



VALIDATION REPORT

“MOLDOVA ENERGY CONSERVATION AND GREENHOUSE GASES EMISSIONS REDUCTION” PROJECT

REPORT No. 2005-1147

REVISION No. 01

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2005-11-07	Project No.: 28924654
Approved by: Einar Telnes <i>Technical Director</i>	Organisational unit: DNV Certification, Climate Change Services
Client: World Bank Carbon Finance Unit	Client ref.: Zarina Azizova

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
<http://www.dnv.com>
Org. No: NO 945 748 931 MVA

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Moldova Energy conservation and greenhouse gases emission reduction” project in Moldova on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design, baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV’s opinion that the “Moldova Energy conservation and greenhouse gases emission reduction” project, as described in the PDD of 8 December 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodologies AMS-II.E and AMS-III.B. Hence, DNV requests the registration of the project as CDM project activity.

Report No.: 2005-1147	Subject Group: Environment
Report title: “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction” Project	
Work carried out by: Ramesh Ramachandran, Mario Voros	
Work verified by: Michael Lehmann	
Date of this revision: 2005-12-12	Rev. No.: 01
Number of pages: 12	

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
	Market Sector
	y
<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit <input type="checkbox"/> free distribution within DNV after 3 years <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution	

© 2002 Det Norske Veritas AS

All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.



<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION	2
1.1 Validation Objective	2
1.2 Scope	2
1.3 Description of Proposed CDM Project	2
2 METHODOLOGY	2
2.1 Review of Documents	2
2.2 Follow-up Interviews	2
2.3 Resolution of Clarification and Corrective Action Requests	2
3 VALIDATION FINDINGS	2
3.1 Participation Requirements	2
3.2 Project Design	2
3.3 Baseline Determination	2
3.4 Additionality	2
3.5 Monitoring Plan	2
3.6 Calculation of GHG Emissions	2
3.7 Environmental Impacts'	2
3.8 Comments by Local Stakeholders	2
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	2
5 VALIDATION OPINION	2
REFERENCES.....	2
Appendix A Validation Protocol	

***Abbreviations***

CAR	Corrective Action Request
CDCF	Community Development Carbon Fund
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CFU	Carbon Finance Unit
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IDA	International Development Association
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
NPV	Net Present Value
ODA	Official Development Assistance
PA	Project activity
PDD	Project Design Document
SIF	Moldova Social Investment Fund
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

The World Bank Carbon Finance Unit has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Moldova Energy conservation and greenhouse gases emission reduction” project (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Mr Michael Lehmann	DNV Oslo, Norway	Team Leader, Energy sector expert
Mr Ramesh Ramachandran	DNV Chennai, India	GHG auditor
Mr Mario Voros	DNV Bratislava, Slovakia	GHG auditor
Mr Einar Telnes	DNV Oslo, Norway	Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual /7/, employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Description of Proposed CDM Project

This proposed category II.E (Energy efficiency and fuel switching measures for buildings) and category III.B (Switching fossil fuels) small-scale CDM project activity is promoted by the World Bank's Community Development Carbon Fund (CDCF). The project consists of efficiency improvements and fuel switching measures for a series of public buildings (kindergartens, schools, vocational schools, hospitals, polyclinics etc.). The project is based on the heat supply and efficiency improvements component of the World Bank Moldova Energy II Project, which nowadays is under implementation in the Republic of Moldova and contains four



components: electricity systems upgrade; heating supply and efficiency improvements; technical assistance and project management.

Each project activity is represented by an owner, which is either the central Ministry of Education (in case of schools and orphanages) or Ministry of Health (in case of hospitals) or the municipality/local authorities (in case of public buildings), all referred as PA-owners. A Carbon Finance Unit (CFU) was created under the Ministry of Ecology and Natural Resources for promoting the whole project and the CFU represents the individual PA-owners as CDM project participant.

The project is expected to reduce GHG emission by approximately 11 567 tonnes of CO₂-equivalents (tCO₂e) per year.

2 METHODOLOGY

The validation consisted of the following three phases:

- i) a desk review of the project design, baseline and monitoring plan
- ii) follow-up interviews with project stakeholders
- iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /7/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the “Moldova Energy conservation and greenhouse gases emission reduction” project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective Action Requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i>	<i>Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD /1/ (version of 18 August 2005 and revised versions of 8 December 2005) submitted by the World Bank Carbon Finance Unit and additional background documents related to the project design and baseline were assessed /2//3//4/.

2.2 Follow-up Interviews

On 22 and 23 September 2005, DNV conducted interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1 and the persons interviewed are listed in the “References” section of this report.

Table 1 Interview topics

Interviewed organisation	Interview topics
Project Manager - Carbon Finance Unit (Ministry of Ecology and Natural resources)	<ul style="list-style-type: none"> • Details of 27 PA (32 buildings) and associated boilers/power plants and Heating systems (Group 1 and Group 2 PAs) • Details of which facilities are new and which are retrofit. • Types of fuel used before and after in each of the PAs and associated facilities. • Overview of fuel switch technology and whether it represents good practice • Purchase and trade agreements with individual Project Owners • Procedures for operation and maintenance, training provisions, monitoring/reporting, internal audits,, management review • EIA requirements as per Moldovan law • Demonstration of additionality (Basis and review of financial information and calculation regarding NPV) • Stakeholders consulted, summary of comments received and how due account was taken of comments received • Details of baseline development with respect to models and assumptions • Monitoring of fuel consumption for each PA/building
DNA of Moldova (Ministry of Ecology, Construction and Territorial Development)	<ul style="list-style-type: none"> • Approval process for CDM projects • Project's contribution to sustainable development • EIA requirements as per Moldovan law • Government Policies for energy conservation and efficiency
Selected Municipalities (Floresti and Ialoveni)	<ul style="list-style-type: none"> • Details of which facilities are new and which are retrofit. • Types of fuel used before and after in each of the PAs and associated facilities. • Overview of fuel switch technology and whether it represents good practice • Purchase and trade agreements with individual Project Owners



2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design.

The validation identified two *Corrective Action Requests* and nine requests for *Clarification*. These requests were presented to the project participants in the form of a draft validation report dated 7 November 2005 (rev. 0), and the project participants were invited to provide a response to these requests. The project participants' response, which included the submission of a revised PDD dated 8 December 2005, addressed the *Corrective Action Requests* and requests for *Clarification* to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised by DNV and the response provided by the project participants are documented in Table 3 of the Validation Protocol in Appendix A to this report.



3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A. The validation findings relate to the project design as documented and described in the PDD of 8 December 2005.

3.1 Participation Requirements

The project participants are the Carbon Finance Unit Moldova, the International Bank for Reconstruction and Development (IBRD) as the Trustee of the Community Development Carbon Fund (CDCF) and the Netherlands. The host Party Moldova and the participating Annex I Party the Netherlands meet all requirements to participate in the CDM. The DNAs of Moldova and the Netherlands have provided written approval of voluntary participation, and the DNA of the Netherlands has provided authorization of the IBRD to participate in the project /5//6/.

The World Bank Moldova Energy-II Project is partly funded through an International Development Association (IDA) credit of the World Bank of US\$35 million and a US\$0.6 million funding from the Swedish International Development Agency (SIDA). The IDA funding and the SIDA funding are not used to purchase CERs from the project and affirmation that the IDA funding is not used to purchase CERs from the project has been provided by the World Bank's Country Manager for Moldova. The IDA funding and the SIDA funding are thus not considered as funding for the CDM component of the Moldova Energy-II Project. Hence, DNV has not further investigated the sources of potential public funding of the IDA funding and the SIDA funding. Only the CDCF funding will be used to purchase emission reductions from the project. The CDCF funding involves public funding by Annex I Parties and affirmation that the public funding provided to the CDCF does not constitute a diversion of ODA and is separate from and is not counted towards the financial obligations of those Parties has been provided by all Annex I Parties participating in the CDCF.

3.2 Project Design

Most of public buildings included in the project are presently supplied with heat from old, technologically outdated boilers which are a part of a deteriorated heat distribution network with a high level of losses, having an overall system efficiency less than 50%. The new technology to be employed by the project activities aims to increase the overall efficiency of the system up to 90% and simultaneously reduce the GHG emissions considerably, both by implementing energy efficiency and fuel switching measures at single buildings or group of buildings. The state-of-the-art technologies will either replace the existing equipment or will be installed in new facilities. The follow-up interviews clarified that all boilers comprised by the project will be substituted by new, more efficient ones, and there is no upgrading of existing equipment.

The project activities (PAs) have been divided into two groups i.e. a) emission sources for both baseline and project are within project boundaries (Local heating systems), b) emission sources where the project scenario will be located within the project boundaries but the baseline scenario will be located outside (district heating system).



By introducing more efficient heating technology, the project will promote sustainable development. Confirmation by the DNA of Moldova that the project assists in achieving sustainable development has been provided /5/.

The 27 PAs considered in this project, are eligible under the small-scale CDM project categories as shown in Table 2. The project includes the fuel switching from existing fossil fuels (coal, mazut, wood and electricity) to a cleaner fuel option (natural gas) and the implementation of energy conservation measures in buildings (additional insulation of building envelopes, windows and doors replacement). In this project, the supply side prevail over the demand side measures in terms of energy savings. The energy conservation measures in buildings and associated emissions reductions are thus not considered.

Table 2 Selected small-scale project categories

CDM small-scale project categories	Eligibility threshold	Expected Project contribution	No. of buildings (Pas)
<i>II.E Energy efficiency and fuel switching measures for buildings</i> For this category the aggregate energy savings may not exceed the equivalent of 15 GWh per year.	15 GWh	12.9 GWh	6
<i>III.B Switching fossil fuels</i> For all PAs of this category the project measures shall both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.	15 ktonnes	7.6 ktonnes (range from 7 189 tCO ₂ e in 2007 to 12 668 t CO ₂ e in 2006)	21

Starting date of the project is 15 January 2004. A fixed crediting period of 10 years is selected starting on 20 January 2004.

3.3 Baseline Determination

The project applies the simplified baseline methodology for category II.E and III.B small-scale CDM project activities (AMS-II.E and AMS-III.B).

According to AMS-II.E, the baseline is the energy baseline consists of the energy use of the existing equipment that is replaced in the case of retrofit measures, and in accordance with AMS-III.B, the emission baseline is the current emissions of the facility expressed as emissions per unit of output (kg CO₂e/kWh). Each energy form in the emission baseline is multiplied by an emission coefficient. The emission coefficient for wood is set to 0 tCO₂/TJ since wood is a renewable source of energy. For the electricity displaced, the emission coefficient is calculated in accordance with provisions for category I.D projects. In

3.4 Additionality

The funding allocated to heating supply and efficiency improvements component of the World Bank Moldova Energy II Project is sub-loaned to project beneficiaries (municipalities and ministries), who are required to repay the loan. Repaying the loans represents a financial burden for the project beneficiaries. The additional revenue generated through the CDCF's purchase of CERs serves thus as a catalyst for investments in energy efficiency projects.



The additionality is demonstrated on the basis of an investment barrier. The NPV of the project without CDM revenues is negative and with CDM revenues positive. The basis for the NVP calculations was assessed and verified during the follow-up interviews.

3.5 Monitoring Plan

The selected methodology involves monitoring the fuel use and output prior to and after fuel switch being implemented according to AMS-II.E and AMS-III.B.

The project emissions of each PA are based on monitoring:

- (i) the type of fuel used,
- (ii) fuel consumption and
- (iii) emission factor.

Fuel consumption will be measured periodically on a monthly basis.

The baseline emissions of each PA will be determined by:

- (i) the building's annual heat consumption, which will be calculated on the basis of the *ex-post* measured fuel consumption and the heating system overall efficiency in the project scenario
- (ii) overall efficiency of the heating system in the baseline scenario which is determined for each PA based on the following efficiencies:
 - Existent coal fired boiler efficiency (U5 - U7): 60%%
 - Existent boiler efficiency (heat stove): 40%
 - Existent mazut fired boiler efficiency: 87%
 - Overall existing external network efficiency: 90%
 - Electricity production efficiency at local power plants: 33%
 - Overall electrical network efficiency: 80%
- (iii) the lower heating value and the emission factor of the fuel used in the baseline scenario, i.e. coal, mazut and wood (The relative share of coal, mazut, wood and electricity is established on the basis of the energy consumption in the reference year 2003).

Authority and responsibility for the project management and also for measuring, monitoring, registration and reporting have been addressed. The Technical Advisor (from the CFU staff) will be responsible for the implementation of the monitoring plan. Also, the beneficiaries have nominated the persons responsible for the implementation of the project activities, including the implementation of the monitoring plan.

3.6 Calculation of GHG Emissions

Direct emissions due to use of various fuels has been captured. Indirect emissions due to construction activities are expected to be minimal.



Due to the evolution of the consumption over the past years, historic fuel consumption can not serve as basis for future energy use forecasts because trends in energy use have significantly changed. Hence, the future annual heat demand and consumption are determined on the basis of the given reference year 2003 energy consumption and an expected annual growth rate in energy consumption of 5%.

The heat consumption growth rate over the transition period is mainly determined by the payment capacity of the consumers. The carried out analysis and on site visits show that in spite of huge need for heating at the current quite low consumption level (of about 20-40% of the 1990 level), the annual consumption growth rate cannot exceed 5-10% because of existing financial constrains. The duration of the heating period during the last decade has been reduced from 4008 hours (5.5 month), as per national standard, to 1200-1800 hours per year and has the tendency to recover by the end of the year 2014.

Project and baseline emission calculations are transparently presented in detail in the provided Excel spreadsheets /4/.

3.7 Environmental Impacts'

According to Moldovan law the project should be coordinated with the territorial offices of the State Ecological Inspectorate (subdivision of the Ministry of Ecology and Natural resources). These institutions provide their acceptance on the placement of the boilers as well as on the air quality indicators and emissions indicators that should be respected by the project entities. The follow-up interviews confirmed that the project meets relevant legislation and has all the necessary permits and licences.

According to relevant laws and regulations construction and/or replacement of thermal heating boilers in public buildings are not subject to an EIA study. Nonetheless, an EIA has been carried out for the Energy II project itself, per World Bank requirements, as well as an Environment Management Plan has been developed. This document stipulates all necessary aspects of potential negative environmental impacts as well as relevant mitigation measures and implementing arrangements, such as air pollution control facilities.

3.8 Comments by Local Stakeholders

A series of stakeholders consultation during the preparation of Energy II project were organized and are reflected in the Project Appraisal Document. Representatives from Ministries, local communities, environmental NGOs, media and project beneficiaries were consulted. Additionally other consultations with local authorities, environmental institutions, NGO and academic persons were organized.

The comments received have been positive and with regard to comments related to allocation of capacity building and CDM revenues, suitable action plans have been envisaged.



4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, the validator shall make publicly available the PDD and receive, within 30 days, comments on the validation requirements from Parties, stakeholders and UNFCCC accredited Non-governmental Organisations (NGOs) and make them publicly available.

The PDD of 18 August 2005 has been published on DNV's Climate Change website*. Parties, stakeholders and NGOs were through the UNFCCC CDM website invited to provide comments on the validation requirement during a period of 30 days from 3 September 2005 to 2 October 2005. No comments were received.

* <http://www.dnv.com/certification/climatechange/Projects/ProjectDetails.asp?ProjectId=247>



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction” project in Moldova. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The project participants are the Carbon Finance Unit Moldova, the International Bank for Reconstruction and Development (IBRD) as the Trustee of the Community Development Carbon Fund (CDCF) and the Netherlands. The host Party Moldova and the participating Annex I Party the Netherlands meet all requirements to participate in the CDM. The DNAs of Moldova and the Netherlands have provided written approval of voluntary participation, and the DNA of the Netherlands has provided authorization of the IBRD to participate in the project.

By introducing more efficient heating technology, the project will promote sustainable development. Confirmation by the DNA of Moldova that the project assists in achieving sustainable development has been provided.

The project is deemed eligible as category II.E and III.B small-scale CDM project activities and correctly applies the simplified baseline methodologies AMS-II.E and AMS-III.B. The project additionality has been demonstrated through an investment barrier.

The monitoring plan is based on the basic requirements of the the applicable monitoring methodologies AMS-II.E and AMS-III.B. All aspects related to the direct and indirect GHG emissions as relevant to the project activity have been addressed. Given that the project is implemented as planned, the project is likely to achieve the stated amount of emission reductions.

In summary, it is DNV’s opinion that the “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction” project, as described in the PDD of 8 December 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodologies AMS-II.E and AMS-III.B. Hence, DNV requests the registration of the project as CDM project activity.



REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ World Bank: *SSC-CDM-PDD for “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction” Project*. Version of 18 August 2005 and 8 December 2005.
- /2/ World Bank: *Baseline Study for “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction”*. 25 May 2005
- /3/ World Bank: *Monitoring Plan for “Moldova Energy Conservation and Greenhouse Gases Emissions Reduction”*. 25 May 2005
- /4/ World Bank: *Spreadsheets documenting emission reduction calculations and the NPV analysis (MOLDOVA Energy EFFICIENCY - November 28 2005.xls)*.
- /5/ Ministry of Ecology and Natural Resources (DNA of Moldova): *Letter of Approval*. 2 September 2005.
- /6/ Ministry of Housing, Spatial Planning and the Environment (DNA of the Netherlands): *Letter of Approval*. 2 November 2005.

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /7/ International Emission Trading Association (IETA) and the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /8/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 06: 30 September 2005.

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /9/ Prof. Valentin ARION, Ph.D., D.Sc. – Dep. “Energy Economics and Management”, Head
- /10/ Arcadie Capcelea, Environmental consultant ESSD EaCA region
- /11/ Andrei Catanoi, biomass project consultant
- /12/ Stela Drucioc, CFU Manager
- /13/ Dr. Constantin Mihailescu, Minister, Ministry of Ecology, Constructions and Territorial Development (DNA of Moldova)

- o0o -

APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK CAR 1	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK OK CAR 1	Ministry of Ecology and Natural Resources (DNA of Moldova): Letter of Approval. 2 September 2005. Ministry of Housing, Spatial Planning and the Environment (DNA of the Netherlands): Letter of Approval. 2 November 2005.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1

Requirement	Reference	Conclusion	Cross Reference/Comment
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK CL-1	The World Bank Moldova Energy-II Project is partly funded through an International Development Association (IDA) credit of the World Bank of US\$35 million and a US\$0.6 million funding from the Swedish International Development Agency (SIDA). The IDA funding and the SIDA funding are not used to purchase CERs from the project and affirmation that the IDA funding is not used to purchase CERs from the project has been provided by the World Bank's Country Manager for Moldova. The IDA funding and the SIDA funding are thus not considered as funding for the CDM component of the Moldova Energy-II Project. Hence, DNV has not further investigated the sources of potential public funding of the IDA funding and the SIDA funding. Only the CDCF funding will be used to purchase emission reductions from the project. The CDCF funding involves public funding by Annex I Parties and affirmation that the public funding provided to the CDCF does not constitute a diversion of ODA and is separate from and is not counted towards the financial obligations of those Parties has been provided by all Annex I Parties participating in the CDCF.

Requirement	Reference	Conclusion	Cross Reference/Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	Moldova: Ministry of Ecology, Construction and Territorial Development. Netherlands: Ministry of Housing, Spatial Planning and the Environment
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	Moldova: Ratification on 22 April 2003 Netherlands: Ratification on 31 May 2002
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The Netherlands' assigned amount have been calculated.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	The Netherlands have in place a national system for estimating GHG emissions and annually report their most recent GHG inventory to the UNFCCC.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The PDD is filled as required by the guidelines for completing the CDM-SSC-PDD version 02.
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G

Requirement	Reference	Conclusion	Cross Reference/Comment
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD has been published on www.dnv.com/certification/climatechange and Parties, stakeholders and NOGs were invited to comment during a 30 days period from 3 September 2005 to 2 October 2005. No comments were received.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	Yes. The project qualifies as a renewable energy project as project emissions are less than 15 000 tCO ₂ e (Type III small-scale CDM project activities). It involves fuel switching from existing fossil fuels (coal, wood and mazut) to natural gas/liquid fuels.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	This project is not a de-bundled component of a larger project activity. The 27 projects activities (PAs) belong to broadly three different government departments, i.e. Ministry of Health, Ministry of Education and municipal local authorities. The criteria for de-bundling (Sections 1 and 2 of Appendix C of Simplified modalities and procedures of SSC CDM) do not apply to it.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/ /4/	DR	The project conforms to Type III, Category III.B as provided for in Appendix B of the simplified modalities and procedures for small scale CDM project activities. However it has to be clarified whether for every individual Project activity (PA), the fuel switch is the main activity as compared to energy efficiency improvements. For PA 8 and 10, for example, the Excel spreadsheet states in the sheet “PA Info” that these PAs have had electrical heating systems	CL-2 CAR-2	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			while the sheets “PA8” and “PA10” state that these PAs have been using natural gas already before the project starting period of July 2004. Moreover, the simplified baseline methodology for category III.B does not allow to claim emission reductions from displacing wood, even in case the wood could be considered non-renewable biomass. Hence, emissions from combusting wood shall be excluded from baseline emissions and the emission factor for wood must be set at 0 tCO ₂ /TJ.		
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project boundaries have been defined in terms of 27 individual project activities (32 distinct buildings) have been geographically located across 9 municipalities spread across the whole country.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	The project system boundaries have been defined. The PAs have been divided into two groups i.e. a) emission sources for both baseline and project are within project boundaries (Local heating systems), b) emission sources where project scenario will be located within project boundaries but for baseline scenario will be located outside (district heating system). The linkage of individual PAs to either of the above groups has not been systematically done.	CL-3	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR I	The follow-up interviews clarified that the expression "Retrofitting of buildings' heat supply systems" was wrongly applied in the PDD. In fact, all boilers comprised by the project have been substituted by new, more efficient ones and there is no upgrading of existing equipment.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	As the project will result in the import of modern heat production equipment and materials, the project result in technology transfer to Moldova.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	The follow-up interviews confirmed that training concerning the project technology will be provided by technology supplier under supervision of Prof. Valentin Arion and CFU.		OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project will also help in upgrade of deteriorated heating systems of public buildings resulting in reduced fuel consumption and energy consumption.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	No adverse environmental aspects are expected from this project.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	By promoting cleaner fuels and reduced fuel consumption the project will help in sustainable development. However, a written copy of the confirmation from the DNA of Moldova that the project assists in achieving sustainable development needs to be provided.	OK CAR-1	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR I	The follow-up interviews confirmed that the project meets relevant legislation and has all the necessary permits and licences from relevant govt authorities.		OK
B. Project Baseline The validation 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 selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The project applies the simplified baseline methodologies proposed for the small-scale project activity category III.B, i.e. the emission baseline is current emissions of the facility expressed as emissions per unit of output (kgCO ₂ /eq kWh) .		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	The PDD mentions that as part of the World Bank Moldova Energy II Project, only the fuel switching component has been taken as part of the CDM and that the GHG reductions due to additional energy conservation measures in buildings will not be considered. Hence the baseline methodology AMS-III.B is applicable as the primary activity is fuel switching and not energy efficiency. However, it has to be clearly demonstrated that in all the individual PAs fuel switch is the primary activity and not energy efficiency improvement.	CL-2	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/ /4/	DR I	The additionality is demonstrated on the basis of an investment barrier. The NPV of the project without CDM revenues is negative and with CDM revenues positive. The basis for the NVP calculations was assessed and verified during the follow-up interviews. Although not explicitly required by AMS-III.B, evidence should be provided that the CDM was seriously considered in the decision to implement the project in 2004.	CL-4	OK
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/ /4/	DR	The various assumptions and data used in development of the baseline model considering the various kinds of fuel, type of heating systems is transparently presented in detail in Excel spreadsheets.		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	Yes, they have been outlined in the supporting document titled “baseline study”(Ref 4).		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	Refer to comments B.2.2		OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/	DR	It has to be clarified that switch to natural gas would not be a “business as usual” scenario, as presently use of gas accounts for 60% of the country energy supply. As indicated in the Emission Reduction Document	CL-5	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			(Ref 3) some of the PAs like PA 8 and 10 have already been using natural gas. Furthermore, one of the baseline assumptions is that the local power plants would use gas.		
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?	/1/	DR	The starting date of the project is identified as 1 July 2004. Evidence for this must be provided.	CL-6	OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	The operational life time has been mentioned as 15 years with the starting date as 1 July 2004. However all emission reduction calculations are available only from 2005.	CL-7	OK
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 monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	The selected methodology involves monitoring the fuel use and output prior to and after fuel switch being implemented.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	The monitoring plan lacks clarity with respect to a) the monitoring of the fuel use and output before and after fuel switch and b) whether all 32 buildings and associated boilers/heating systems (part of 27 PAs) are systematically covered.	CL-8	OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Refer to comments above	CL-8	OK
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?	/1/		Refer to comments under D.1.3.	CL-8	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	Yes. Direct project emissions are identified		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Refer to D.2.1	CL-8	OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Refer to D.2.1	CL-8	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.3. Monitoring of Leakage If applicable, 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?	/1/	DR	The monitoring methodology AMS-III.B does not require leakage calculations.		OK
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 baseline emissions during the crediting period?	/1/	DR	The monitoring plan lacks clarity with respect to the following a) fuel use and output before and after fuel switch b) whether all 32 buildings and associated boilers/heating systems (part of 27PAs) are systematically covered.	CL-8	OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Refer to comments above	CL-8	OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Refer to comments above	CL-8	OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Refer to comments above	CL-8	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Authority and responsibility of project management for each PA has been mentioned. Consisting of the PA owner, PA operator and project monitor. All the PAs will be centrally monitored by the Project Manager (of the carbon finance unit).		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR	Yes, it has been defined.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR	Yes. they have been envisaged.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Yes, they have been envisaged.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	Yes, they have been envisaged.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	Yes, they have been envisaged.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Yes, they have been envisaged.		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes they have been envisaged.		OK
D.5.9. Are procedures identified for dealing with	/1/	DR	Yes they have been envisaged.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-13

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
possible monitoring data adjustments and uncertainties?					
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	Yes they have been envisaged.		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	Yes they have been envisaged.		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	Yes they have been envisaged.		OK
E. Calculation of GHG emission 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. 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 project emissions captured in the project design?	/1/	DR	Direct emissions due to use of various fuels has been captured. Indirect emissions due to construction activities are expected to be minimal.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR	Yes		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/ /4/	DR	The project emission calculations are transparently documented in Excel spreadsheets.		OK
E.1.5. Have conservative assumptions been used?	/1/	DR	The sources used for selecting the presented heat values and emission factors are not clearly mentioned.	CL-9	OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	Yes		OK
E.2. Leakage 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 leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	The monitoring methodology AMS-III.B does not require leakage calculations.		OK
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The PAs have been divided into two groups i.e. a) emission sources for both baseline and project are within project boundaries (Local heating systems), b) emission sources where project scenario will be located within project boundaries but for baseline scenario will be located outside (district heating system). The linkage of individual PAs to either of the above	CL-3	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			groups has not been systematically done (Refer to comments under A.2.2).		
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	Only direct emissions are expected,		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	The various assumptions and data used in development of the baseline model considering the various kinds of fuel, type of heating systems are transparently presented in detail in Excel spreadsheets.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	The baseline emission calculations are transparently documented in Excel spreadsheets.		OK
E.3.6. Have conservative assumptions been used?	/1/	DR	Various assumptions related to annual heat consumption, efficiency of existing heating systems, fuel consumption structure, GHG emission factors have been made to develop the baseline model.		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	Yes		OK
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 case?	/1/	DR	Yes. as it is a fuel switch project, there would be a reduction of GHG intensive fossil fuels like coal, and mazut).		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	An environmental monitoring plan has been prepared approved by Moldovan national authorities.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR I	The follow-up interviews confirmed that the environmental management plan is in accordance with Moldovan law.		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project is not expected to create any adverse environmental impacts. The air pollution control facilities employed by the PAs have been outlined in “Environmental analysis and Management plan”.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Refer to comments under F.1.1 and F.1.3		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	The PDD mentions representatives from ministries, environmental NGOs, media and project beneficiaries.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Workshops were used as a media for inviting stakeholder comments.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	No stakeholder consultation process is required by regulations/laws for this type of project.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
G.1.4. Is a summary of the comments received provided?	/1/	DR	Yes.		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	The comments received have been positive and for the comments related to allocation of capacity building and CDM revenues ,suitable action plans have been envisaged.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>A copy of the written approval of voluntary participation by the DNA of Moldova, including a confirmation that the projects assists in achieving sustainable developments, needs to be provided.</p>	<p>Table 1</p> <p>A.3.3</p>	<p>The LoA of Moldova has been provided.</p>	<p>OK</p> <p>Ministry of Ecology and Natural Resources (DNA of Moldova): <i>Letter of Approval</i>. 2 September 2005.</p>
<p>CAR 2</p> <p>Moreover, the simplified baseline methodology for category III.B does not allow to claim emission reductions from displacing wood, even in case the wood could be considered non-renewable biomass. Hence, emissions from combusting wood shall be excluded from baseline emissions and the emission factor for wood must be set at 0 tCO₂/TJ.</p>	<p>A.1.3</p>	<p>We have set the emission factor for wood as zero. It has reduced the total ERs only to about 2000 tons. Attached is revised PDD and corresponding excel sheet.</p>	<p>OK</p> <p>Emissions from combusting wood are no longer included in the baseline emissions.</p>
<p>CL 1:</p> <p>For public funding for the project activity from Parties included in Annex I these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.</p>	<p>Table 1</p>	<p>Affirmations that the World Bank's International Development Association funding is not used to purchase emission reductions has been provided by the World Bank's Country Director for Moldova.</p> <p>Statements on non-diversion of ODA from all CDCF participants are also provided.</p>	<p>OK</p> <p>The World Bank Moldova Energy-II Project is partly funded through an International Development Association (IDA) credit of the World Bank of US\$35 million and a US\$0.6 million funding from the Swedish International Development Agency (SIDA). The IDA funding and the SIDA funding are not used to purchase CERs</p>

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
			<p>from the project and affirmation that the IDA funding is not used to purchase CERs from the project has been provided by the World Bank's Country Manager for Moldova. The IDA funding and the SIDA funding are thus not considered as funding for the CDM component of the Moldova Energy-II Project. Hence, DNV has not further investigated the sources of potential public funding of the IDA funding and the SIDA funding. Only the CDCF funding will be used to purchase emission reductions from the project. The CDCF funding involves public funding by Annex I Parties and affirmation that the public funding provided to the CDCF does not constitute a diversion of ODA and is separate from and is not counted towards the financial obligations of those Parties has been provided by all Annex I Parties participating in the CDCF.</p>
<p>CL 2</p> <p>It has to be clarified whether for every individual Project activity (PA), the fuel switch is the main activity as compared to energy efficiency improvements. For PA 8 and 10, for example, the Excel</p>	<p>A.1.3 B.1.2</p>	<p>Initially in this project have been considered about 100 PAs. In the end their number has been reduced to 27 – all including fuel switching measures. For these 27 PAs, fuel switching measures prevail over energy efficiency ones.</p> <p>Indeed the PA 8 and 10 have used electrical heating before 2004 and in the sheets "PA8" and "PA10" is</p>	<p>The complimentary information provided with regard to whether fuel switch is the main activity sufficiently addresses part of DNV's request for clarification.</p> <p>With regard to the baseline for</p>

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
spreadsheet states in the sheet “PA Info” that these PAs have had electrical heating systems while the sheets “PA8” and “PA10” state that these PAs have been using natural already before the project starting period of July 2004.		indicated that these PAs have used natural gas. This appears after converting the amount of electricity used for heating into fuel consumption of the local power plants which are natural gas fired. Thus the natural gas consumption for these PAs is related to power plants.	PAs that have had electrical heating: This need to be clearly addressed in the PDD and the calculations and assumptions used to transform electricity consumption into emission from electricity generation need to be provided.
<p>CL 2 (continued)</p> <p>The development of baseline for PAs that have had electrical heating need to be clearly addressed in the PDD and the calculations and assumptions used to transform electricity consumption into emission from electricity generation need to be provided.</p> <p>Note that the baseline for AMS-III.B is “is the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO₂equ/kWh). Emission coefficients for the fuel used by the generating unit before and after the fuel switch are also needed.” The wording of AMS-III.B is thus related to direct emissions from the unit where the fuel switch occurs and not the indirect emissions associated with electricity consumption. This deviation from the methodology needs to be clearly addressed in the PDD and justified.</p>	A.1.3 B.1.2	<p>There has been introduced a new PA category – II.E for PAs with electricity heating.</p> <p>The main steps for transforming (in baseline) electricity consumption for heating into emissions from electricity generation at local power plants are:</p> <ol style="list-style-type: none"> 1. For a given year the electricity consumption, is known. 2. There is known the level of total electricity losses in transmission and distribution networks (about 20%). This means, that the overall efficiency of the transmission and distribution networks equals to about 80%. 3. Knowing the variables in points 1 and 2, one can be readily determine the electricity generated by the power plant. 4. Taking into account the efficiency of the power plant (efficiency of converting fuel embodied heat into electricity) – about 30%, we determine the fuel volume needed to produce the relevant amount of electricity. 5. For the resulted fuel consumption (point 4) and given type of fuel (natural gas) and respectively its emission factor, there are easily determined the emissions at the local power plants. 	<p>The introduction of category II.E for the PAs with electricity heating as baseline is appropriate. However, the PDD needs to be consistently updated with regard to including category II.E, e.g. Section B.3 only mentions III.B.</p> <p>The simplified baseline methodology for category II.E (AMS-II.E) requires that “for the electricity displaced, the emission coefficient is calculated in accordance with provisions of paragraphs 6 or 7 for category I.D projects.” However, the determination of baseline for PAs with electricity heating as baseline scenario is not in accordance with paragraphs 6 or 7 for category I.D projects. The PDD needs to be updated to discuss the determination of the electricity emission factor in light of the requirements of AMS-II.E.</p>

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
		<p>This general methodology is reflected in details in PDD, items B.5.1 (for fuel consumption - Figure 7,b, formulas (9) and (8)) and for emissions calculation - See E.1.2.4.)</p> <p>The numerical calculations carried out in Excel worksheets follow fully (step by step reflected on separate sheets) the presented above methodology and it can be checked for any given PA.</p>	<p>Given that the majority of domestic power generation is from thermal plants (EIA Country Analysis Briefs), the choice of a natural gas fired power plant as reference to determine the baseline emission factor is conservative. However, the assumed technical transmission and distribution losses of 20% and the assumed efficiency of the power plant (33%) need to be further substantiated.</p>
<p>CL 2 (continued II, part 1)</p> <p>The introduction of category II.E for the PAs with electricity heating as baseline is appropriate. However, the PDD needs to be consistently updated with regard to including category II.E, e.g. Section B.3 only mentions III.B.</p>	<p>A.1.3 B.1.2</p>	<p>Section B.3 of the PDD was updated.</p>	<p>OK</p>
<p>CL 2 (continued II, part 2)</p> <p>The simplified baseline methodology for category II.E (AMS-II.E) requires that "for the electricity displaced, the emission coefficient is calculated in accordance with provisions of paragraphs 6 or 7 for category I.D projects." However, the determination of baseline for PAs with electricity heating as baseline scenario is not in accordance with paragraphs 6 or 7 for category I.D projects. The PDD needs</p>	<p>A.1.3 B.1.2</p>	<p>The answer to this question is given in PDD, Para B.5.1 and presented below.</p> <p><i>Electrical heating PAs (II.E category)</i></p> <p>Referring to baseline calculation for buildings with electrical heating, one has to consider a technological chain (fig. 8,b), which is different from the mentioned above (fig. 8,a). The new chain includes the distribution and transmission electrical networks, and the power plants.</p> <p>Once an additional PA category (II.E) was applied, the relevant baseline methodology has been used to</p>	<p>OK</p> <p>The PDD was revised as requested and the baseline emission factor for PAs with electricity heating as baseline scenario is correctly applied in accordance with paragraphs 7 (b) for category I.D projects.</p>

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
to be updated to discuss the determination of the electricity emission factor in light of the requirements of AMS-II.E.		<p>determine the baseline emissions occurred at electricity generation plants. The simplified baseline methodology for category II.E (AMS-II.E) requires that "for the electricity displaced, the emission coefficient is calculated in accordance with provisions of paragraphs 6 or 7 for category I.D projects. For fossil fuels, the IPCC default values for emission coefficients may be used".</p> <p>According to AMS-I.D, paragraphs 7, point b - as the relevant option for Moldova's conditions, the emission coefficient (measured in kg CO₂equ/kWh) is to be calculated in a transparent and conservative manner as the weighted average emissions (in kg CO₂equ/kWh) of the current generation mix.</p> <p>Thus, for PAs of II.E category the baseline calculation would include the following steps:</p> <p>a) For each PA the building's electricity consumption is adjusted to take into consideration losses into electrical grid</p> $W_{power\ system} = Q_{csm} \cdot (1 + \Delta W_d + \Delta W_t),$ <p>where $W_{power\ system}$ represents the electricity produced at the local power plants to meet the building's demand; Q_{csm} building's electricity consumption for heating purpose; ΔW_d and ΔW_t normative values of the technological losses in distribution and transmission electrical networks.</p> <p>The normative level of electricity losses in Moldova represents 4.5% for the transportation network (see Technology needs and Development Priorities. Report elaborated under the United Nations Framework Convention on Climate Change. UNDP Moldova, Chisinau 2002. Table 1.9, page. 37) and</p>	

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion																																							
		<p>15.5% for distribution network, according to National Agency for Energy Regulation (www.anre.md, Methodologies (See the document "Metodologia determinarii, aprobarii si aplicarii tarifelor la energia electrica livrata de intreprinderile de distributie "Red Nord" S.A. si "RED Nord-Vest" S.A.").</p> <p>b) Calculation of the weighted average emission factor (in kg CO2equ/kWh) of the current generation mix in the country (EFpower system) is done according to formula</p> $EF_{power\ system} = \sum_{i=1}^n FF_i \cdot \alpha_i$ <p>where EFi represents the emission factor for i-power plant, in kg CO2equ/kWh; αi the share of the power plant i in the total electricity production in the country (tab.4.1).</p> <p>Table 4.1. Electricity production structure in Moldova</p> <table><tr><th rowspan="2">#</th><th rowspan="2">Local Power Plants</th><th colspan="2">Year 2003</th><th>Year 2000</th><th rowspan="2">Electricity production efficiency, ηpp, %</th></tr><tr><th>Electricity produced, MW</th><th>Share (αi), %</th><th>Share (αi), %</th></tr><tr><td>1</td><td>Moldovan Thermal Power Plant</td><td>2 551 817</td><td>76.86%</td><td>75.81%</td><td>32.8</td></tr><tr><td>2</td><td>CHP-2</td><td>621 803</td><td>18.73%</td><td>20.25%</td><td>37.1</td></tr><tr><td>3</td><td>CHP-1</td><td>107 757</td><td>3.25%</td><td>3.10%</td><td>34.3</td></tr><tr><td>4</td><td>CHP-North</td><td>38 754</td><td>1.17%</td><td>0.84%</td><td>18.4</td></tr><tr><td></td><td>Total</td><td>3 320 131</td><td>100.00%</td><td>100.00%</td><td>-</td></tr></table> <p>Note: The figures are obtained from the State Enterprise Moldelectrica - the National Electricity Transmission Operator.</p> <p>c) The CO2 emissions at the local generating plants, caused by electricity consumption for heating purpose, are determined as the electricity produced to meet the building's demand times the weighted average emission factor for the current generation mix in the country.</p> <p>The above presented procedure for PAs of II.E category baseline calculation is absolutely identical to that corresponding to formulae (8) and (9) - for</p>	#	Local Power Plants	Year 2003		Year 2000	Electricity production efficiency, ηpp, %	Electricity produced, MW	Share (αi), %	Share (αi), %	1	Moldovan Thermal Power Plant	2 551 817	76.86%	75.81%	32.8	2	CHP-2	621 803	18.73%	20.25%	37.1	3	CHP-1	107 757	3.25%	3.10%	34.3	4	CHP-North	38 754	1.17%	0.84%	18.4		Total	3 320 131	100.00%	100.00%	-	
#	Local Power Plants	Year 2003			Year 2000	Electricity production efficiency, ηpp, %																																				
		Electricity produced, MW	Share (αi), %	Share (αi), %																																						
1	Moldovan Thermal Power Plant	2 551 817	76.86%	75.81%	32.8																																					
2	CHP-2	621 803	18.73%	20.25%	37.1																																					
3	CHP-1	107 757	3.25%	3.10%	34.3																																					
4	CHP-North	38 754	1.17%	0.84%	18.4																																					
	Total	3 320 131	100.00%	100.00%	-																																					

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
		<p>PAs of III.B category. The only difference is that in case of II.E PAs in formula (8) the EBSL represents the overall efficiency of the electrical networks and power plants, determined as</p> $E_{BSL} = \eta_{PP,BSL} \cdot \eta_{el.net,BSL} \quad , \quad (9)$ <p>where $\eta_{PP,BSL}$ is the weighted average efficiency of the local power plants (33%);</p> <p>$\eta_{net,BSL}$ the overall efficiency of the local electrical distribution and transmission networks (80 %).</p> <p>Additionally, taking into consideration the fact that all local (Moldovan) power plants are natural gas fired and the fact of non-availability of CO₂ emissions per kWh at these power plants, the above mentioned issue converges to determination of the weighted average efficiency for the actual generation mix.</p> <p>The weighted average efficiency of the local power plants $\eta_{PP,BSL}$ is calculated on the basis of information provided in Table 4.1, regarding the structure of electricity generation per local power plants (year 2000) and their efficiencies (available only for the year 2000) as follows:</p> $\eta_{PP,BSL} = 0.7581 \times 0.328 + 0.2025 \times 0.371 + 0.0310 \times 0.343 + 0.0084 \times 0.184 = 0.3359 \text{ or } 33\%.$ <p>Similarity of the baseline methodologies of both PAs categories - II.E and III.B category, allows us to use the same software for baseline emission calculations.</p> <p>For all project activities and considered years of the crediting period the values Q_{csm} are given in Baseline Study, Annex 2, tab. A1. The structure of</p>	

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
		fuels used in the baseline and fuel consumption quantities are summarized in Baseline Study, Annex 2, tab. A3.	
CL 2 (continued II, part 3) The assumed technical transmission and distribution losses of 20% and the assumed efficiency of the power plant (33%) need to be further substantiated.	A.1.3 B.1.2	<p>Calculations will be done according to formula (8), where EBSL in this case represents the overall efficiency of the electrical networks and power plants</p> $E_{BSL} = \eta_{PP,BSL} \cdot \eta_{el.net,BSL} \quad (9)$ <p>where $\eta_{PP,BSL}$ - the weighted average efficiency of the local power plants (33%); $\eta_{net,BSL}$ - the overall efficiency of the local electrical distribution and transmission networks (80 %). To be mentioned that electricity losses in transportation network consists 4.5% (see Technology needs and Development Priorities. Report elaborated under the United Nations Framework Convention on Climate Change. UNDP Moldova, Chisinau 2002. Table 1.9, page. 37) and in distribution network – 15.5%, according to National Agency for Energy Regulation (www.anre.md, Methodologies – see the document "Metodologia determinarii, aprobarii si aplicarii tarifelor la energia electrica livrata de intreprinderile de distributie "Red Nord" S.A. si "RED Nord-Vest" S.A.").</p>	<p>OK</p> <p>The complimentary information provided justifies the assumed technical transmission and distribution losses of 20% and the assumed efficiency of the power plant (33%).</p>
CL 3 The PAs have been divided into two groups i.e. a) emission sources for both baseline and project are within project boundaries (Local heating systems), b) emission sources where the project scenario will be located within the project boundaries but the baseline scenario will	A.2.2 E.3.1	<p>The linkage of individual PAs to either of the mentioned two groups has been done on the basis of emission source location criteria, e.g. inside or outside of the project boundary.</p> <p>A table was included in the PDD which clearly links each PA to either group 1 or group 2</p>	<p>OK.</p> <p>The revised clearly links each PA to either group 1 or group 2 with regard to the system boundary (as described in section B.4 of the PDD).</p>

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion
be located outside (district heating system). The linkage of individual PAs to either of the above groups has not been systematically done.			
CL 4 Although not explicitly required by AMS-III.B, evidence should be provided that the CDM was seriously considered in the decision to implement the project in 2004.	B.2.1	The World Bank mission report from May 2004 is provided as an evidence that CDM was considered in the decision to implement the projects.	OK Due to the change of the starting date of the crediting period to 20 January 2005, evidence that the CDM was seriously considered in the decision to implement the project in 2004 is no longer required. Nonetheless, the World Bank mission report from May 2004 evidences that CDM was considered in the decision to implement the projects.
CL 5 It has to be clarified that switch to natural gas would not be a “business as usual” scenario, as presently use of gas accounts for 60% of the country energy supply.	B.2.5	Switch to natural gas is not a "business as usual" since no private investments occur in this sector (being a state owned and respectively regulated sector). Moreover, the local authorities hardly invest in utilities and distribution grids. For instance, the 60% of natural gas in the energy balance of the country is basically due to use of this fuel type at the local power plants.	OK The additional information justifies that switch to natural gas is not a business as usual scenario.
CL 6 The starting date of the project is identified as 1 July 2004. Evidence for this must be provided.	C.1.1	We changed the starting date of the project as January 20, 2006 , with the crediting period - 2006-2015. All figures in the PDD were modified.	OK Due to the change of the starting date of the crediting period, evidence that some projects started 1 July 2004 is no longer required.
CL 7	C.1.2	We changed the starting date of the project as	OK

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion																
The operational life time has been mentioned as 15 years with the starting date as 1 July 2004. However, all emission reduction calculations are available only from 2005.		January 20, 2006 , with the crediting period - 2006-2015. All figures in the PDD were modified.	The change of the starting date of the crediting period and the modification of the PDD addresses this request for clarification.																
CL 8 The monitoring plan lacks clarity with respect to a) the monitoring of the fuel use and output before and after fuel switch and b) whether all 32 buildings and associated boilers/heating systems (part of 27 PAs) are systematically covered.	D.1.3	The monitoring plan is intended for supervision of operational phase of each PA, or otherwise monitoring of the period after fuel switching implementation. On the other hand, the fuel use before deals with baseline concept development and therefore there is no subject for monitoring.	OK. The complimentary information provided with regard to monitoring plan sufficiently addresses DNV's request for clarification.																
CL 9 The sources used for selecting the presented heat values and emission factors are not clearly mentioned.	E.1.5	The source is indicated in B.2, page 14, Table 4 of the PDD and is the <i>Technology Needs Assessment and Development Priorities - Report elaborated under the UNFCCC, UNDP Moldova, MinEcology, Chisinau, Moldova, 2002</i> (Annex 1.11, Pag. 149). A scanned copy of the page that the PDD refers to is provided.	The provided reference does not include the lower heating values given in Table 4 of the PDD. Moreover, the emission factor given for coal in Table 4 does not match the emission factors given in the provided reference and the emission factors. Emission factors (in tCO ₂ /TJ): <table> <tr> <td>Fuel</td><td>PDD</td><td>Report</td><td>IPCC</td></tr> <tr> <td>Coal:</td><td>95</td><td>92.7</td><td>94.6</td></tr> <tr> <td>Mazut:</td><td>77</td><td>76.6</td><td>77.3</td></tr> <tr> <td>NG:</td><td>56</td><td>55.9</td><td>56.1</td></tr> </table>	Fuel	PDD	Report	IPCC	Coal:	95	92.7	94.6	Mazut:	77	76.6	77.3	NG:	56	55.9	56.1
Fuel	PDD	Report	IPCC																
Coal:	95	92.7	94.6																
Mazut:	77	76.6	77.3																
NG:	56	55.9	56.1																
CL 9 (continued) The provided reference does not include the lower heating values given in Table 4	E.1.5	In the revised PDD were used - the emission factor values were accepted as IPCC ones;	OK The selected lower heating values for coal, mazut, natural gas and																

Draft report corrective action requests and requests for clarification	Reference	Summary of project participants' response	Final conclusion																																																		
of the PDD. Moreover, the emission factor given for coal in Table 4 does not match the emission factors given in the provided reference and the emission factors.		<p>- the LHV values traditionally applied in Moldova</p> <table><tr><th rowspan="2"></th><th rowspan="2">Type of fuel</th><th colspan="3">LOW HEAT VALUE</th></tr><tr><th>Used in calculations</th><th>Recorded in Moldova</th><th>IPCC TJ / k t</th></tr><tr><td>1.</td><td>Coal</td><td>20 TJ / k t</td><td>14 - 26 TJ / k t [3]</td><td>15.9-28.7 Tab. 1-24, pag. 1.62</td></tr><tr><td>2.</td><td>Mazut</td><td>40.4 TJ / kt</td><td>[2] Tab 2.8, Pag. 35</td><td>39...44</td></tr><tr><td>3.</td><td>Nat Gas</td><td>33.5 MJ/Nm3</td><td></td><td>52.3 Tab. 1-24, pag. 1.62</td></tr><tr><td>4.</td><td>Wood</td><td>14.49 TJ / k t</td><td></td><td>10.9 - 20.0 Tab. 1-13, pag. 1.45</td></tr></table> <table><tr><th rowspan="2"></th><th rowspan="2">Type of fuel</th><th colspan="2">EMISSION FACTOR</th></tr><tr><th>Used in calculations tCO2 / TJ , [1]</th><th>IPCC tCO2 / TJ</th></tr><tr><td>1.</td><td>Coal</td><td>94.6</td><td>94.6</td></tr><tr><td>2.</td><td>Mazut</td><td>77.3</td><td>77.3</td></tr><tr><td>3.</td><td>Nat Gas</td><td>56.1</td><td>56.1</td></tr><tr><td>4.</td><td>Wood</td><td>0</td><td>109.6</td></tr></table> <p>REFERENCES</p> <p>1. Analiza situatiei din complexul energetic al Republicii Moldova si asigurarea securitatii energetice, Chisinau 2001, Institutul de Energetica al ASM, 170pp.</p> <p>2. Роддатис К.Ф., Полтарецкий А. Н. Справочник по котельным установкам малой производительности, Энергоатомиздат, 1989.</p>		Type of fuel	LOW HEAT VALUE			Used in calculations	Recorded in Moldova	IPCC TJ / k t	1.	Coal	20 TJ / k t	14 - 26 TJ / k t [3]	15.9-28.7 Tab. 1-24, pag. 1.62	2.	Mazut	40.4 TJ / kt	[2] Tab 2.8, Pag. 35	39...44	3.	Nat Gas	33.5 MJ/Nm3		52.3 Tab. 1-24, pag. 1.62	4.	Wood	14.49 TJ / k t		10.9 - 20.0 Tab. 1-13, pag. 1.45		Type of fuel	EMISSION FACTOR		Used in calculations tCO2 / TJ , [1]	IPCC tCO2 / TJ	1.	Coal	94.6	94.6	2.	Mazut	77.3	77.3	3.	Nat Gas	56.1	56.1	4.	Wood	0	109.6	<p>wood are country specific values provided by the Energy Institute of Moldova.</p> <p>Appropriate IPCC emission factors for coal, mazut, natural gas and wood were selected.</p>
	Type of fuel	LOW HEAT VALUE																																																			
		Used in calculations	Recorded in Moldova	IPCC TJ / k t																																																	
1.	Coal	20 TJ / k t	14 - 26 TJ / k t [3]	15.9-28.7 Tab. 1-24, pag. 1.62																																																	
2.	Mazut	40.4 TJ / kt	[2] Tab 2.8, Pag. 35	39...44																																																	
3.	Nat Gas	33.5 MJ/Nm3		52.3 Tab. 1-24, pag. 1.62																																																	
4.	Wood	14.49 TJ / k t		10.9 - 20.0 Tab. 1-13, pag. 1.45																																																	
	Type of fuel	EMISSION FACTOR																																																			
		Used in calculations tCO2 / TJ , [1]	IPCC tCO2 / TJ																																																		
1.	Coal	94.6	94.6																																																		
2.	Mazut	77.3	77.3																																																		
3.	Nat Gas	56.1	56.1																																																		
4.	Wood	0	109.6																																																		

- o0o -