2007: Means of measurement equipment included in the State Registry of Ukraine by the state on 01.01.2008”. These references [46] were provided by PPs and are sufficient.

90% of boiler houses are equipped with automatic fuel accounting system. Gas flow commercial system is installed at gas distributing unit of a boiler-house that consists of gas flow meter and automatic corrector for temperature and pressure. Gas consumption is reduced to normal conditions and registered automatically. Fuel control at the remaining 10% of boiler-houses will be executed manually, i.e. gas flow commercial system is installed at gas distributing unit of a boiler-house that consists of gas flow meter, air temperature and temperature of the natural gas sensors and gas pressure sensor at the input to the boiler-house. Operators register parameters of gas: temperature and pressure in operational journals every 2 hours. These parameters are used to bring gas consumption to normal conditions. Support on paper and electronically will be organized. Daily (hourly) records at every boiler house, HDS and CHP are centralized monthly in ME ”KTM” office. All this information was provided within **CR10**.

In response to **CAR18** requesting for the level of accuracy and uncertainty in proposed monitoring methodology, PP has notified the high measurement accuracy (2%) related only to measuring devices for natural gas consumption and electricity (0.5%) generated or received from the grid. All other monitoring parameters are statistical data.

Several findings had been raised via e.g. **CAR5, CAR6** related to the more detailed description of the project operational and management structure, responsibilities and institutional arrangements for data collection and archiving, aspects of training and maintenance, quality insurance procedures and, submission of periodical reports.

PP submitted all required information in a sufficient manner (s. Annex 3 of the final PDD).There is no need to specify any additional JI related Work procedure at ME ”KTM”. Collection of information required for calculations of reductions of GHG emissions as a result of the project is performed in accordance with the procedure common for the enterprise. MP requires no additional information to be collected and archived, apart from the data already being collected and processed.

ME “KTM” - as a project owner - will be responsible for designing, engineering and installation works execution by its own personnel or via subcontractors’ services. ME ”KTM” has all licenses and permissions required under Ukrainian legislation to perform design and rehabilitation of the project equipment.

On-going technical trainings and re-trainings are carried out in accordance with the established plant standards [34, 35]. The technology involved in operation of new boilers doesn’t require special training. Transfer of new not widely approved technologies, e.g. co-generation units, etc. may hinder the proper activity implementation in time. But this technological barrier should be taken over due to equipment supplier services within the warranty period and after that. Supplier is also in charge for initial training.

The management experience in implementation of JI projects is though absent on-site, including international collaboration, determination, verification, registration, monitoring of similar projects and so on. In order to minimize this organizational barrier, Mr. Andriy Repin - Chief of the Production-Technical Service (PTS) at ME "KTM" - together with his team (from PTS staff) was appointed as a project manager and coordinator for this JI project on-site. Moreover, and as indicated in the MP (Annex 3), project design institutes (IEE together with SVT) will be responsible for organization of training seminar on data recording, JI specific methodological support as well as for monitoring and reporting of GHG emissions under the project implementation.

In response to **CAR6** and **CAR20**, PP provided all necessary information on the time schedule, measures, on Quality Control (QC) and Quality Assurance (QA) procedures and with regard to employee groups involved to guarantee the smooth project implementation during crediting time. Maintenance of existing equipment is a baseline scenario. Maintenance of CHP units (including wages for operation) and maintenance of new boilers and networks performed in Appendix 9. Dealing with emergencies and handling of malfunction within the project operational lifetime is regulated in the existing plant internal instructions. Proceeding in case of malfunctions is described like this: “*Failure should be firstly reported to the Project manager or Chief Engineer. If failure is not removed within 48 hrs, the equipment supplier should be ordered for repair. If repair is not possible, equipment should be replaced by equivalent item. Failure events will be recorded in the site events log book*”. The only possible missing data can be related to malfunction of flow meters for natural gas consumption or meters for electricity consumption. Hence, requests raised by the AIE (s. **CAR21**, **CAR24**) are settled now, too. For more detailed information on all arrangements made refer to the Annex 3 ”Monitoring plan” in final PDD (ver. 04). To view of the assessment team the discussion about these issues (s. **CAR25**, **CAR26**, **CAR27**) also related to further monitoring provisions is settled.

Environmental Assessment and contribution to the **sustainable development**

As this project activity aims at rehabilitation of existing facilities (so, not a new construction) leading in sum to better environmental performance of the system, no formal environmental impact assessment is required by the relevant Ukrainian authorities. References to the relevant host country legislative requirements are given. Anyway, in chapters F.1-F.2 of the final PDD (ver. 04) a detailed environmental impact analysis is provided. Outcome of this analyze shows: the project activity will result in the significant reduction of fuel burned, and such hazardous atmospheric emissions as carbon, sulfur and nitrogen oxides as well as fly-ash and particulate matter will be reduced sufficiently. Moreover, an outcome of the independent expertise conducted by Health Inspection Services in Kharkiv Region (February 2005) confirms that amount of hazardous emissions generated at facilities of ME “KTM” doesn’t exceed the permitted values and, thus, in conformity with relevant legislative requirements of the Ukraine. An environmental impact level is assessed as permissible [37]. Therefore, there is no need to introduce and monitor any further environmental indicators during project operational lifetime.

Besides GHG emission reduction the project is likely to achieve several positive social ”after effects”, e.g. improvement of heat supply quality via guaranteed normative level of temperature inside the residential buildings as well as more stable hot water supply service. In fact, the consumers’ houses are sometimes “sub-heated”. As a result, temperature inside the buildings is much lower than normative one, and hot water supply is insufficient or absent. Some specific monitoring parameters, such as registration of residents’ complaints for possibly poor-quality heat supply or measurement of internal temperature in specific buildings, aim at cross-check of advantages to be achieved from project implementation within crediting period.

Local stakeholder process

The project idea as JI project were presented at International Conferences, which were took place in Yalta (Ukraine) in 2004, 2007 and 2008. Governmental and district heating organizations should be involved in the comprehensive follow-up discussions.

As already mentioned above, for this JI project two letters of endorsement had been issued already in October 2007 and in March 2008 signed by representatives of the Ministry of Environmental Protection (former DFP of Ukraine) and by the head of Housing, Public Utilities and Energy Department (Kharkiv City Council), both supporting the proposed project activity [38, 39].

Instead of direct involvement of heat consumers in the MP and cross-check of effects from project implementation (temperature inside the buildings, sum of returned payments based on complaints from heat consumers) and in order to sensitize the local population (housing sector), local stakeholder process was though not initiated.

Generally speaking, as project activity will not cause any negative influence on environment or negative social effects, local stakeholder process is not required by the host country relevant legislation.

Miscellaneous findings

Additional issues were raised with regard to:

- traceable reference to the project implementation time schedule: **CAR3**, **CAR6**;
- description of project equipment **CAR10** and measures **CR6.1**;
- clear indication of the version number for Meth Tools used: **CR4**;
- clear indication of the roles for private institutions involved in the project development and implementation: **CAR32**;
- background information and necessity of a separate annex, summarizing the official sources of project relevant information: **CAR16**;
- correction of typos which though could impact the misunderstandings or influence results of ERUs calculation: **CAR12**, **CAR13.1**

and were solved in the final PDD.

Project approval status by Parties

The project is designed as a bilateral JI Track-1 project between Ukraine as a host country and The Netherlands (via E-Energy B.V.). Both Parties have indicated their national Focal Points (DFP) responsible for the approval of JI/CDM projects.

The Ukraine is an Annex-I-Party to the KP by ratifying of KP on February 4th, 2004. The host Party's assigned amount is calculated and recorded in accordance with the modalities for the accounting of assigned amounts and equals to 100% of emissions in 1990. In June, 2006 the Ukraine has submitted its Second National Communications within KP to UNFCCC. And in August 2008 Ukraine introduced Track-1 procedure for approving of JI projects [5]. This enables PPs to get credits issued and deal with them without having to submit projects to the UNFCCC JISC for approval. But under Track-1, projects can get credits from the Ukrainian government if at first a letter of approval (LoA) has been issued by the DFP of investor country. Track-1 classification of carbon credits, which are going to be generated, shall be emphasized there, too.

The Netherlands as a Party included in Annex I (s. JI guidelines §21) fulfils all eligibility requirements as well and, thus, can transfer and/or acquire ERUs issued in accordance with the relevant provisions. Official LoA issued by the Ministry of Economic Affairs of Netherlands authorizing a private entity E-energy B. V. as a PP was still outstanding to the date of completing of this Report [OI1]. This document is a part of project design documentation for the final step of the approval process by the DFP of the host country.

Moreover and before any transactions of ERUs generated from the Ukraine to the buyer Party will be undertaken, the project documentation initially published on UNFCCC webpage within JI Track-2 has to be withdrawn from JISC for transparency of the approval process of this project now is going to be approved as JI Track-1 project activity.

For any further details about CRs or CARs raised during the determination process as well as PPs responses please refer to the Annex 1 of the Determination report (Table 2 Resolution of Corrective Action and Clarification Requests).

For any further information about the documents reviewed during the determination process and review process related to the questions above please refer below to the Annex 2: Information Reference List.

Industrie Service

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on UNFCCC website by installing a link to TÜV SÜD own website and invited comments by Parties, stakeholders and non-governmental organizations during a period of 30 days.

The following table presents the key information on this process:

Webpage(s): http://ji.unfccc.int/JI_Projects/DB/YBMYI97HLW3UMEJYLKUVNRKN55JKCN/PublicPDD/SHV1PBTYIX7YMXUIKMVHPP9OSRKOC4/view.html http://www.netinform.de/KE/Wegweiser/Guide2_1.aspx?ID=5121&Ebene1_ID=26&Ebene2_ID=1612&mode=1	
Starting date of the global stakeholder consultation process: 2008-07-24	
Comment submitted by: No comments have been received.	**Issues raised:** -
Response by TÜV SÜD: -	

Industrie Service

5 DETERMINATION OPINION

TÜV SÜD has performed a determination of the following JI Track-1 project: “Rehabilitation of the District Heating System in Kharkiv City”.

TÜV SÜD has executed the determination of this JI Track-1 project on the basis of all currently valid and relevant JI criteria of the host country. The review of the project design documentation and subsequent follow-up interviews have provided TÜV SÜD with sufficient evidences to determine the fulfillment of stated criteria.

An analysis as provided by the applied project specific “Methodology” demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are, hence, additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions as specified in the final PDD version 04.

This JI project meets requirements as defined in Order # 718 [40]. To be conform with this regulation, the investor Party is clearly identified in the PDD and represented by E-Energy B.V. LoA for this particular project has to be signed by the DFP representative from the partner country (in this case Netherlands) and the Track-1 character of carbon credits expected to be generated shall be specified. Then, TÜV SÜD can recommend this project for approval as JI Track-1 project by the DFP of Ukraine.

TÜV SÜD assessment team has also reviewed the estimation of the projected emission reductions. So, we can confirm that the resulting total amount of emission reductions namely 1,001,342.3 tons CO_{2e} (to be issued as ERUs) represents a reasonable estimation in the intended duration of the project activity from January 1st 2008 to December 31st 2012, i.e. within the first Commitment Period of the Kyoto Protocol from 2008-2012.

The determination is based on the information made available to the AIE and engagement conditions detailed in this report. The determination has been performed using a risk-based approach as described above. The only purpose of the report is its use during the registration process as JI Track-1 project in the host country. Hence, TÜV SÜD cannot be held liable by any party for decisions made or not made based on the determination opinion, which will go beyond that purpose. This report had been submitted on basis of the latest publicly available regulations in the host country. This excludes any mandatory requirement which will be appointed belated

Munich, 2008-12-16

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Annex 1: Determination Protocol

Table 1: Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity The project design is assessed.					
A.1. Project Boundaries Project boundaries are the limits and borders defining the GHG emission reduction project.					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	10	DR, I	Yes, the geographical boundaries are clearly defined in the PDD.	☑	☑
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	14	DR, I	In principle the boundaries of the new planned facilities are described correctly. **Corrective Action Request No. 1:** However it needs more clearly map for CHP-3, 4 and 5 (page 10 of the PDD). The legend of the map is not in English. **Corrective Action Request No. 2:** CHP-4 is part of the project (page 2), but in the PDD there is no description of the works that will be performed at this unit. Is this unit producing electricity in present/after refurbishment? **Corrective Action Request No. 3:** S. page 5, Table 1 the total number of boiler houses at 01.01.2007 was 272 and at page 2 "Project includes 277 boiler-	**CAR 1** **CAR 2** **CAR 3**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			houses". Please explain.		
A.2. Technology to be employed Determination of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The AIE should ensure that environmentally safe and sound technology and know-how is used.					
A.2.1. Does the project design engineering reflect current good practices?	26	DR, I	Yes, the employed technology does reflect current good practice in the host country.	☑	☑
A.2.2. Does the project use state-of-the-art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	25, 26, 28,	DR, I	The project uses state of the art technology. It is not a business as usual as well. The technologies are very modern and completely changing old systems, however, **Corrective Action Request No. 4:** Types of new devices and facilities (e.g. HDS) as well as technical data should be described in the PDD.	**CAR 4**	☑
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	25, 26, 28	DR, I	It is not likely that the project technology will be substituted by a more efficient technology in the next 20 - 30 years. As for JI projects currently only a project period of 5 years (first commitment period from 2008 to 2012) it is ensured that there is absolutely no risk that this technology will be substituted by another technology	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			in this time.		
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	35 36	DR, I	Yes, it needs. **Corrective action request No. 5:** Aspects of training and maintenance have to be described more detailed in the revised PDD and should be done.	**CAR 5**	☑
A.2.5. Does the project make provisions for meeting training and maintenance needs?	36	DR, I	Except of the stated need of the required training (see A.2.4) there is no provision made for training and maintenance needs. The PPs stated that the training of the personnel will be performed. However there was no training plan available during on-site mission. **Corrective Action Request No. 6 :** Additional information concerning the time schedule, measures, concerned employees (group), responsibilities for trainings and maintenance should be included in the final revised PDD (in chapter D - monitoring).	**CAR 6**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B. Project Baseline The determination of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the discussion and selection of the baseline methodology transparent?	7 10	DR, I	Currently there are no binding requirements that approved methodologies (as in case of CDM) - for example, methodologies approved by UNFCCC for CDM projects – have to be applied for JI projects. So, it is in the free decision of the project developers whether they use an approved CDM methodology for their project or whether they would chose a project specific approach, described in a transparent, plausible, re-traceable and conservative manner. It has to be highlighted that in the existing project there is no known CDM methodology that fits to the baseline and project scenario of this particular project. So the proceeding of the project participants to develop a project specific baseline methodology is acceptable and	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			correct.		
B.1.2. Does the baseline methodology specify data sources and assumptions?	22 23 24 29 30	DR	Information about local deficit of heating consumption should be clearly described in the PDD, as well as link to concrete calculation for it. Also, in relation with Law 1 (inside temperature in the buildings) Moreover, there is no evidence on how the efficiency of the boilers has been calculated (measured). **Corrective Action Request No. 7:** Data and sources relevant for the baseline setting have to be elaborated more detailed and transparent manner. **Corrective Action Request No. 8:** On page 20 from PDD it's mentioned that EF for electricity generation and for reducing electricity consumption in Ukraine are used. Taking into account that in Kharkiv area electricity is supplied by CHP- 3 and CHP-5, please calculate the EF due to electricity generation from these units. **Corrective Action Request No. 9 :** What are the national requirements concerning domestic hot water? (24h/24h)	**CAR 7** **CAR 8** **CAR 9** **CAR 10**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Corrective Action Request No. 10 : At page 8 in PDD there is a statement: "oil fired boilers", please explain or correct.		
B.1.3. Does the baseline methodology sufficiently describe the underlying rationale for the algorithm/formulae used to determine baseline emissions (e.g. marginal vs. average, etc.)		DR, I	**Corrective Action Request No. 11 :** No, the described formulae to determine the baseline are not transparent and nearly not comprehensible. Especially because of the fact, that there's no underlying methodology, it's crucial to describe all formulae used in a traceable manner. **Corrective Action Request No. 12 :** At page 18 from PDD, it's used EF for NG 0.561 instead of 0.0561 [$ktCO_2/TJ$]. It shall be corrected.	**CAR 11** **CAR 12**	☑
B.1.4. Does the baseline methodology specify types of variables used (e.g. fuels used, fuel consumption rates, etc)?		DR, I	Yes, but see CAR below: **Corrective Action Request No. 13 :** The increase of the heat supply planned for the project scenario and the relation to the baseline scenario must be demonstrated much more clearly.	**CAR 13**	☑
B.1.5. Does the baseline methodology specify the spatial level of data (local, regional, national)?		DR, I	See CAR 1.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Baseline Determination The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	7 10	DR, I	None of the existing approved CDM methodologies can be directly applied to the project. See B.1.4. of this check-list.	☑	☑
B.2.2. Has the baseline been determined using conservative assumptions where possible?	22 23 24 30	DR, I	**Corrective Action Request No. 14 :** The efficiency of the boilers and the losses in the distribution network has to be assessed in more detail.	**CAR 14**	☑
B.2.3. Has the baseline been established on a project-specific basis?		DR, I	Yes, the baseline is established on a project-specific basis.	☑	☑
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	19 20	DR, I	Yes, the baseline takes into account the major national and sectoral policies, macro-economic trends and political developments.	☑	☑
B.2.5. Is the baseline determination compatible with the available data?		DR	Yes, generally the baseline determination is compatible with the available data. But See B.1.4.	☑	☑
B.2.6. Does the selected baseline represent a likely scenario in the absence of the project?		DR, I	Yes, the baseline does represent a likely scenario in the non-project case.	☑	☑
B.2.7. Is it demonstrated that the project activity itself		DR,	This is not business as usual.	**CAR 15**	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?		I	It is not common practice. **Corrective Action Request No. 15 :** The payback of 13.7 years – without ERU's and 13.5 years with the JI project (page 22 from PDD) has to be explained in more details. **Clarification Request #1** Please demonstrate that installing of CHP's – gas engines – in Salkivski area, instead of HOB's (heat only boilers) and electricity from CHP-3 and CHP-5 produce less GHG emissions. Also compare the relative costs (per unit of energy produced). If this solution is more efficient, why not installing CHP units at all boiler houses where the boilers are replaced?	**CR 1**	
B.2.8. Have the major risks to the baseline been identified?		DR, I	Yes, the major risks are described in the PDD and reflected on the project scenario.	☑	☑

B.2.9. Is all literature and sources clearly referenced?			Yes, **Corrective Action Request No. 16 :** But it should be considered whether a separate annex listing the different documents to establish the baseline could be added also as a separate annex to the PDD to make the process more descriptive and transparent.	**CAR 16**	☑
B.3. Additionality					
B.3.1. Is the discussion of how emission reductions are achieved by the project scenario in comparison to the identified baseline scenario provided in a transparent manner?	13 18	DR	The discussion of how emission reductions are achieved by the project scenario in comparison to the baseline scenario is provided in a transparent manner.	☑	☑
B.3.2. In case of using calculation models in order to demonstrate emission reductions: Are all formulae and input data based on provable records?	31	DR, I	**Clarification Request #2** The losses in the distribution network (baseline and project) are based on assumptions. Please explain how to check these values.	**CR 2**	☑
B.3.3. Does the PDD clearly demonstrate the additionality?		DR	**Clarification Request #3** Appendix 9 IRR NPV: NPV without JI Project is: - 33 216 655 € and with JI Project is – 30 539 349 €. See also CAR 15. Please explain. **Clarification Request #3.1** Evidences for additionality have to be	**CR 3** **CR 3.1**	☑

			provided: • Fixed low tariff • Bank loan not available • No municipality investment available (without JI) • With JI, municipality will finance the project.		
B.3.4. In case of using the additionality tool: Are all steps followed in a transparent and provable manner?	6	DR	**Clarification Request #4** S. page 21 it's stipulated the use of Additionality tool Ver 04, but the most recent is Ver 05.	**CR4**	☑
B.3.5. Does the discussion sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	18 19 20 21	DR, I	Yes. The discussion mentions national and sectoral policies and macro-economic trends.	☑	☑
B.3.6. Is the approach for demonstrating additionality provided by the most recent (or still applicable) methodology correctly applied?		DR, I	Not relevant, because no approved methodology has been used.	☑	☑
B.4. Project Boundary					
B.4.1. Are all emission related to the baseline scenario clearly identified and described in a complete manner?		DR,	Yes, they are.	☑	☑
B.4.2. In case of grid connected electricity projects: Is the relevant grid correctly identified due to the JISC guidance and the underlying methodology?		DR, I	No, see CAR 8	☑	☑

B.4.3. Are all emission related to the project scenario clearly identified and described in a complete manner?		DR, I	No, see CAR 8	☑	☑
B.4.4. Are all emission related to leakage clearly identified and described in a complete manner?		DR, I	Yes,	☑	☑
B.5. Detailed Baseline Information					
B.5.1. Is there any indication of a date when determine the baseline?		DR	Yes, 2003	☑	☑
B.5.2. Is this in consistency with the time line of the PDD history?	11 12	DR, I	Yes,	☑	☑
B.5.3. Is all data required provided in a complete manner by annex 2 of the PDD?		DR	No, but are described in chapter B. of PDD.	☑	☑
B.5.4. Is all data given in compliance with the methodological approach?		DR, I	Yes,	☑	☑
B.5.5. Is all data evidence by official data sources or replicable records?	22 23 24 29 30	DR, I	Yes, the most of the documents provided during the on-site visit are official ones, i.e. signed and stamped.	☑	☑
C. Duration of the Project/ Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	10 12	DR, I	Yes, the starting date of the project is stated in the PDD with the March 2004. The operational lifetime is defined as 20 years which is a plausible assumption for this type	☑	☑

			of project.		
C.1.2. Is the project's crediting time clearly defined?		DR, I	Yes, it lasts from January 1st, 2008 until the end of 2012 (corresponding to the first commitment period under the Kyoto protocol).	☑	☑
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate baseline methodology.					
D.1.1. Does the monitoring methodology reflect good monitoring and reporting practices?	31 33 35 36 44 45 46	DR, I	The described MP is project specific. **Corrective Action Request No. 17 :** The monitoring plan has to include also the possibility to proper measure the losses in the distribution network and the amount of heat delivered. Also, calibration requirements and procedures, responsible companies (third parties) in Ukraine should be described. A training plan should be prepared as well.	**CAR 17**	☑
D.1.2. Is the selected monitoring methodology supported by the monitored and recorded data?		DR, I	See D.1.1.	☑	☑
D.1.3. Are the monitoring provisions in the monitoring methodology consistent with the project boundaries in the baseline study?		DR, I	Yes, basically the monitoring provisions are in line with the project boundaries, but see CARs mentioned above.	☑	☑

D.1.4. Have any needs for monitoring outside the project boundaries been evaluated and if so, included as applicable?		DR, I	No, there is no need for monitoring outside project boundaries.	☑	☑
D.1.5. Does the monitoring methodology allow for conservative, transparent, accurate and complete calculation of the ex post GHG emissions?		DR, I	No, the project specific monitoring methodology is not transparent. See CARs mentioned above.	☑	☑
D.1.6. Is the monitoring methodology clear and user friendly?		DR, I	See D.1.5	☑	☑
D.1.7. Does the methodology mitigate possible monitoring errors or uncertainties addressed?		DR, I	**Corrective Action Request No. 18:** The level of accuracy and uncertainty for proposed monitoring methodology is not satisfactory for the calculation of ERUs. See CAR 16	**CAR 18**	☑
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?		DR, I	See CAR 17	☑	☑
D.2.2. Are the choices of project GHG indicators reasonable?		DR	See CAR 17	☑	☑
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?		DR	See CAR 17	☑	☑

D.2.4. Will the indicators enable comparison of project data and performance over time?		DR, I	Yes, but under the precondition that the CARs mentioned above will be solved.	☑	☑
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	31	DR, I	In the PDD the leakage is estimated at less than 1%.	☑	☑
D.3.2. Have relevant indicators for GHG leakage been included?		DR, I	N/A	☑	☑
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?		DR, I	See D.3.1.	☑	☑
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?		DR, I	See D.3.1.	☑	☑
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline emissions during the crediting period?		DR, I	**Corrective Action Request No. 19:** No, in addition to the parameters included in monitoring plan, there is a need to evaluate the heat output and losses in the distribution network. See also CAR 14 and CAR 17.	**CAR 19**	☑
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?		DR, I	Yes, if CAR 19 is solved.	☑	☑

D.4.3. Will it be possible to monitor the specified baseline indicators?		DR, I	Only if CAR 19 is solved.	☑	☑
D.5. Monitoring of Environmental Impacts It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.					
D.5.1. Does the monitoring plan provide for the collection and archiving of relevant data on environmental impacts?	37	DR, I	Generally, there is no negative environmental impacts are expected due to the EIA.	☑	☑
D.5.2. Will it be possible to monitor the specified environmental impact indicators?	37	DR, I	Yes, it's required by the plant standard procedures. Monitoring reports will be sent to the state/regional authority yearly.	☑	☑
D.6. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.6.1. Is the authority and responsibility of project management clearly described?	36	DR, I	The responsibilities and the structure of the project management (building the new facilities) is ME "Kharkivski teplovi merezhi".	☑	☑
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	36	DR, I	**Corrective Action Request No. 20:** In the PDD there are mentioned responsible parties for monitoring the data. However the description currently is not detailed and clear enough. For example it's not mentioned who is responsible for the preparing of the monitoring report.	**CAR 20**	☑

D.6.3. Are procedures identified for training of monitoring personnel?	35	DR, I	See CAR 5	☑	☑
D.6.4. Are procedures identified for emergency preparedness where emergencies can result in unintended emissions?	34 35	DR, I	**Corrective Action Request No. 21:** No, there are no statements about emergencies mentioned in the PDD. Please add some information on this criterion.	**CAR 21**	☑
D.6.5. Are procedures identified for calibration of monitoring equipment?	46	DR, I	No, only for Natural Gas meters, because the methodology doesn't foresee any other kinds of measurement.	☑	☑
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	46	DR, I	See D.6.5.	☑	☑
D.6.7. Are procedures identified for monitoring, measurements and reporting?		DR, I	No procedures for measurements. For monitoring are used only statistical data. **Corrective Action Request No. 22:** Please identify a reporting structure.	**CAR 22**	☑
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?		DR, I	No such procedures can be identified from PDD. **Corrective Action Request No. 23:** Please indicate the day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) in the PDD.	**CAR 23**	☑
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	46	DR, I	No such procedures can be identified from the PDD ver. 02. **Corrective Action Request No. 24:** Please provide procedures for dealing with possible monitoring data adjustments and	**CAR 24**	☑

			uncertainties in the PDD.		
D.6.10. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	34 35 45 46	DR, I	No such procedures could be identified. **Corrective Action Request No. 25:** Please provide procedures for internal audits of GHG project compliance with operational requirements in the revised PDD.	**CAR 25**	☑
D.6.11. Are procedures identified for project performance reviews?		DR, I	Except of general statements no procedures could be identified. **Corrective Action Request No. 26:** Please describe exact procedures for project performance reviews in the PDD.	**CAR 26**	☑
D.6.12. Are procedures identified for corrective actions?		DR, I	No, they still have to be identified. **Corrective Action Request No. 27:** Please describe in the PDD, how it`s envisaged to identify and perform corrective actions.	**CAR 27**	☑
E. Calculation of GHG Emissions by Source It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Predicted Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect		DR	Yes, project emissions, baseline emissions	**see**	☑

	GHG emissions captured in the project design?			and leakage are discussed in the PDD. But see CAR 8.	**CAR 8**	
E.1.2.	Are the GHG calculations documented in a complete and transparent manner?		DR	No, the provided excel calculation file uses formulae, which are not explained anywhere (see e.g. Appendix 1: "Boilers"). **Corrective Action Request No. 24:** Please describe GHG calculations documented in a complete and transparent manner.	**CAR 28**	☑
E.1.3.	Have conservative assumptions been used to calculate project GHG emissions?		DR	In principle, "yes". For distribution network the values are plausible, but for the new boilers the efficiencies (92 – 97%) seem to be too high. **Corrective Action Request No. 29:** Please provide evidence on how the efficiency of new boilers has been assessed. Also for the new CHP's and heat exchangers.	**CAR 29**	☑
E.1.4.	Are uncertainties in the GHG emissions estimates properly addressed in the documentation?		DR	Uncertainties are not quantified. **Corrective Action Request No. 30:** Please address uncertainties in the GHG emissions estimates.	**CAR 30**	☑
E.1.5.	Have all relevant GHG(s) and source categories listed in Kyoto Protocol Annex A been evaluated?		DR	Yes. Fuel combustion is the relevant source in this category.	☑	☑

E.2. Leakage Effect Emissions It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	14	DR, I	It is plausible, that outside the project boundary no leakage effects occur as described in the PDD.	☑	☑
E.2.2. Have these leakage effects been properly accounted for in calculations?	31	DR	See E.2.1.	☑	☑
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	31	DR	See E.2.1.	☑	☑
E.2.4. Are the calculations documented in a complete and transparent manner?		DR, I	See E.2.1.	☑	☑
E.2.5. Have conservative assumptions been used when calculating leakage?		DR, I	See E.2.1.	☑	
E.2.6. Are uncertainties in the leakage estimates properly addressed?		DR, I	See E.2.1.	☑	
E.3. Baseline Emissions The determination of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?		DR	Yes, under the pre-condition that all CARs concerning this topic mentioned above will be solved.	☑	☑

E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?		DR	Yes, under the pre-condition that all CARs concerning this topic mentioned above will be solved.		☑
E.3.3. Are the GHG calculations documented in a complete and transparent manner?		DR	Mostly yes. In Appendix 4 Liquidation, column K (heat energy saving) for e.g., the calculations are not fully traceable. **Corrective Action Request No. 31:** Please describe GHG calculations in more transparent manner.	**CAR 31**	☑
E.3.4. Have conservative assumptions been used when calculating baseline emissions?		DR, I	Yes, the baseline emissions have been calculated according to fuel consumption in 2003.	☑	☑
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?		DR	See CAR 30	☑	☑
E.3.6. Have the project baseline and the project emissions been determined using the same appropriate methodology and conservative assumptions?		DR	See CAR 31	☑	☑
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?		DR	Yes, the project will result in fewer GHG emissions than the baseline scenario.	☑	☑

F. Environmental Impacts Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the AIE.		DR, I			
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?		DR	Yes, the description of the environmental impacts is sufficient. The local stakeholder process was performed correctly.	☑	☑
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	39	DR,I	The project has been approved by Environmental Authority, without the requirement of an EIA.	☑	☑
F.1.3. Will the project create any adverse environmental effects?	37	DR, I	No, the project probably will not create any adverse environmental effects.	☑	☑
F.1.4. Are transboundary environmental impacts considered in the analysis?	37	DR	No, they are not considered. And actually there's no reason to analyse this criterion in this particular case.	☑	☑
F.1.5. Have identified environmental impacts been addressed in the project design?		DR,	Yes. See comments under F.1.1	☑	☑
F.1.6. Does the project comply with environmental legislation in the host country?		DR	Yes, see F.1.2.	☑	☑

Table 2: Resolution of Corrective Action and Corrective Action Requests

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
In principle, the boundaries of the new planned facilities are described correctly. **Corrective Action Request No. 1:** However, it needs more clearly map for CHP-3, 4 and 5 (page 10 of the PDD). The legend of the map is not in English.	A.1.2.	A scheme of the centralized heat supply has been provided during the on-site audit.	More transparent map (with legend in English) indicating the main municipal DHS sub-divisions is included in the PDD (v. 03), see Fig. 2. More detailed information of which boiler-houses (in sum 277) and 3 CHPs – with total number of installed boilers 639, 288 of those to be replaced - are the part of the project activity is summarized in the Appendix 1 "Boiler equipment". Further information of exact location of the project sites (address), type of project equipment and description of the measures to be implemented incl. time schedule is also provided in Appendix 1. The issue could be closed preconditioned CAR1.1-1.4 are settled.
Corrective Action Request No. 1.1: Generally, color attribution is not traceable and has to be re-reviewed by the PPs and Appendix 1 shall be updated. For instance:	Appendix 1, PDD v.03	Color attribution was excluded from re-reviewed Appendix 1-6. But the names of these files remained previous because other Appendixes have links with them. Appendix 1 was updated in a such way:	Updated Appendixes 1-9 were provided to the AIE for final review. Assessment team could confirm the more traceable organisation of the information provided.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
- Boiler houses, where frequency controllers are planned to be installed are not indicated as envisaged (per yellow color); - "furnace plant organizing" and "carrying out of boiler house from basement with gas furnace plant organizing": Are there any essential differences between these measures? - "Reconstruction of network system only" colored brown and number of boiler under replacement in the same line cannot be tolerated as it is, etc.		Measures such as: frequency controllers installation and liquidation or reconstruction of heating points where placed in the relevant boiler-house line in the column "Measures to be implemented" In the Appendix 1 also Boiler houses and their base data are listed, where there is no boilers reconstruction, only network system is reconstructed and heating points. More detailed reconstruction of network system and heating points are presented in Appendixes 2-6. Measure "furnace plant organizing" – means that furnace plant will be organized in existing boiler-house, and "carrying out of boiler house from basement with gas furnace plant organizing" - means that furnace plant will be organized in new place and basement of buildings will be release. These measures are different by location of furnace plants (in existing boiler-house or not), but the effect for the project is the same.	Also essential differences in execution of such measures as "furnace plant organizing" and "carrying out of boiler house from basement with gas furnace plant organizing" are highlighted and therefore more understandable for reviewer(s). The issue is closed.
Corrective Action Request No. 1.2: See Appendix 1: List of Implemented measures / or measures to be implemented in the next years are not complete specified for each specific project site.	Project boundaries Appendix 1, PDD v.03	In the Appendix 1 all Boiler houses and their base data (type of boilers, fuel consumption, power consumption etc.) are listed that are included in the project. Column "Measures to be implemented" contains only measures that concern to emission reduction calculated in this	Alterations undertaken improve the whole understanding of this project activity including so many project sites and complex measured proposed for execution. For more detailed information refer to

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		Appendix. Other measures (such as pipes replacement, CHP units installation are presented in Appendixes 2-6, where relevant emission reduction is calculated.	Appendixes 2-6. The issue is settled.
Corrective Action Request No. 1.3: See Appendix 1: Reasonability of old boiler with efficiency more than 85% shall be clarified. Moreover it's not conform to the project targets indicated e.g. in chapter A.4.2. (PDD v.03).	Project boundaries Appendix 1, PDD v.03	Appendix 1 contains column "Efficiency" that means - average efficiency of boilers that are in use at boiler house. For example: at the boiler-house Elektrovozna, 7a there were the following types of boilers in 2003- NIISTU-5 (8 pcs); KBNG-2,5 (2 pcs); KBNG-3,15 (1 pcs). Relative portion in work of boilers NIISTU-5 made approximately 15 % with efficiency of 75,5 %, thus relative portion in work of boilers KBNG made at level of 85 % with efficiency of 91 %. Not all boilers will be replaced according to the Appendix 1, only 8 boilers NIISTU-5. Some old boilers with efficiency less than 85% are not planed to be replaced within the project implementation because the main loses at this boiler-houses are in the networks. Their fuel consumption make less than 1,5 % from ME "Kharkivski teplovi merezhi" fuel consumption.	Statement in the PDD (s. chapter A.4.2.): "Old operating boilers with low efficiency will be replaced by the new highly efficient ones that will result in efficiency increase from 65-85% up to 90-93%" could course a misunderstanding of the project idea or lead to the generalisation. In fact, e.g. not all boilers with efficiency less than 85% are going to be replaced within the project scenario. And what the "efficiency" values specified in Appendix 1 really mean is explained reasonably. This shall be considered by the verifier of the monitoring data provided by the project operator on the later stage of project implementation.
Corrective Action Request No. 1.4: See chapter A.2. Project description. PPs concede further extension of project	Project boundaries Appendix 1,	At present any further essential extension of the project is not planned. The corresponding changes are made in chapter A.2.	Statement "project… may be expanded by including the other DHS objects in the city" is deleted

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
boundaries, by mean of including of other Kharkiv' DHS project sites. To view of assessment team, it cannot be tolerated and have to be corrected.	PDD v.03		from the revised PDD (v. 04). So, the request is addressed as required.
Corrective Action Request No. 1.5: An electronic version reflecting also clear the baseline and the project boundaries should be included in the revised PDD.		An electronic version of clearly map in English for CHP-3, 4 and 5 was included in the revised PDD.	Included in the PDD (v. 03). This issue raised on clear indication of project boundaries could be closed after CAR1.1-1.4 are settled.
Corrective Action Request No. 2: **CHP-4** is part of the project (page 2), but in the PDD there is no description of the works that will be performed at this project site. Is this unit producing electricity in present/after refurbishment?	A.2.4.	CHP-4 is not producing electricity any more. The electricity production ended in 1983 and there are no planned measures for its reconstruction except the installation of frequency controllers' at feeding water pumps. This measure was already implemented in 2008. Only networks that attached to CHP-4 will be replaced under the project and several boiler-houses will be switched to it. See Appendix 1, Appendix 2 and Appendix 5 for more detailed information.	Sufficient explanation is included in PDD (v. 03). Also during the on-site visit in August 2008, TÜV SÜD team could close this issue by auditing of the PPs.
Corrective Action Request No. 3: On page 5, Table 1 the total no. of boiler houses at 01.01.2007 was 272 and at page 2 "Project includes 277 boiler-houses". Please explain.	A.2.5.	ME "Kharkivski teplovi merezhi" owned 284 boiler-houses in the base year 2003. 277 of them were included in the project baseline, see Appendix 1. Some of them were switched to CHP or other boiler-houses within the project during 2003-2007. Therefore the total number of boiler houses to the date 01.01.2007 was 272.	Sufficient information is provided. Documents provided to the AIE regarding project implementation schedule. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Corrective Action Request No. 3.1: In case project starting date 11/03/2004 and year 2003 is based year for the project, this statement from PDD (v.03) shall be clarified. "Load from some of them was switched to CHP or other boiler-houses within the project during 2003-2007."		This is print mistake. Right statement is: Load from some of them was switched to CHP or other boiler-houses within the project during 2004-2007.	Misleading statement was addressed. Project duration (starting date) is updated and in consistency with implementation schedule as specified e.g. in Appendix 1. Hence, the issue is eliminated.
Corrective Action Request No. 4: Types of new devices and facilities (e.g. HDS) as well as technical data. These documents should be included also as an annex in the PDD.	A.2.2.	Documents provided during the audit. Types of new devices and facilities as well as links to producer's sites included in the PDD paragraph A.4.2.	Links to producer's sites included in the PDD (ver. 03) and technical documentations provided during the site visit. The issue is closed.
Corrective Action Request No. 5: Aspects of training and maintenance have to be described more detailed in the revised PDD and should be done.	B.1.3.	Project includes operational expenses only linked with JI project. Maintenance of existing equipment is a baseline scenario. Maintenance of CHP units (including wages for operation) and maintenance of new boilers and networks performed in Appendix 9. The technology involved in operation of new boilers doesn't require special training.	Maintenance is provided by the supplier in the warranty period and after that. Also for initial training the supplier is in charge. The issue is closed.
Except of the stated need of the required training (see A.2.4) there is no provision made for training and maintenance needs. The PPs stated that the training of the	B.1.3.	Additional information concerning the time schedule, measures, concerned employees (group), responsibilities for trainings and maintenance is included in the revised PDD	Mr. Andrei Repin (project owner site) is in charge with training and maintenance activities. He designated the group of employees

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
personnel will be performed. However there was no training plan available. **Corrective Action Request No. 6 :** Additional information concerning the time schedule, measures, concerned employees (group), responsibilities for trainings and maintenance should be included in the final revised PDD (in chapter D - monitoring).		version 03 (Annex 3 – monitoring plan).	who will perform special training. The issue can be considered as closed now.
Information about local deficit of heating consumption should be clearly described in the PDD, as well as link to concrete calculation for it. Also, in relation with Law 1 (inside temperature in the buildings). Moreover, there is no evidence on how the efficiency of the boilers has been calculated (measured). **Corrective Action Request No. 7:** Data and sources relevant for the baseline setting have to be elaborated more detailed and in a transparent manner.	B.1.4.	Evidences have been provided during the on-site audit regarding boilers' efficiency and heat losses in distribution network.	See CAR No. 7.1. The efficiency of the boilers is calculated according to Ukraine internal methodologies [20], from Reference list (s. PDD). In the revised PDD (ver. 03), there are considerations regarding Law 1. The unit is checking the compliance with Law 1 based on complaints from consumers. The issue can be considered as closed now.
Corrective Action Request No. 7.1. However, a proof stating that the total amount of heat delivered to consumers in baseline was enough to ensure inside		The Methodology for "District Heating" projects in Ukrainian conditions was developed for application in different Regions Ukrainian. In some Regions the consumers receive less than	Repayment for less than 3% of the total payment for heat energy could be seen as a specific local problem regarding heat distribution or as a specific problem regarding

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
temperature of 18°C have to be included in the revised PDD.		necessary amount of heat, in the result of which the temperature inside the buildings is much lower than normative one, and hot water supply is insufficient or absent. Therefore this Methodology allows to take into account improving of the heat supply quality for the consumers and excludes deliberate reduction of heat delivery, and, in such a way, of fuel consumption with the purpose of increasing of generation of GHG emissions reduction units (ERUs) at the project activity. Delivery less than necessary amount of heat and hot water really took place previously in cities and regions of Ukraine, and is reflected for example in JI Projects "Rehabilitation of the District Heating System in Donetsk Region", "Rehabilitation of the District Heating System in Chernihiv Region", etc. However, total amount of heat delivered to ME "Kharkivski teplovi merezhi" consumers in baseline was enough to ensure the normative inside temperature of 18°C. According to "Rules of rendering of heat and hot water supply service to population" № 1497 from 30.12.1997, the enterprises must make the re-payments to population for delivery less than necessary amount of heat. The normative inside	insulation of the buildings and not as a general issue regarding Kharkov district heating. The assumption of compliance with the requirement of the relevant Law is considered correct. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		temperature should be not lower than 18 °C. Heat supply enterprise makes the re-payment: – 5% from payment for every degree from 18 to 12 °C; – 10% from payment for every degree from 12 to 5 °C; – When inside temperature is lower than 5 °C the payment is to be returned completely. ME "Kharkivski teplovi merezhi" made re-payments to consumers for underheating in 2003 base year. The sum was 1,7 mln. UAH, that is less then 3% from total payment for heat energy. Thus, inside temperature in 2003 base year according to conservatizm principle is considered to be not lower than 18 °C.	
Corrective Action Request No. 8: On page 20 in the PDD ver. 02 it mentioned that EF for electricity generation and for reducing electricity consumption in Ukraine are used. Taking into account that in Kharkiv area electricity is supplied by CHP-3 and CHP-5, please calculate the emission factor due to electricity generation from these units.	B.2.7.	Ukraine has united power grid; therefore, it is not correct to assume that in Kharkiv area electricity is supplied only by CHP-3 and CHP-5. We can use new Carbon Emission factors (CEF) for 2006-2012, taken from Table 8 "Emission Factors for Ukrainian grid 2006-2012" of "Ukraine-Assessment of new calculation of CEF" verified by TUV SUD Industrie Service GmbH.	Information on (decreased) load during non-heating period at CHP-3 and CHP-5 is provided in Appendix 1. Moreover, as checked during on-site visit, during the summer CHP-3 and CHP-5 are not running. So, these CHP units could be seen as must-run units for heat production and electricity generated is only a secondary product. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Corrective Action No. 9: What are the national requirements concerning domestic hot water? (24h/24h)	B.2.9.	Hot water supply service is realized by hot water delivery schedule, co-ordinated with local authorities.	There is "Rules of rendering of heat and hot water supply service to population" № 1497 from 30.12.1997" – [26] in the reference list.The issue is closed.
Corrective Action Request No. 10: On page 8 in PDD there is a statement: "oil fired boilers", please explain.	D.1.1.	The statement was at page 20 in PDD version 1. In the new PDD, version 2, this statement has been deleted.	The statement on page 20 doesn't exist anymore. Anyway, see e.g. chapter D.2: Fuel oil is still considered as fuel consumed or fired at the project relevant facilities. The issue is though closed now.
Corrective Action Request No. 11: The described formulae to determine the baseline are not transparent and nearly not comprehensible. Especially because of the fact, that there's no underlying CDM methodology, it's crucial to describe all formulae used in a traceable manner (for e.g. in Appendix 1 Boilers there are values without any links, explanations).	D.1.1.	A separate sheet or a legend will be included in revised PDD. Formulae presented in D.1.1. - D.1.3. will be used for monitoring of the emissions in the project scenario and the baseline scenario. They will be used in Monitoring report. The baseline is dynamic and depends on conditions of each reported year. Therefore we can't use these formulae in PDD to estimate emission reductions because we have no data (weather conditions, low heating value of fuels, etc.) for any reporting year yet. Formulae presented in D.1.4. are used to estimate emission reductions in PDD. Appendix 1. "Boilers" contains calculations which are	In the revised Excel sheets there are links (red coloured) to the calculations inserted in the PDD. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		made with using of formulae from D.1.4. These forecasting calculations are based on equipment efficiency increasing in course of project implementation. We added links with these formulae in PDD to Appendix 1.	
Corrective Action Request No. 12: On page 18 (PDD, v.03) EF for NG equals 0.561 instead of 0.0561 [$ktCO_2/TJ$]. Appropriate correction is necessary.	D.1.4.	The typo is corrected.	The typo is corrected in the revised PDD (v. 03). The issue is closed
Corrective Action Request No. 13: The increase of the heat supply planned for the project scenario and the relation to the baseline scenario must be demonstrated much more clearly.	D.1.7.	The **dynamic baseline** will consider any increase in the heat demand.	The no. of consumers and the total heated surface are parameters in the monitoring procedure. PPs response is sufficient. The issue is closed
Corrective Action Request No. 13.1 : In the table 4, page 20 from PDD (ver. 3), instead of kcal/m^3 it is written Gcal. Reasonable correction has to be done.	B.1.4	Reasonable correction was done.	Correction undertaken is correct. The issue is solved.
Corrective Action Request No. 14: The efficiency of the boilers and the losses in the distribution network has to be assessed in more detail.	D.3.1.	The calculations of losses in the distribution network (baseline and project) were made in accordance with methodology МУ 34-70-080-84. Losses in the distribution network are used only to estimate emission reductions. For monitoring of real emission reductions in any reported year the developed methodology will be used, that do	See Document [31] in Annex "References list" provided by the PPs. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		not contains efficiency of the distribution networks or the efficiency of the boilers.	
Corrective Action Request No. 15: The payback of 13.7 years – without ERU's and 13.5 years with the JI project (page 22 from PDD) has to be explained in more details.	D.6.1.	Net Present Value and Internal Rate of Return were calculated for 2018 year (11 years from the project start). The discounted payback period is more than 20 years therefore NPV for 2018 year is negative (- 33 216 655 € and with JI Project is – 30 539 349 €).	Documents regarding project costs have been provided to AIE and included in IRL [33], [34], [35]. The issue is closed.
Corrective Action Request No. 16: Should be considered whether a separate Annex listing the different documents to establish the baseline could be added also as a separate annex to the PDD to make the process more descriptive and transparent.	D.6.2.	Reference list is included in the revised PDD.	"References.pdf" is an additional annex added to the updated PDD (v. 03) providing a long list of nearly all information sources on how the baseline was set, methodological approach, host country regulations, etc.
Corrective Action Request No. 17: The monitoring plan has to be included also the possibility to proper measure the losses in the distribution network and the amount of heat delivered. Also, it should describe calibration requirements and procedures, responsible companies (third parties) in Ukraine The responsibilities and the knowledge conc. the collection of the data for JI	D.6.4.	The calculations of losses in the distribution network (baseline and project) were made in accordance with methodology МУ 34-70-080-84. Losses in the distribution network are used only to estimate emission reductions. For monitoring of real emission reductions in any reported year the developed methodology will be used, that do not contains efficiency of the distribution networks. In the revised PDD, the management of	See comments to CAR 14 and CAR 6. The issue is closed

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
should be included in the PDD (management of monitoring). The process should be generally described as well.		monitoring is described (See Annex 3 – monitoring plan).	
Corrective Action Request No. 18: The level of accuracy and uncertainty for proposed monitoring methodology is not satisfactory for the calculation of ERU's.	D.6.5.	IEE, will include in the revised PDD a calculation regarding the level of accuracy and uncertainty for the monitoring methodology. See monitoring plan (Annex 3).	In the new PDD it is included. The level of accuracy is related only to measuring devices for natural gas consumption (2%) and electricity – 0.5% (generated or received from the grid). All others parameters involved in monitoring process are statistical data. The issue is closed.
Corrective Action Request No. 19: In addition to the parameters included in monitoring plan, there is a need to evaluate the heat output and losses in the distribution network.	D.6.6	See CAR 16 See response to CAR 17	The monitoring process is not based on heat or heat distribution losses measurements. See also comments above. The issue is closed.
Corrective Action Request No. 19.1: At page 72, table 14 from PDD (ver. 3), the total baseline (2003) emissions is 2162832.6 and in Appendix 8 Baseline the value is 2199928. This discrepancy shall be explained or corrected.	D.4.1	The total (dynamic!) baseline emissions are different for any reported years. In the table 14 from PDD (ver. 03), the total Baseline emissions are presented for 2012 year and are 2162832.6 that is corresponds to Baseline emissions from Appendix 8 Baseline (see 2012 year). Value – 2199928 – relates to Baseline emissions in 2003 Base (not historical baseline!) year. Baseline for this project is dynamic. It's mean	Explanations support the AIE by the re-review of the calculated values. Calculation rationale represented in section E and Appendix 8 are considered as correct. Baseline emissions have been calculated by consideration of fuel and power consumption in 2003 at

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		that it depends on different factors. Dynamic baseline show what emission would happen in any reported year if DHS remains without changes. Baseline emissions for any reported year consist of the following factors: - fuel consumption in Base (!) year and adjustment factors - whether conditions, heating area, etc. in reported year. (Adjustment factors will be taken into consideration during monitoring); - power consumption in the Base(!) year 2003: - power production to the grid that will be replaced by power from new CHP units. For estimation of Baseline emissions fuel consumption, power consumption and power production to the grid in any reported year is constant and equal to 2003 year. But Carbon Emission factors (CEF) for electricity generation and electricity consumption in Ukraine used for Baseline emissions calculations are different for years 2003-2012. Baseline emissions are decreased from 2003 to 2012. See Fig. 5. Dynamic baseline and project emissions of GHG.	boiler houses operated by ME "KTM". Emissions caused due to power production to the grid are constant values. (This effects also above mentioned sources of GHG emissions under baseline scenario.) Though CEF is vary as settled in applied Operational Guidelines (ERUPT-4) [42]. Fig. 5 of the final PDD (v.04) or Appendix 8 provides all necessary information illustrating this approach. The issue is settled.
Corrective Action Request No. 20: Responsible parties for monitoring the	D.6.8.	Will be included in the revised PDD In the revised PDD, responsible persons of	Mr. Andrei Repin from ME together with IEE and SVT are in charge

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
data are mentioned In the PDD ver 02. However the description currently is not detailed and clear enough. For example it's not mentioned who is responsible for preparing the monitoring report.		monitoring are described (Annex 3 – monitoring plan).	with monitoring report. The issue is closed.
Corrective Action Request No. 21: There are no statements about emergencies mentioned in the PDD. Please add these statements.	D.6.9.	See Annex 3 – monitoring plan.	There is an intervention and reporting structure coordinated by Mr. Andrei Repin included in the revised PDD. The issue is closed.
Corrective Action Request No. 22: Please identify a reporting structure for monitoring and reporting.	D.6.10.	See CAR 20 See Annex 3 – monitoring plan.	See comment above. The issue is closed.
Corrective Action Request No. 23: Indicate the day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) in the PDD.	D.6.11.	See CAR 20 See Annex 3 – monitoring plan.	Daily (hourly) records at every boiler house, HDS and CHP are monthly centralised in ME office. Both on paper and electronically support. The issue is closed.
Corrective Action Request No. 24: Please provide procedures for dealing with possible monitoring data adjustments and uncertainties in the PDD.	D.6.12.	See CAR 18 See Annex 3 Monitoring plan.	The only possible missing data are related to malfunction of flow meters for natural gas consumption or meters for electricity consumption. The Ukraine standard is "Failure should be firstly reported to the Project manager or Chief Engineer. If

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
			failure is not removed within 48 hrs, the equipment supplier should be ordered for repair. If repair is not possible, equipment should be replaced by equivalent item. Failure events will be recorded in the site events log book." The issue is closed.
Corrective Action Request No. 25: Please include in the revised PDD procedures for internal audits of GHG project compliance with operational requirements.	E.1.2.	Is included in the revised PDD version 03.	Compliance of the project activity with the operational requirements is constantly controlled by responsible stuff of a boiler-house, and according to their reports – by PTS (Chief engineer). Possible bottlenecks and mistakes in project implementation should be identified and solved by responsible stuff of PTS. The issue is closed.
Corrective Action Request No. 26: Please describe in the revised PDD the procedures for project performance reviews.	E.1.4.	Is included in the revised PDD version 03.	See above The issue is closed.
Corrective Action Request No. 27: Procedures for identification and solving of possible mistakes should be included in revised PDD.	E.3.3.	Is included in the revised PDD version 03.	See above The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Corrective Action Request No. 28: Please describe GHG calculations documented in a complete and transparent manner.	E.3.4.	See CAR 11 Is described in the revised PDD version 03, subsection D.1.4. All Appendixes 1-6 contains calculations of GHG emissions reduction. Every Appendix contains calculations of GHG emissions reduction that corresponds to technologies used in the JI project. Appendix 1 - replacing of boilers, Appendix 2 - replacing of networks, Appendix 3 - replacing of heat exchangers, Appendix 4 - liquidation of HDS with network shortening, Appendix 5 - frequency controllers' installation, Appendix 6 - cogeneration units' installation. Total sums of ERs for every year and for every technology are tabulated in Appendix 7. Appendix 8 contains calculations of baseline emissions and project emissions as well as GHG emissions reduction for every project year, based on formulae presented in D.1.4. **Appendix 7** and **Appendix 8** contain links with all appendixes 1-6.	Preconditioned CAR 19.1 is closed. CAR19.1 is closed by assessment of the final PDD and updated Appendixes 1-9. Thus, CAR28 is also settled now.
Corrective Action Request No. 29: Please provide evidence regarding the efficiency of the new boilers. Also for the new CHP's and heat exchangers.	E.1.3	Solved during the audit. See also CAR 4.	Included in the new version (03) of the PDD. Technical documentation of the suppliers has been provided as links or hard copies. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Corrective Action Request No. 30: Please address uncertainties in the GHG emissions estimates.	E.1.4	See CAR 18 See Annex 3 – monitoring plan.	See comments to CAR 18. The issue is closed.
Corrective Action Request No. 31: Please describe GHG calculations in more transparent manner. In Appendix 4 Liquidation, column K (heat energy saving) for e.g., the calculations are not fully traceable.	E.3.3	See CAR 11 **Appendix 4** Liquidation contains calculations of GHG emissions reductions due to improvement of the heat networks system organization. It will be provided by liquidation of Heat Distribution Stations (HDS) and building of Individual Heating Points (IHP) with replacing 4-pipe lines by 2-pipe ones. It is common situation in Kharkiv city when main pipeline stretches near heated buildings several kilometers to HDS and then 4-pipe lines stretch back to heated buildings. In such situations ME "Kharkivski teplovi merezhi" establishes Individual Heating Points near the heated buildings (usually in basements) and lays short pipelines from main pipeline to IHP. This will enable to liquidate in total 46 km of pipes with different diameters. Calculations of heat energy saving were made in accordance with operating «Methodical instructions by definition of heat losses in hot water and steam heat networks» МУ 34-70-080-84.	The revised calculation spread sheets (xls. file) are more traceable and linked in a transparent way to PDD text. The issue is closed.
Corrective Action Request No. 32: Institute of Engineering Ecology acting on	A.3., Annex 1	Institute of Engineering Ecology was excluded from Annex 1 or chapter A.3.	Relevant parts of the updated PDD are updated as required.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
behalf of ME "Kharkivski teplovi merezhi" is not an authorized PP for this JI project. Thus, this entity is allowed to refer only in chapters B.4. and D.4. of the PDD. (Thus, not in Annex 1 or chapter A.3.)	PDD v.03		The Issue is closed.
-	-	-	-
Clarification Request #1 Please demonstrate that installing of CHP's – gas engines – in Salkivski area, instead of HOB's (heat only boilers) and electricity from CHP-3 and CHP-5 produce less GHG emissions. Also compare the relative costs (per unit of energy produced). If this solution is more efficient, why not installing CHP units at all boiler houses where the boilers are replaced?	B.2.7	Installing of CHP's – gas engines – is economically profitable only if the boiler house (where they installed) can consume produced electricity for own needs. The boiler house KSZHM is sufficiently big and could use electricity from new CHP units to meet own needs.	The boiler house KSZHM is one of the biggest boiler houses for district heating from Europe. TÜV SÜD team visited the location. The issue is closed.
Clarification Request #2 The losses in the distribution network (baseline and project) are based on assumptions. Please explain how to check these values during verification process.	B.3.2	The calculations of losses in the distribution network (baseline and project) were made in accordance with methodology «МУ 34-70-080-84». Losses in the distribution network are used only to estimate emission reductions. For monitoring of real emission reductions in any reported year the developed methodology will be used, that do not contains efficiency of the distribution networks.	See also comments to CARs above. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Clarification Request #3 Appendix 9 IRR NPV: NPV without JI Project is: - 33 216 655 € and with JI Project is – 30 539 349 €. See also CAR 15. Please explain.	B.3.3	Net Pesent Value and Internal Rate of Return were calculated for 2018 year (11 years from the project start). The discounted payback period is more than 20 years therefore NPV for 2018 year is negative (- 33 216 655 € and with JI Project is – 30 539 349 €).	See comments to CAR 15. Closed.
Clarification Request #3.1 Evidences for additionality have to be provided: • Fixed low tariff • Bank loan not available • No municipality investment available (without JI) • With JI, municipality will finance the project.		1.During the on-site visit the documents on tariff from the price inspection was provided. 2. No bank gives credits without the proper guarantees. ME "Kharkivski teplovi merezhi" is a communal ownership enterprise, and all its main funds belong to territorial population. For this reason the property of enterprise can not be a credit mortgage. 3. Municipality distributes the investments to all fields of city activity. The status of JI international project and the fact of signing of the external economic contract between ME "Kharkivski teplovi merezhi" and the purchaser of the Emissions reduction units, provides the priority for distribution of funds from the state and local budgets to the rehabilitation of the city district heating system, thus to provide fulfillment of international liabilities on the joint implementation project. After the decision on development of the JI	All referenced documents were submitted to the assessment team view. Detailed discussion on this point based on the special host country conditions and results of relevant surveys performed by the international entities is provided in chapter B.2. Outcome of this analysis: Project faces a significant financial barrier. Project status as registered JI project activity and consideration of future ERU revenues shall contribute to overcome this barrier. Clarification request is addressed in an appropriate manner. Relevant hard proofs are provided.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		Project on Green House Gas Emissions Reduction (year 2004) abrupt increasing of financings from the city budget took place. See table 10 in the revised PDD version 03. As the Project has not passed determination yet, the target financing is not present. After Project registration and acquisition of JI status, possibility for target financing will appear.	
Clarification Request #4 On page 21 it's stipulated the use of Additionality tool Version 04, but the most recent is Version 05.	B.3.4	Will be corrected in the new PDD. Additionality tool Version 5.2 is used in the revised PDD version 03.	Revision is checked in the updated PDD (v.03). CR is settled.
Clarification Request #5 Re: installation of CHP units at boiler houses of Salkivskiy Living Area. 3 CHP units from "Pervomaiskdieselmash" (1890 kW x 3) is not the same as 2 CHP units from „Caterpillar" (1060 kW x 2). What is the real electricity demand? Reasonability of this statement shall be clarified.	A.2. PDD v.03	1890 kW - is the total capacity of 3 gas engine-generator machines of JSC "Pervomaiskdieselmash", and 1060 kW is capacity of 1 Caterpillar" engine-generator machine. See PDD. Therefore 1060 kW x 2 = 2120 approximately equal 1890 kW. Annual electrical energy consumption at boiler house of Salkivskiy Living Area in 2003 was - 21998000 kW*h. Therefore real average electricity demand is 2.7 MW. But it is different in different periods (in winter larger, in summer – less) thus it is planned to install only about 2 MW capacity.	The statement in the PDD (ver 03) with regard to the capacities planed to be installed at boiler house of Salkivskiy Living Area was just misunderstood. In fact, alternatives are comparable. Additional clarification on this issue provided by the PP is reasonable. The issue is closed.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
Clarification Request #6 Such measures as e.g. replacement of old boilers by the new highly efficient boilers, switching of load from boiler-houses with obsolete equipment to modern equipped boiler houses and CHP plants and units, etc. seems to be economically the most attractive course of action and would have occurred anyway in the absence of the project activity. Please clarify this fact taking into account also an aspect of the operational ability of the project equipment at least during the crediting period (remaining lifetime).	B.1. PDD v.03 reasonability of the baseline scenario (at least during 2008-2012)	ME "Kharkivski teplovi merezhi" fulfils annual minimal repairing of the DH system to keep it working. Particularly it executes repairing of network's parts and boilers that might cause accidents. The most economically feasible and realistic scenario without carbon credits sales is a baseline scenario with very slow reconstruction activity, making a major overhaul of the heating system is not economically attractive and is not required according to valid regulations. Old boilers could remain in operation for the whole period when they pass the regular tests, with minimal repairing if necessary, without lifetime limitation; and at least during the crediting period. Switching of load from boiler-houses with obsolete equipment to modern equipped requires building of the new parts of network, that is the most expensive measure. Minimal annual repairing doesn't lead to drooping of baseline emissions because of degradation of the whole system with efficiency droop at other objects, the overall actual emissions of Supplier would stay on the approximately same level. This scenario is less environmentally favorable for the near future (including first commitment period 2008-2012), since GHGs emissions of Supplier will continue to be kept at the same level or even higher, but	It's true, that boilers and other project relevant equipment is obsolete and outdated. Anyway, PP arguments sound reasonable. After the so-called "prolongation" regularly performed by the technical expertise entity in accordance with domestic standards operational lifetime of old boilers can be extended essentially. Reference to the national standards used for the estimation of the remaining lifetime of the existing facilities of ME "KTM" in the absence of the project activity is specified (s. client response to CR#6). Plant license with validity until 2012 can be seen as a sufficient evidence confirming the operational ability of the project equipment at least during the crediting period. As reference, see Appendix 11: Plant operational license issued by Ministry of Housing and Municipal Economy of Ukraine (in Ukrainian language).

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		economically such scenario is more attractive. Generally, there are no requirements in any Ukrainian regulations on obligatory decommissioning of equipment after expending its normative lifetime. According to the domestic "Rules..." [ДНАОП 0.00.-1.26-96 «*Правила будови і безпечної експлуатації парових котлів з тиском пари не більше 0,07 Мпа (0,7 кГс/см^2), водогрійних котлів і водопідігрівачів з температурою нагріву води не вище 115 0С*»], after end of the normative lifetime the out-of-time technical examination should be made. Usual periodic examination for boilers should be made once per 4 years (external and internal examination) and once per 8 years (hydraulic pressure examination). License #345059 "For heat energy production, transportation by main and distribution networks, energy supplying" that was issued by Ministry of Housing and Municipal Economy of Ukraine to ME "Kharkivski teplovi merezhi" and is valid for 5 years till 2012 can confirm that operational life time of the boilers and networks is at least for this period. See Appendix 11 License.	
Clarification Request #7 Clear statement on whether "fuel switch" is		There were 8 coal operated boiler-houses in base year 2003: at Nizhinska 4, Poltavska 3,	Assessment team has analyzed the response provided by the PP: at the project sites Nr. 7, 12, 13

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
a part of the project activity or not is necessary. This kind of measures is missing in the list illustrated in Appendix 1. Otherwise information on page 2, 29, etc. (PDD ver 04) is misleading.		Tsygarevskiy lane 9, Paryzhskoyi komuny 23, Ak. Pavlova 30/30-A, Leningradska 30, Feyerbaha sq.12, P. Komuny 24. The type of fuel is specified in Appendix 1, column "Fuel type". Then in the column "Measures to be implemented" it is presented that instead of boiler-houses: Nizhinska 4, Poltavska 3, Tsygarevskiy lane 9, Paryzhskoyi komuny 23, the furnace plants will be organized with installation of small capacity boilers - AOGV-50 and KGB-100. These types of boilers are gas operable only, that is why switching of this boiler-houses to gas is obvious. Load from the boiler house at Ak. Pavlova 30/30-A is switched to the KSZHM boiler-house, which is gas operable. Calculations of emissions reduction for these boiler-houses were made with taking into consideration of fuel switch. Boiler-houses: at Leningradska, 30, Feyerbaha sq.12, P. Komuny, 24 are not planned to be switched to gas, therefore coal is also considered as a project fuel.	and 14 (s. Appendix 1) instead of old coal-fired boilers (type: NIISTU-5) new gas-fired equipment will be installed (small capacity boilers, type: AOGV-50 and KGB-100). These and further clarifications withregard to the proposed measures to be undertaken at other project site operating on coal (under baseline scenario) are consistent with information provided in Appendix 1. Thus, fuel switch from coal to natural gas is also a part of the project activity, which is considered by the calculation of ER. The issue is settled.
Clarification Request #8 A part of the total heat **load will be re-distributed** to **CHPs**, KSZHM, etc. But will steam-boilers at several other boiler houses be held off from the operation or	A.2. PDD v.03	71 boiler-house will be switched during the project to the following boiler- houses: Ilicha, 118, Gertsena, 17, Kotlova, 29, Volodarskogo, 57 b, Krasnooktyabrska, 7, Slavianska, 8, Volodarskogo, 88, boiler-house of Plant Hartron, KSZHM and CHP-3, CHP-4, CHP-5. These	Explanations provided clarify the special project circumstances and reasonability of the assumptions made within the PDD. Response provided should

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
even decommissioned? It is necessary to clarify how this measure will be influence the baseline calculations. Will it enable the ME «KTM» to operate with the same total heat output as in the baseline? Reasonable explanations have to be provided on how the envisaged load will be carried (via increased number of the operating hours, available capacities or high pressure equipment installed at relevant boiler-houses, CHPs). Why it's necessary to replace the boilers at boiler houses from those the load will be re-distributed to the other DHS project sites? Clear statement is necessary.		boiler-houses have reserve capacity, that is enough to accept load from boiler-houses, which will be closed. Total heat output will be the same. There is only one boiler-house among all boiler-houses with installed steam boilers, from which connected load will be switched. It is boiler-house Proskury str., 12 with 1 boiler DKVR-6,5/13. It is planed to switch it to boiler-house of Plant Hartron. But there was no connected steam load at boiler-house Proskury str., 12. Steam boilers provided only heat load in 2003 year. Boiler-houses where steam load was connected in 2003 have special marks "steam" in the column E -Boiler's type of Appendix 1. They are: K. Marksa, 17 (1 steam boiler NIISTU-5); Zhovtnevoyi Revolutsiyi, 59 (2 steam boilers NIISTU-5); Pushkinska,104 (2 steam boilers DKVR 2,5/13); Pomerky, 70 (3 steam boilers DKVR- 4/13); Valeryanivska, 113 (3 steam boilers Lankashir); K. Marksa, 17 (1 steam boiler NIISTU-5); Tynyakova, 7 (1 steam boiler E-1/9); Klochkovska, 366 (1 steam boilers E-1/9). But there is no switching of load planed at these boiler-houses. Thus, the total heat output will be the same and measure of switching heat load	contribute to transparency of measures proposed to be undertaken and make the verifications at the later stage of the project implementation easier. This issue is settled.

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		from one boiler-house to another will not have influence to the baseline. Besides this, changes in connected load (heating area, number of consumers, etc.) in the reported years will be compensated due to adjustment factors, which are described in detail in monitoring "Methodology". See Annex 3 Monitoring plan. There is no replacement of boilers at boiler houses from those the load will be re-distributed to the other DHS project sites.	
Clarification Request #9 It is still not clear, how the parameter BBEi – Baseline Boilers Efficiency, % was assessed / calculated. And why it was not possible to apply AM0044, s. formulae (1) in this case. Note: This CDM methodology was developed for pretty similar conditions in Mongolia.	Appendix 1, Chapter D.1.4. (project emission)	Parameter BBEi – Baseline Boilers Efficiency was taken from operation sheets of each boiler. Operation sheets established experimentally during the adjustment works are kept at the front of boilers at every boiler-house. The main cause of impossibility of AM0044 using for baseline calculation is no data for thermal energy output, because of thermal energy meters absence on the majority of boiler houses included in the project. According to AM0044 the following steps shall be used to estimate the baseline emissions: Step 1 – Determine the thermal efficiency of each baseline boiler The baseline thermal efficiency for each boiler included in the project boundary shall be determined using the following formula:	The source of data used in ER calculations is identified and could be considered as reliable. Operation sheets with indication of actual boiler efficiency will be established experimentally during the adjustment works on a regular basis. An extended explanation on why the approach from AM0044 cannot be applied in this specific case is provided. PP uses the project specific approach though based on acceptable methods, e.g. element of such national standards as ASME PTC 4- 19987, BS8458 or

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
		$\eta_{BL,m,I}$ = EG $_{BL,his,I}$ / FC $_{BL,his,I}$ (1) Where: $\eta_{BL,m,I}$ – Average baseline thermal efficiency of boiler 'i' EG $_{BL,his,I}$ – Average historic thermal energy output from the baseline boiler 'i' (MJ/yr). FC $_{BL,his,I}$ - Average historic fossil fuel consumption from the baseline boiler 'i' (MJ/yr). Where possible, the above calculation shall be based on historical data for the project activity site for the most recent 3 years before the implementation of the project activity. The average thermal output and fuel consumption value for 3 years will be used in the equation. This data shall be reported in the CDM PDD. Total thermal output for each baseline boiler will be determined from actual measured baseline data for steam flow, pressure and temperature, using acceptable standard methods as outlined in ASME PTC 4-19987 or BS8458 or other recognized national or international standard. Thus, without heat meters at each boiler (as in case of this project) it is impossible to use the AM0044 methodology.	other recognized national or international standard. Taking into account the absence of heat meters and non-traceability of the real plant operation (load will be adjusted manually and can vary greatly within a day and within a year) the assessment team had to accept the approach applied. In fact, averaging of such values without having a secure monitoring system would lead to the too uncertain baseline picture. The issue is closed.
Clarification Request #10 Specify the automatic/manual fuel control system. It's not described clearly enough.	Monitoring: Fuel consump-	Automatic fuel control (at ~90% of boiler-houses): gas flow commercial system is installed at gas distributing unit of a boiler-house that	Justifications of monitoring practice for fuel consumption is provided to the expected extend. Hence,

Draft report clarifications and corrective action requests	Reference to the table 1 & 2	Summary of project owner response	Determination conclusion
	tion	consists of gas flow meter and automatic corrector for temperature and pressure. Gas consumption is reduced to normal conditions and registered automatically. Manual fuel control (at ~10% of boiler houses): gas flow commercial system is installed at gas distributing unit and consists of gas flow meter, air and natural gas temperature sensors and gas pressure sensor at the input to the boiler-house. Operators register parameters of gas: temperature and pressure in operational journals every 2 hours. These parameters are used to bring gas consumption to normal conditions.	monitoring methodology reflects good monitoring practices. The issue is settled.
Outstanding issue Nr 1: Official LoA issued by the Ministry of Economic Affairs of Netherlands (DFP of the other Party involved) authorizing a private entity E-energy B. V. to act as a PP has to be provided to the AIE. Together with this LoA, TÜV SÜD can then recommend this JI project for acceptance as JI Track-1 project in the host country.	LoA (buyer) Track-1	LoA from the Netherlands is under preparation. Anyway, official LoA issued by the Ministry of Economic Affairs of Netherlands authorising a private entity E-energy B. V. as the PP will be issued, as it was explained by E-energy B. V., after submitting of the official LoA from Ukraine, which in turn may be issued only after submitting of the Final Determination Report to the National agency of Ukraine	In August 2008 Ukraine introduced Track-1 procedure for approving of JI projects [5]. This enables PPs to deal with credits without having to submit projects to the UNFCCC for approval. But under Track-1, projects can get credits from the Ukrainian government if at first a LoA has been issued by the DFP of investor country. ERUs Track-1 classification shall be emphasized, too. So, LoA is still outstanding, but has to be provided.

Industrie Service

Annex 2: Information Reference List

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
1.	UNFCCC homepage – http://www.unfccc.int including the Joint Implementation section – ji.unfccc.int			Guidelines
2.	Validation and Verification Manual, IETA/World Bank (PCF), http://ieta.org/ieta/www/pages/index.php?IdSitePage=392 // determination protocol (as background information)			Guidelines
3.	1996 Revised IPCC Guidelines			
4.	IPCC Good Practice Guidance and Uncertainty Management 2006			
5.	On-site visit and interviews conducted by the TÜV SÜD auditing team on August 14-16, 2008 in Kharkiv City (Ukraine): TÜV SÜD determination team on-site: Dr. Georg Zenk — GHG lead auditor Mr. Constantin Zaharia — GHG auditor (trainee), technical expert Ms. Anna Peretykina — GHG auditor (trainee), project manager Interviewed persons at project sites (Kharkiv City, Ukraine): Mr. Sergey J. Andreev — Director, KTM Mr. Andrey P. Repin — JI project manager and coordinator, head of Technologic Department, KTM Ms. Tat'yana B. Gavriluk — Vice director in economics sector, KTM Ms. Tat'yana P. Zaporozhchenko — Chief accountant, KTM Ms. Galina A. Kuznetsova — Head of heat sales department, KTM Mr. Vladimir S. Borsch' — Head of metrological, tuning and testing department, KTM Ms. Natal'ya U. Bukhan — Head of law department, KTM Mr. Igor P. Fedorov — Chief metrologist, KTM Ms. Ludmila F. Chueva — Head of Ecology Group, KTM			

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
	Mr. Andrey V. Dolzhenko Dr. Dmitriy U. Paderno Ms. Tat’yana Grechko Dr. Vladimir Gomon	Engineer of Production and Technical Department, KTM Vice Director, IEE Senior Engineer, IEE Vice Director, SVT		
6.	Tool for the demonstration and assessment of additionality (Version 05.2)			Meth. Tool
7.	AM0044 (v.01) “Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors”			CDM Methodology
8.	ACM0009 (v.03) “Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas”			CDM Methodology
9.	AM0048 (v.02) “New cogeneration facilities supplying electricity and/or steam to multiple customers and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels”			CDM Methodology
Hard proofs and relevant references provided by PPs				
10.	July 15, 2008	Initial PDD of JI project “Rehabilitation of the District Heating System in Kharkiv City” (version 02) as available on http://ji.unfccc.int/JI_Projects/DB/YBMYI97HLW3UMEJYLKUVNRKN55JKCN/PublicPDD/SHV1PBTYIX7YMXUIKMVHPP9OSRKOC4/view.html (project Ref.-nr. 0150)		PDD in GSP 24.07.-22.08.2008
11.	September 24, 2004 December 26, 2005	Contract Nr. 524/221866 on JI project development (until 31.06.2005) between IEE (project developer) and ME “KTM” Contract Nr. 43 on consulting in JI project designing and implementation: PDD (project specific methodological approach, monitoring plan) development, search of ERU purchaser, etc.	IEE & ME “KTM” SVT & ME “KTM”	Serious consideration of JI; project development
12.	March 11, 2004	Meeting Protocol on issue about realisation of Kyoto Protocol mechanisms at ME “KTM”, pointing out of the first steps	ME “KTM”	See Appendix 13: Starting date

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
	December 30, 2004	on project implementation as JI Order Nr. 622 on implementation of Kyoto Protocol mechanisms at ME “KTM” (main reason: financial barrier), on necessity of feasibility study, PIP (on monthly basis), validation by the AIE up to the end of 2005		Directorate decision on project implementation
13.	August 15, 2008	Information Sheet signed by the Head of the accounting department of ME “KTM” On comparison of financial sources from city budget (incl. for implementation of JI project starting from 2004) from 2001 to 2003 and from 2004 to July, 2008)	ME “KTM”	(Current) Project financing (Table 10, PDD v.03)
14.	August 14, 2008	Scheme of centralized heat supply system of Kharkiv city incl. location of CHP-3, -4 and -5 as well as several city-boiler-houses (heat distribution stations), pump stations, representation of the heat networks for specific districts of Kharkiv city.	Photo-report of the AIE	Project sub-measures and boundary
15.	May 25, 2004	Report Nr 453859: Determination of JI Track-1 project in Ukraine: “District Heating System Rehabilitation of Chernigiv Region”	TÜV SÜD	Project specific approach
16.	June 8, 2007	Report Nr 831042: Determination of JI Track-1 project in Ukraine: “Rehabilitation of the District Heating System in Donetsk Region”	TÜV SÜD	Project specific approach
17.	September 30, 2005	Report Nr 664242: Determination of JI Track-1 project in Ukraine: “Rehabilitation of the district heating system of Crimea”	TÜV SÜD	Project specific approach
18.	December 30, 1997	Rules of rendering of heat and hot water supply service to population № 1497	Ukrainian Government	Baseline setting and consideration of risks
19.	June 24, 2004	Law of Ukraine Nr. 1875-IV (article 7,) about housing and public utilities and about responsibilities of local governments in Ukraine	Ukrainian Government	Host country relative legislation

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
20.	July 01, 2006 August 10, 2008	Order Nr. 955 issued by the Cabinet of Ministers of the Ukraine "On establishment of tariffs for heating services for centralized district heating systems" Conclusion Nr.Nr. 567, 570, 571, 572, 575, 576 issued by the State Inspection on Commercial Controlling (SICC) in Kharkiv Region: specify the local tariffs for heat supply services of ME "KTM" on ½ year basis (price varies from month to month: from 07.2008 (Nr. 567) until 12.2008 (Nr. 576)	State authotity SICC	Legal requirement regulating heat price Note: ME "KTM" itself has no influence on establishment of heat tariffs
21.	October 04, 2006	Decision Nr. 804 (plus Annexes 1, 2, 3) of Kharkiv City authority On establishment of tariffs for heating services in Kharkiv City, provided by ME "KTM"	Kharkiv City Council	financial barrier
22.	March 20, 2003	Parameter chart of water boiler Nr. 5, 6 and 8 *// measures Nr.11 at BH location: Elektrovozna, 7 a* Type "NIISTU-5", boiler efficiency (%), conferred with State supervision authorities of Kharkiv City	ME "KTM"	performance comparison / old boilers
23.	December 30, 2005	Temporary parameter chart of water boiler Nr. 4 and 5 approved by the State supervision authorities of Kharkiv City	ME "KTM"	performance comparison / old boilers
24.	January 19, 2007	Heat supply annual report for year 2006 at ME "KTM" Clarification issued by the State Statistical Entity (SSE), also approved by the Main Office of Statistical Enumeration in Kharkiv Region (MOSE), KR on 22.01.07	SSE, MOSE	Project boundaries, also ref. to CAR3
25.	December 2007	Networks upgrading measures: new pre-insulated pipeline Quality Certificate Nr. 215/12 and product description // *s. Appendix 4 and fig 4 in the PDD* for tubes and new isolation material with 50 years guarantee from supplier	ONIKS Ltd., JISC Transprogress	Project technology
26.	2006	Investment Feasibility study Nr. XTC-001-TE01 on installation of frequency controllers indicated payback period ca. 1,5 year, achieved power effectiveness ca. 60% (first 2 years) Note: Reduction of transportation (heat) losses per reducing of the network' length: as a result pump capacities (and in parallel electricity consumption) could be reduced significantly	Elpro-M LCC, KharkovOE and ME "KTM"	new modified pumps with frequency controllers

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
	August 19, 2007	Contract Nr. 200811 on supply of frequency controllers units to KTM		On status of project implementation
27.	October 2004 – April 2007	“Carrying out of boiler house from basement with gas furnace plant organizing”: *Measure Nr.4 at BH location: Karpovskiy lane, 5/7* - Act on work completion incl. cost sheet: dated October 2004, - Acts on work completion (6 Acts): December, 2004 - Acts on work completion (2 Acts): August 2006 - Act on work completion Nr. 3299 // Reconstruction of gas volume corrector: March 2007 - Act on work completion (Nr. 159) // On liquidation of pipeline networks, installation of modern measurement and logging equipment (e.g. heat counter type “EEM-MWN-Ø65” or “Supercal”)	OJSC “Puls”, contractor	PIP on example of one project site
28.	-	Specification of new boilers of type “AOGV” // *measures NrNr.144,165,169, 171 etc. (s. Appendix 1)* confirmation of the fuel utilisation efficiency of ca. 92% (s. also Table 2 and Fig. 3 in the final PDD)	OJSC Mayak, manufacturer	efficiency of new boiler
29.	June, 2008	Act signed by the AK “Kharkivoblenergo” (KOE) total energy consumption (kW/h) at ME “KTM” in June 2008	KOE & ME “KTM”	Electricity from the grid
30.	January, 2008	Efficiency prove of CHP-3 and CHP-5: technical and economical parameter sheets, which confirms performance factor of these CHPs	OJSC ”Kharkivska CHP-5”	Calculations of ER; availability of capacities for re-load
31.	1985	Operating «Methodical instructions by definition of heat losses in hot water and steam heat networks». МУ 34-70-080-84	National Ministry	Calculation of heat losses (s. Appendix 10)
32.	August 17, 2007	“Ukraine. Assessment of new calculation of CEF” (Annex 2, Table 8) As reference to Emission Factors for Ukrainian grid 2006-2012	TÜV SÜD	Carbon Emission factor for Ukrainian grid
33.	May 2004	Operational Guidelines for Project Design Documents of Joint Implementation Projects - as developed by the Ministry of Economic Affairs of the Netherlands (ERUPT 4) -	Ministry of Economic	Varying Carbon Emission factors for

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
		Table B1 "Baseline carbon emission factors for JI projects generating electricity" Table B2 "Baseline carbon emission factors for JI projects reducing electricity consumption")	Affairs of the Netherlands	2003-2012 (baseline and crediting period)
34.	25.05.2005 15.12.2005	Ukrainian Law “On industrial safety and employment protection” (2004) Plant Order Nr. 311: on work safety department establishment Plant Order Nr. 714: on work safety program at ME “KTM” (incl. staff instructions on regular basis)	ME “KTM”	Plant standards on safety working conditions
35.	19.06.2008 31.07.2008	Ukrainian Industrial “Rules of operational staff attestation” (1996), further Ukrainian state “Rules…” on safety operation, incl. heat production and distribution facilities (1994-2004) Proof on implementation of Operational Rules: e.g. Orders Nr. 341 and 418: allowing the plant personal, e.g. welders, oxygen-cutting operators, etc. to operate the Project equipment, after passing of specific examination due to plant standards (electro safety class, etc.)	ME “KTM”	National rules on safety working conditions, Specific procedures for staff training at ME “KTM”
36.	August 27, 2001	Order Nr. 29: On approving of the standard organisation structure Incl. Annex 1 “Management structure“, clear responsibilities, positions, names	ME “KTM”	ME “KTM” Organization chart
37.	February 08, 2005	Official Conclusion Nr. 3.7/836 issued by the Health Inspection Services in Kharkiv Region (HIS) confirming that (hazardous) emissions amount of ME “KTM” doesn’t exceed the permitted values	HIS	EIA
38.	March 04, 2008	Letter of Endorsement Nr. 1099/0/16-08 signed by Mr. S. Kadigrob (Kharkiv City Council, Department of Housing, Public Utilities and Energy)	Municipal authority	Status of project approval
39.	October 29, 2007	Letter of Endorsement Nr. 3152 signed by Mr. S. Kurulenko (representative of the Ukrainian Ministry of Environmental Protection)	Former DFP (Ukraine)	Status of project approval
40.	August 10, 2008	Order # 718 “On changes to the Order #206 from 22.02.2006 of Cabinet of Ministries of Ukraine”, enabling the DFP of the Ukraine to use JI Track-1 procedures in the host country	Goverment	JI Track-1 procedures in the host country
41.	September	Contract Nr. 221347 on ERU trading	KTM & E-Energy	ERUs buyer is defined

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
	21, 2007	signed by KTM and E-Energy (ERUs buyer and PP)		
42.	*	LoA (buyer country) * still to be issued by the by the Ministry of Economic Affairs of Netherlands (DFP of the other Party involved) authorizing a private entity E-energy B. V. to act as a PP and before ERUs generated can be transferred from the host country to the partner Party	DFP (buyer)	LoA (ERUs buyer)
43.	24.11.2008	Final PDD (version 04)	PPs	Final PDD
44.	June 12, 2007	License #345059, validity for 5 years till 2012 (s. Appendix 11 to PDD) “For heat energy production, transportation by main and distribution networks, energy supplying” issued by Ministry of Housing and Municipal Economy of Ukraine to ME "KTM"	Ukrainian Ministry	Remaining operational lifetime of the boilers and networks
45.	1996	National “Rules….” (Ukrainian original: ДНАОП 0.00.-1.26-96 «*Правила будови і безпечної експлуатації парових котлів з тиском пари не більше 0,07 Мпа (0,7 кГс/см^2), водогрійних котлів і водопідігрівачів з температурою нагріву води не вище 115 ^{0}C*», - after end of the normative lifetime the out-of-time technical examination should be made; - periodic examination for boilers should be made once per 4 years (external and internal examination) and once per 8 years (hydraulic pressure examination).	Domestic standard	On technical examination during and after the end of normative lifetime of major equipment
46.	January 01, 2005 2007	- Law of Ukraine “*About metrology and metrology activity*” from 01.01.2005 (In Ukrainina language: ст. 16 та 20 Закону України "Про метрологію та метрологічну діяльність” URL: http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=113%2F98-%E2%F0) - National standard “ДСТУ 2708: Metrology. Calibration of measuring devises. Organizing and carring out procedure” (in Ukrainin language: Національний стандарт України ДСТУ 2708 "Метрологія. Повірка засобів вимірювальної техніки. Організація та порядок проведення") - Calibration interval varying depending on type of fuel counters and defined in “Guide 2007 “Means of measurement equipment included in the State Regystry of Ukrain by the state on 01.01.2008” (In Ukrainian language: «Покажчик 2007. «Засоби вимірювальної техніки,	National authority	Calibration of fuel counters: standards

Ref-No.	Issuance date	Title/Type of Document	Editor	Additional Information, relevance in JI context
		занесені до Державного Реєстру України станом на 01.01.2008»)		