Community Development Carbon Fund

Moldova Energy conservation and greenhouse gases emissions reduction

Project Design Document

December 8, 2005

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CONTENTS

Acronyms and Abbreviations

BSL	Baseline
CDM	Clean Development Mechanism
CDM EB	Clean Development Mechanism Executive Board
CDCF	Community Development Carbon Fund
CER	Certified Emission Reductions
CO_2	Carbon Dioxide
CFU	Carbon Finance Unit created under the Ministry of Environment of Moldova
LHS	Local heating system
ER	Emissions Reduction
ERPA	Emission Reduction Purchase Agreement
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
NG	Natural gas
NPV	Net Present Value
PA	Project Activity
PAs	Project Activities
UNFCCC	United Nations Framework Convention on Climate Change
WB	The World Bank

Units of Measure

GJ	gigajoule (10^9 joules)
GW	gigawatt (10^9 watts)
GWh	gigawatt hour (10^9 watt hours)
kg	kilogram (1000 grams)
kW	kilowatt (1000 watts)
kWh	kilowatt hour (1000 watt hours)
MJ	mega-joule (10^6 joules)
Leu (*pl. Lei*)	national currency of the Rep. of Moldova (1 USD = 12.6 Lei in 2005)
MW	megawatt (1 million watts)
MWh	megawatt hour (1 million watt hours)
Nm^3	normal cubic meter
t	metric tonne (1000 kilograms)
tCO_2	tonnes of carbon dioxide
USD	US dollars

A. General description of the small-scale project activity

A.1 Title of the small-scale project:

"Moldova Energy conservation and greenhouse gases emissions reduction".

A.2 Description of the small-scale project activity:

(Please include in the description
- the purpose of the project activity
- the view of the project participants on the contribution of the project activity to sustainable development (max. one page).)

Project background

This project has a special feature being completely based on the Heat supply and efficiency improvements component of the World Bank Moldova Energy-II Project[1], which nowadays is under implementation in the Republic of Moldova. The project refers to energy conservation measures in public buildings and consequently to GHG emission reduction.

According to the WB Moldova Energy II Project Implementation Plan, the heating component is to be implemented in three phases:

1) the first phase encompassed the already identified and appraised 20 public buildings, including the pilot project in municipality of Ungheni. A part of the investments (about US $700000) have been used due to the Project Preparation Funds provided by the World Bank. That Pilot Activity already implemented in Ungheni, included installation of 4 heating plants, connection pipes and individual heating substations for 3 kindergartens and a medical school. The capacity of the heating plants allows the connection of the neighboring residential buildings to the heating sources;
2) the second phase is being prepared (identified and appraised) with the assistance of the Swedish and local consultants; and
3) the third phase will be identified and appraised within 18-24 months from the start of the project (the end of 2005).

The WB Energy II Project investment decisions refer to least cost technical solutions, which have to satisfy the required heating standards at minimum costs.

Purpose of the project activities

This Moldovan project aims at GHG emission reduction as result of efficiency improvements and fuel switching measures for a series of public buildings (kindergartens, schools, vocational schools, hospitals, policlinics etc.) implemented via the WB Moldova Energy II Project.

Project activities contribution to sustainable development

The project shows the evident contribution to sustainable development. It is designed to address rehabilitation and upgrade of the deteriorated heating systems of public buildings. As the result of its implementation the project would provide a series of benefits that would address social issues.

The main benefits of the project will include:

[1] The World Bank Energy II Project, Credit line 3833-MD, December 2003.

(a) reducing fuel consumption through energy efficiency measures;
(b) decreasing payment burden for consumed energy resources;
(c) increasing of heating service quality;
(d) reducing the amount of GHG emissions and other pollutants.

Besides it, the project will increase the living and activity conditions within the considered public buildings:

- the room heating temperature;
- the duration of heating period;
- the heated areas;
- it will make available and affordable hot water in such buildings like hospitals and policlinics, schools and orphanages etc.

A.3 Project participants:

(Please list Party(ies) and private and/or public entities involved in the project activity and provide contact information in annex 1 of this document.)(Please designate one of the above as the official contact for the CDM project activity.)

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Moldova (host country)	Carbon Finance Unit Moldova	No
The Netherlands	International Bank for Reconstruction and Development (IBRD) as the Trustee of the Community Development Carbon Fund	Yes

In accordance with the use of the term *project participant* in the CDM M&P, a project participant is (a) a Party involved, and/or (b) a private and/or public entity authorized by a Party to participate in a CDM project activity.

- ***Project-manager*** - the Carbon Finance Unit.
- ***PA-owner*** - the beneficiary of the World Bank Moldova Energy-II Project that nowadays is under implementation in the Republic of Moldova.
- ***PA-operator*** - the person legally designated by the PA-owner, responsible for PA local heating system operation and maintenance.
- ***Project monitor*** - the person designated by the Carbon Finance Unit, responsible for data collection, archiving and reporting.

Each out of 19 projects activities 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. Taking into consideration the similarity of energy conservation measures implemented and transaction cost

reduction for all considered PAs and the use of CDM *project participant* term[2], a Carbon Finance Unit (CFU) was created under the Ministry of Ecology and Natural Resources, for promoting the whole project (fig. 1). CFU has the status of an independent legal entity and is empowered to enter into the Emission Reduction Purchase Agreement (ERPA).

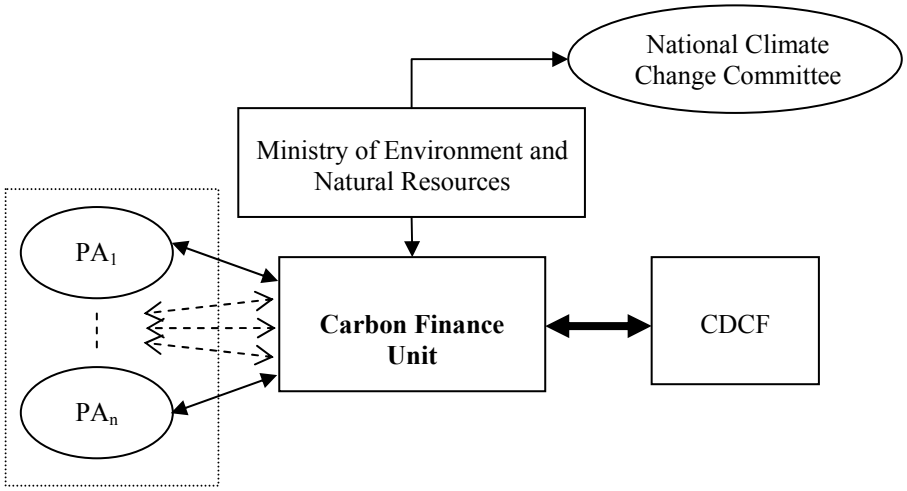

Figure 1. Principle of project bundling

The CFU will serve as the CDCF counterpart and provide support for the implementation. In this respect, the CFU will have the following main duties: (a) on behalf of the PAs negotiate with the CDCF the Emission Reduction Purchase Agreements (ERPA) and sign them; (b) sign the subsidiary agreement with PAs (Emissions Reduction Owners (EROs) for each of the CDCF Projects), that stipulates the CFU and PAs rights and responsibilities; (c) receive the carbon payments from the CDCF and transfer this money to the PAs, pro rata, according their actual ERs; and, (d) be responsible for the projects Monitoring Plans. CFU will as well provide technical assistance for institutional and human capacity building in the area of Kyoto Protocol and CDM activities, as well as the financial assistance to the potential project beneficiaries. CFU serves as counterpart for other CDCF projects in the country.

[2] CDM Glossary

Table 1. The list of public entities involved in the project activities

PA No.	Public facilities	PA address
PA1	Romanian school	10 Trandafirilor Str., Cantemir, Republic of Moldova
	Kindergarten nr.3	16 Basarabia Str., Cantemir, Republic of Moldova
PA2	Russian school	2 Mihai Eminescu Str., Cantemir, Republic of Moldova
	Kindergarten nr.1	8 Gagarin Str., Cantemir, Republic of Moldova
PA3	Gymnasium No.5	79 Ştefan cel Mare Str., Falesti, Republic of Moldova
PA4	Kindergarten No.5	23 Moldovei Str., Falesti, Republic of Moldova
	Library	7 Moldovei Str., Falesti, Republic of Moldova
	Center of arts	5 Moldovei Str., Falesti, Republic of Moldova
PA5	Kindergarten No.10	2 Bălţului Str., Falesti, Republic of Moldova
PA6	District hospital + CFD	7 Ştefan cel Mare Str., Falesti, Republic of Moldova
PA8	Cultural center	1 Speranţei Str., Floresti, Republic of Moldova
	City Museum	1 Speranţei Str., Floresti, Republic of Moldova
PA9	Center of arts	3 Libertăţii Str., Floresti, Republic of Moldova
PA10	Musical school	37 Mihai Eminescu Str., Straseni, Republic of Moldova
PA11	School nr.1	187 Mihai Eminescu Str., Straseni, Republic of Moldova
PA12	Kindergarten nr.1	1 Mihai Eminescu Str., Straseni, Republic of Moldova
PA17	District hospital	7 Alexandru cel Bun Str., Ialoveni, Republic of Moldova
PA18	District hospital	5 Toma Ciorbă Str., Nisporeni, Republic of Moldova
PA19	Lev Tolstoi lyceum	54 Stefan cel Mare Str., Leova, Republic of Moldova
PA20	District hospital	63 Stefan cel Mare Str., Leova, Republic of Moldova
PA24	Kindergarten nr.3 + Residential	9A Bernardazzi Str., Ungheni, Republic of Moldova
PA25	Kindergarten nr.4 + Residential	15A Boico Str., Ungheni, Republic of Moldova
PA26	Medical college + Residential	6 Vasile Lupu Str., Ungheni, Republic of Moldova
PA27	Kindergarten nr.2+School	161A Ştefan cel Mare Str., Ungheni, Republic of Moldova

A.4 Technical description of the project activity:

A.4.1 Location of the small-scale project activity: See summarized information presented in Table 1.

A.4.1.1 Host country Party(ies): Republic of Moldova

A.4.1.2 Region/State/Province etc.: Republic of Moldova

A.4.1.3 City/Town/Community etc: 8 municipalities - Cantemir, Falesti, Floresti, Ialoveni, Leova, Nisporeni, Straseni, Ungheni

A.4.1.4Detailed description of the physical location, including informationallowing the identification of this small-scale project activity(ies) *(max one page)*:**u**According to the project scenario, those 25 public buildings considered in the project, being part of 19 project activities (PA), activities which are independent, stand-alone, and spread out all over the country (see fig.2), are to be supplied from the sources of local heating systems. All PAs sources will be located either in the mentioned buildings or in the neighborhood of the group of considered public buildings.

A.4.2 Type and category(ies) and technology of the small-scale project activity

(Please specify the type and category of the project activity using the categorization of appendix B to the simplified M&P for small-scale CDM project activities, hereafter referred to as appendix B. Note that appendix B may be revised over time and that the most recent version will be available on the UNFCCC CDM web site.
In this section you shall justify how the proposed project activity conforms with the project type and category selected (for simplicity, the rest of this document refers to "project category" rather than "project type and category").
If your project activity does not fit any of the project categories in appendix B, you may propose additional project categories for consideration by the Executive Board, in accordance with paragraphs 15 and 16 of the simplified M&P for small-scale CDM project activities. The final SSC-PDD project design document shall, however, only be submitted to the Executive Board for consideration after the Board has amended appendix B as necessary.)
(This section should include a description of how environmentally safe and sound technology and know-how is transferred to the host Party, if such a transfer is part of the project.)

Project type and category

Following all mentioned-above and referring to (i) the project purpose and (ii) the technology/measures to be employed and taking into account the recommendations of the *Simplified M&P for small-scale CDM project activities*, all considered PAs fall into two predefined categories –

II.E Energy efficiency and fuel switching measures for buildings[3] - includes PAs which primarily aims at reducing emissions through energy efficiency measures (Type II – Energy efficiency improvement projects; PA8, PA9, PA10, PA17 and PA26). For the selected category the aggregate energy savings may not exceed the equivalent of 15 GWh per year;

III.B Switching fossil fuels[4] that includes PAs which primarily aim at reducing emissions through fuel switching (Type III – Other project activities, PA1, PA2,PA3, PA4, PA5, PA6, PA11, PA12, PA18, PA19, PA20, PA24, PA25 and PA27). For this category the project measures shall both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide

[3] Para 64, Appendix B of the simplified modalities and procedures for small-scale CDM project activities, 2004.
[4] Para 72, 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, 2004.

equivalent annually.

Description of project categories relevant to the considered activities

(EXCERPT from Appendix B to the Simplified Modalities and Procedures for small-scale CDM Project Activities)

II.E. Energy efficiency and fuel switching measures for buildings

Para. 64. This category comprises any energy efficiency and fuel switching measure implemented at a single building, such as a commercial, institutional or residential building, or group of similar buildings, such as a school, district or university. This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B. Examples include technical energy efficiency measures (such as efficient appliances, better insulation and optimal arrangement of equipment) and fuel switching measures (such as switching from oil to gas).

III. B. Switching fossil fuels

Para. 72. This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls in category II.D or II.E.

PAs distribution per categories:

Category II.E	- PA8, PA9, PA10, PA17, PA26
Category III.B	- PA1, PA2, PA3, PA4, PA5, PA6, PA11, PA12, PA18, PA19, PA20, PA24, PA25, PA27.

The carried out analysis has shown that all 19 PAs, considered in this project meet their threshold requirements, thus, belonging to small scale project activities. It is confirmed that these bundle of PAs meet the eligibility criteria, thus qualifying for a small-scale CDM project.

The installed capacity of the project does not exceed than 15 kilo-tonnes of carbon dioxide equivalent annually. In the event the total amount of installed capacity exceeds 15 kilo-tonnes , CERs will only be issued up to the maximum value.

All 19 PAs considered in this project, are distributed per two project categories as shown in table 2. The carried out numerical analysis, based on the elaborated Excel model, demonstrates that those two project categories meet their threshold requirements, thus qualifying for a small-scale CDM project.

Table 2. PAs distribution per categories and verification of the small-scale project eligibility

CDM small-scale project categories	Threshold	Expected Maximum Project contribution (10^{th} crediting year)	No. of PAs
II.E Energy efficiency and fuel switching measures for buildings For this category the aggregate energy savings may not exceed the equivalent of 15 GWh per year.	15 GWh	**9.8 GWh**	5
III.B Switching fossil fuels 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	**5.6 ktonnes**	14

Technology to be employed by project activities

Most of public buildings included in the project are presently supplied with heat and hot water from physically old, technologically outdated boilers via an extremely deteriorated heat distribution network with a high level of losses, having an overall system efficiency less than 50%. The new technologies to be employed by project activities are aimed to increase the overall efficiency of the systems up to 90% and simultaneously considerably reduce the GHG emissions, by implementing energy efficiency and fuel switching measures at a single building or group of buildings. The state-of-the-art technologies will either replace the existing equipment or will be installed in new facilities. According to the project, Moldova will import most modern heat production equipment and materials.

A.4.3 Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

(*Please state briefly how anthropogenic greenhouse gas (GHG) emission reductions are to be achieved (detail to be provided in section B.) and provide the estimate of total anticipated reductions in tonnes of CO_2 equivalent as determined in section E. Max. length one page.)*

The anthropogenic greenhouse gas (GHG) emission reductions in this project are to be achieved as a result of

- fuel switching from existing fossil fuels (coal, wood and mazut) to a cleaner fuel option (natural gas) and
- implementation of energy conservation measures in buildings (additional insulation of building envelops, windows and doors replacement).

Here, the supply side measures prevail over the demand side ones in terms of energy savings and emissions reduction contribution. Since building's retrofit measures yield to an insignificant ER, in the Moldovan project the emissions reduction effect produced by energy savings in buildings is neglected.

The total expected average annual GHG emissions reductions over the crediting period is about 6.0 kilotonnes of CO_2 per year (see section E below).

In the absence of project activity, predominantly due to availability and price the operator would continue to use coal, wood and mazut as there are no national/sectoral policies that would require use of natural gas or other cleaner fuels. Also there are no policies that would give incentives to switch to cleaner fuels and without CDM the project would not have attracted investments.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period: *(Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emission reductions shall be in indicated using the following tabular format. For type (iii) small-scale projects the estimation of project emissions is also required.)*

Table 3. Estimated annual emission reductions

Number of years	Years	Annual estimation of emission reductions in tonnes of CO2 e
1	2006	4068
2	2007	5129
3	2008	5386
4	2009	5655
5	2010	5938
6	2011	6235
7	2012	6547
8	2013	6874
9	2014	7218
10	2015	7584
Total estimated reductions (tonnes of CO2 e)		60 633
Total number of crediting years		10
Annual average over the crediting period of estimated reductions (tones of CO2 e)		6063

A.4.4 Public funding of the small-scale project activity:

(In case public funding from Parties included in Annex I to the Convention is involved, please provide in annex 2 information on sources of public funding for the project activity from Parties included in Annex I which 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.
Note: When the CDM-SSC-PDD is filled in support of a proposed new simplified methodology, it is to be indicated whether public funding from Parties included in Annex I is likely to be involved indicating the Party(ies) the extent possible.)

The project will be financed through the IDA credit. The total Energy II project financing will be US$ 39.93 million, of which US$35 million would be financed from the IDA credit, US$4.33 million from internal cash generation and municipal contributions and US$0.6 million from the Swedish International Development Agency (SIDA). The project has several components, including the heating component, for which only US $ 9.16 will be allocated. The Ministry of Finance would on lend the relevant portions of the IDA credit financing improvements in heating of public buildings to the municipalities participating in the project, either through direct loans with a guarantee from the local rayons, or through a loan to the rayons which would then be on-lent to the municipality. Because of the limited financial capacity of the municipalities, and the significant social impacts of the proposed investments, the Ministry of Finance would pass most of the subsidies implicit in the IDA terms to the local governments/project beneficiaries. Funds would be on-lent for a period of not less than 15 years and not more than 40 years, including a grace period of not less than 3 years and not more than 10 years, at an interest rate of 1.5 percent.

A.4.5 Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

(Please refer to appendix C to the simplified M&P for the small-scale CDM project activities for guidance on how to determine whether the proposed project activity is not a debundled component of a larger project activity.)

The current project represents a bundle of small-scale project activities, technologically fully independent and geographically spread out all over the country. The minimal distance between two PAs boundaries is more than one kilometre, while the maximal distance is about 400 km.

Each project activity, included in this project, is represented by an owner/beneficiary of the World Bank Moldova Energy-II Project that nowadays is under implementation in the Republic of Moldova, which is either the central Ministry of Education or Ministry of Health, or the municipality/local authorities.

*Debundling i*s defined as the fragmentation of a large project activity into smaller parts. According to Appendix C (paragraph 2) of the Simplified M&P for Small-Scale CDM project activities, the current project cannot be deemed to be a debundled component of a larger project activity because by the moment of registration of this project proposal there is none registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participants; in the same project category and technology/measure; and registered within the previous 2 years; and whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

B. Baseline methodology

B.1 Title and reference of the project category applicable to the project activity:

(Please refer to the UNFCCC CDM web site for the most recent list of the small-scale CDM project activity categories contained in appendix B of the simplified M&P for small-scale CDM project activities.)

Type of the project activity:

Type II – Energy efficiency improvement projects;

Type III – Other project activities.

Category of the project activity:

II.E "Energy efficiency and fuel switching measures for buildings";

III.B "Switching fossil fuels".

B.2 Project category applicable to the small-scale project activity*:*

(Justify the choice of the applicable baseline calculation for the project category as provided for in appendix B of the simplified M&P for small-scale CDM project activities, by showing that the proposed project activity meets the applicability conditions. Describe how the methodology is applied in the context of the project activity: Please explain the basic assumptions of the baseline methodology in the context of the project activity. Provide the key information and data used to determine the baseline scenario (variables, parameters, data sources etc.) in table form.)

The selected baseline methodology is based on the known fuel consumption for given reference year (t_0) and annual consumption growth rate. The year 2003 was chosen as the reference year, for which there are most complete and reliable data regarding the operation heating systems.

The project activities encompassed in this project are similar, aiming at local heating systems installation for all considered public buildings. Therefore the baseline methodology application for all PAs is similar and includes the following steps (fig. 3):

1. Reference year (t_0) choice.
2. Public building's heat consumption calculation for the reference year.
3. Heat consumption ($Q_{csm,t}$) forecast for the study period (t_0+1, ..., t_0+T_{cred}).
4. Fuel type choice for the study period.
5. Fuel embedded heat ($Q_{fuel,BSL,t}$) calculation for the years of the study period.
6. Fuel consumption ($V_{fuel,BSL,t}$) calculation for the years of the study period.
7. CO_2 emissions ($Em_{BSL,t}$) calculation for the years of the study period.

In the autumn of the 2004 a series of visits to all project sites were conducted, which allowed to collect information and data regarding the considered public buildings (total spaces, heated areas and their current share etc.) and the respective existing heating systems (types of heating sources, their location and installed capacity, used fuel structure, fuel volumes, peak heat demand, heating period duration, building's retrospective heat consumption etc.). During these visits, the project participants presented their view and expectations regarding the possible heating service evolution in the absence of the proposed project. This information was laid down to the foundation of the baseline scenario development.

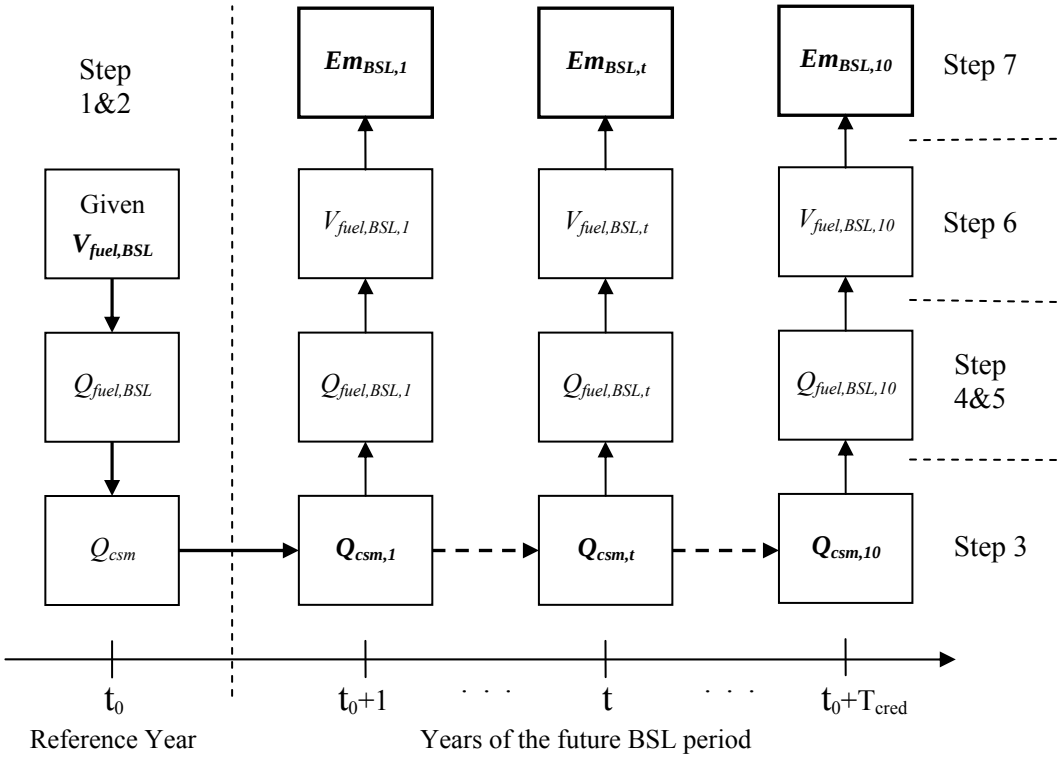

Figure 3. Basic steps for baseline methodology application

The heat demand and annual heat consumption are key factors determining the baseline. It is worth mentioning that heat consumption was determined not on the basis of the given heated areas, but first on the basis of the real fuel consumption resulting from the budgetary allocations for public building's heating.

For the purpose of this project the appropriate parameters of the existing heating systems equipment were determined according to the relevant handbooks. All initial parameters used in this project are summarized in the sheet "Initial Data" of the Excel file "Moldova Energy conservation and ER.xls".

Information regarding the climate in Moldova and parameters used for heating system design: ***The climate*** of the Republic of Moldova is temperate continental. Winters are mild and short, summers are hot and long. The average annual air temperature throughout the territory of the Republic is above zero (+8°C in the north, +9°C in the central parts of the country, and +10°C in the south). The length of the heating season is 158 days in the south, 166 days in the central parts (around Chisinau) and 177 days in the north of the country. The minimum temperature used for calculations in sizing of heating equipment is –18°C. Maximum and minimum temperatures in Moldova range between +40°C in the summer and –32°C in the winter, with temperatures during the coldest month (January) averaging around –5°C in central Moldova.

Basic assumptions made in elaborating the baseline for all project activities:

1. The public building's heat demand and annual heat consumption are not constant, because of undergoing recovery process of heating services in the country and still existing limitation of the budgetary allocations for public buildings.
2. The increase in the annual heat consumption is not proportional to the increase in heat demand, because of the gradual extension of the annual heating period duration.
3. The existent fuel structure for each PA will remain unchanged during the future period.
4. Heating system efficiency will remain unchanged during the future period.
5. The existent PA sources will remain the same over the crediting period.
6. At the local power plants only the natural gas is used.

B.3 Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed small-scale project activity

(Justify that the proposed project activity qualifies to use simplified methodologies and is additional using attachment A to appendix B of the simplified M&P for small-scale CDM project activities. National policies and circumstances relevant to the baseline of the proposed project activity shall be summarized here as well.)

For each PA of this project can be identified a multitude of baseline scenarios which differ by the annual heat consumption growth rate over the crediting period. The analysis of public buildings included in the project has shown that the annual growth rate during the coming decade can vary from four (4) to ten (10) percent. Following the principle of the most conservative scenario selection,

eventually as the baseline has been chosen the scenario corresponding to five (5) percent annual heat consumption growth rate (see fig. 6).

In accordance with the Art. 12 of the Annex II to Decision 21/CP.8, *to use simplified modalities and procedures for small-scale CDM project activities, a proposed project activity shall*:

(a) Meet the eligibility criteria for small-scale CDM project activities set out in paragraph 6 (c) of decision 17/CP.7;
(b) Conform to one of the project categories in appendix B to this annex;
(c) Not be a debundled component of a larger project activity, as determined through appendix C to this annex.

The proposed CDM small-scale project complies with all mentioned-above requirements.

For the selected type and category (Type III – Other project activities, category III.B Switching fossil fuels, and Type II- Energy efficiency improvement projects, category II.E Energy efficiency and fuel switching measures for building) the *Appendix B of the Simplified Modalities and Procedures for small-scale CDM project activities* offers an indicative baseline methodology adapted to the Moldovan project circumstances.

Additionality of the project activity

In regard to small-scale CDM projects the Simplified modalities and procedures for small-scale CDM project activities (Appendix B, Attachment A)[5] require from the project participants to demonstrate that the project activity would otherwise not be implemented due to the existence of one or more of the barriers listed below:

a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher'.

The Moldova Energy II Project has been approved and is currently under implementation. It contains four components: electricity systems upgrade; heating supply and efficiency improvements; technical assistance and project management. The amount of funding allocated to heating supply and efficiency improvements is $9.1 million dollars. However, the IDA credit is sub-loaned to project beneficiaries (municipalities and ministries) by the MOF, who are required to repay the loan used to implement the PAs. Repaying the loans assumed by the project beneficiaries represents a financial burden for the project beneficiaries, as it ties up limited financial resources which may otherwise be used for social or environmental programs undertaken by the project beneficiaries. The repayment obligations act as a

[5] Annex II to *Decision 21/CP.8 "Guidance to the Executive Board of the clean development mechanism"*, 2002.

disincentive, discouraging project beneficiaries from assuming loans to implement PAs. Without the revenue generated by selling the emission reductions, the PAs have an NPV (net present value) of minus 501,823 US$ USD (see Annex 3).

The World Bank project implementation team started explaining the opportunity to sell emission reductions to potential project beneficiaries in early 2004. In October 2004, the World Bank's environment, energy, and carbon finance teams held a large workshop with the representatives of all interested potential project beneficiaries. After the workshop arrangements setting out how the potential project beneficiaries could become eligible and obtain carbon revenues were agreed upon. [The World Bank's official mission reports which document these discussions are filed in the World Bank archives].

The project beneficiaries subsequently entered into subsidiary loan agreements with the MOF to implement the PAs, on the understanding that they will receive additional revenue from selling the emission reductions generated by the PAs. The NPV for all PAs with the revenue from emission reductions improves significantly but is still negative $323,000(see Annex 3)The money received from selling the emission reductions to the CDCF will be used for social and environmental purposes, thereby freeing up resources to enable the project beneficiaries both repay the loans and undertake much needed community development projects.

The purchase of emission reductions by the CDCF is therefore acting as catalyst for investments in energy efficiency projects. The PAs would not have been implemented without the revenue generated by the sale of emission reductions. The Emissions Reduction Study predicts the implementation of the PAs will halve the emissions generated.

B.4 Description of the project boundary for the project activity:

(Define the project boundary for the project activity using the guidance specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

For the Moldovan project, which aims at retrofitting of heating systems for a large number of selected public buildings spread out all over the country (see fig. 2), the project boundaries were established as those which represent the physical boundaries of the rehabilitated local heating systems (LHS). For each project activity comprised in the project, it is being foreseen to install a new heating source (GHG emission source), located either in the project building or in the neighborhood of the group of buildings.

In this context all PAs fall into two groups –

Group 1	PA1, PA2, PA3, PA4, PA5, PA6, PA11, PA12, PA18, PA19, PA20, PA24, PA25, PA27
Group 2	PA8, PA9, PA10, PA17, PA26

Group 1 includes PAs for which the emission source for both baseline and project scenarios are within the established project boundaries (fig. 4);

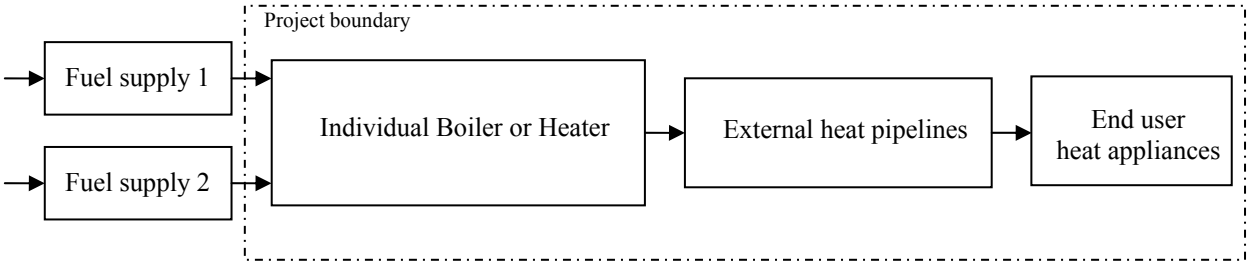

Figure 4. Energy chart and project boundary for PAs (group 1)

Group 2 - PAs for which the emission source for project scenario will be located within the established project boundaries, but for baseline scenario are located outside (fig. 5). Such a situation is related to project sites where the considered public buildings have been heated from the district heating system (DHS) or by electricity, while the current project foresees the installation of local boilers.

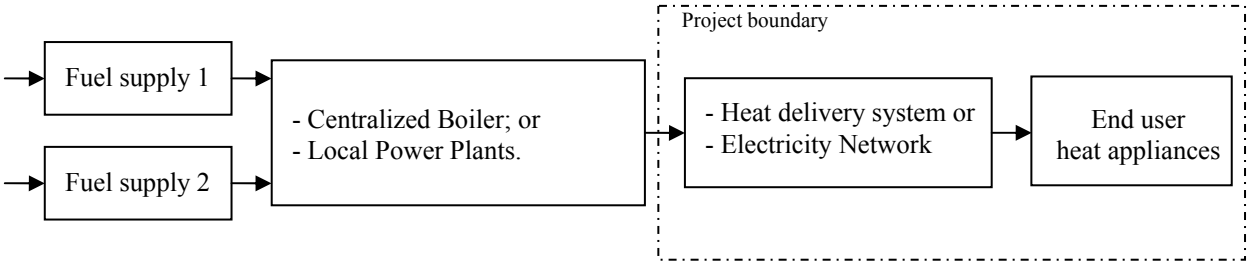

Figure 5. Energy chart and project boundary for PAs (group 2)

For PAs, belonging to group 1, the project participants will fully control the local heating systems, inclusively their sources; all GHG emissions are encompassed by the project boundary and will be determined and attributed to the project; such a situation complies with the Marrakesh Accords definition of the *principle of control*.

In contrast to the mentioned above, for PAs of the group 2, sources are located outside the project boundary and project participants have not a total control on them, but *it was found reasonable to attribute the GHG emissions to the relevant CDM project activities because of related fuel consumptions and GHG emissions significance and measurability*.

B.5 Details of the baseline and its development:

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in

the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

Basic assumptions regarding heat consumption by public buildings

Assumptions and arguments regarding heat and respectively fuel consumption for public buildings included in the project:

1. Evolution of the fuel consumption over the past years can't serve as basis for the future period forecast because tendencies were significantly changed. In this study *future annual heat demand and consumption are determined on the basis of the given reference year (2003) level of consumption and expected annual growth rate (5%).*

2. 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.

3. The objectives included in the project are public buildings financed from local or central budgets. According to official estimations, the economic growth in the country and respectively the budget allocations towards project institutions during the next decade will not exceed an annual rate of 4-10%[6]**.** Therefore, *the payments for fuel consumption will not exceed the budget allocations.*

4. Some deviations from the above-mentioned assumption, referred to fuel consumption growth can occur but these *deviations are not decisive for the whole evolution of the situation*. In some buildings where the heating system, for example, has been frozen and deteriorated, the electrical heating is being used, but at a lower consumption level (whether because of limited capacity of electricity supply system or financial constraints) and in case of project implementation an important growth in jump could be registered.

5. *The duration of the heating period* during the last decade has been reduced from 4008 hours (5.5 months), as per national standard, to 1200-1800 hours per year and has the tendency to recover by the end of the year 2014.

6. It's worth to be mentioned that large building spaces are not being heated yet (especially it refers to professional schools with total areas of circa 15-20 thousand square meters) and probably will never be heated as being redundant for nowadays needs. The energy consumption forecast done for such objectives only on the bases of heated spaces could result in significant errors, as there is a high probability that a part of those areas will be abolished.

Approach chosen for heat consumption forecast

[6] Economic Growth and Poverty Reduction Strategy Paper, The Government of the Republic of Moldova, May 2004, Chisinau, Moldova. Moldova's Economic Transition: Slow and Contradictory. Stuart Hensel and Anatol Gudim, CIRS - Center for Strategic Studies and Reforms, Chisinau, 2004, published as well in: The EU & Moldova. On a Fault-line of Europe. Edited by Ann Lewis. Federal Trust, London)

Until 1993-94 in the Republic of Moldova the heating service provided was corresponding to national standards. Later because of upcoming financial difficulties the quality of service was decreasing substantially. Fuel consumption was cut, heated spaces were reduced, the heating period duration has been drastically shrunk and in some cases for whole public buildings (schools, kindergartens) the heating service was fully stopped. Many public buildings over the transition years were abandoned, but still remaining in the ownership of the relevant public institutions as areas expected to be heated and used. Perhaps some of them never will be returned into the service circuit.

By 1998-99 the heat consumption has got the lowest level of 10-30 % of the standard values. After about 10 years of recession, since 2003-2004 a tendency for heat supply recovery was identified (fig. 6). Budget allocations towards public institutions started to increase and respectively the payments for heating services and fuel supply got the same tendency.

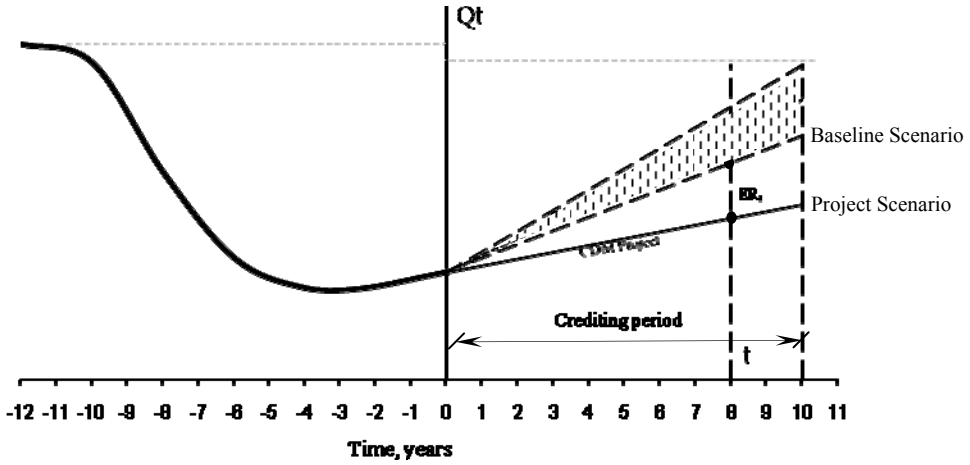

Figure 6. A multitude of possible evolutions of the situation existing before the proposed CDM project (baseline scenarios)

The collected data, regarding the heat consumption in the project considered buildings over the last decade, allowed to identify the general historical trend. But in this project for determining the future heat consumption the approach based on the given consumption for the reference year and annual rate of growth was applied. In this study as reference was accepted the year 2003, because of most trusted data and being the origin of the recovering process, foreseen to take place according to an exponential growth-

$$Q_t = Q_0 \cdot (1+r)^{t-t_0} \quad , \qquad (1)$$

where Q_t represents the heat consumption for year t of the future period,

Q_0 - the consumption for the reference year t_0;

r - the annual consumption growth rate.

The analysis done by project buildings has shown that in order to achieve the national heating standard over the coming ten years, which also represent the crediting period, it would require a substantial

annual heat consumption growth, of about 100-130% in some cases. Such a energy consumption growth implies a similar growth of service payments. But since the public institutions considered in the project are financed from the local and central budgets, the payments growth cannot exceed the annual budgetary allocations growth, which is estimated at the level of 4-10% annually. That's why a common conservative annual growth rate of 5% for all public buildings included in the project has been chosen in this study. It is worth to be mentioned that the accepted growth rate will bring the heat consumption by the end of the crediting period to a level still below the national heating standard (fig. 7).

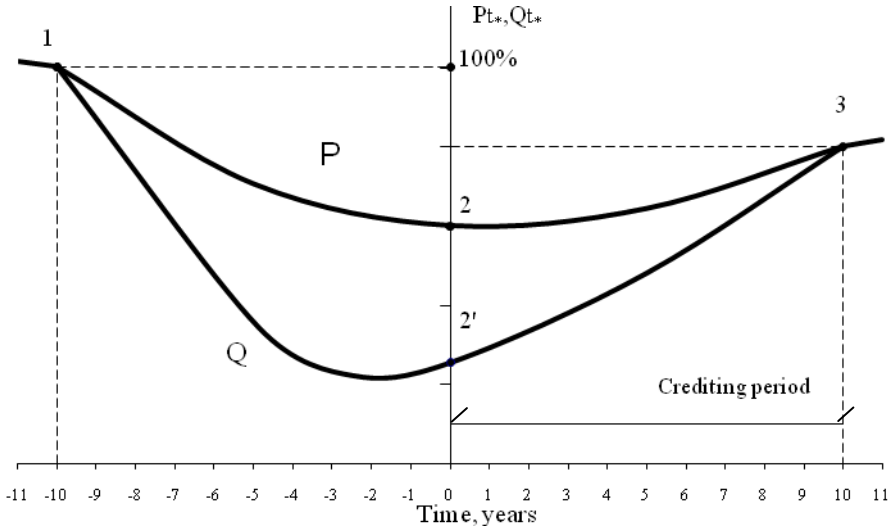

Figure 7. Evolution of heat demand (P) and heat consumption (Q) over the study period

The discrepancy between the relative heat demand (Pt_*, $Pt_* = Pt / P1$) and the annual heat consumption (Qt_*, $Qt_* = Qt / Q1$) is determined by the variation of the annual heating period duration. During the most economically difficult transition years the heating period had been reduced up to four times.

Determination of building's heat consumption for the reference year Q_0

This variable is being determined through the given fuel consumption for the reference year[7]. According to technological chain (Fig. 7,a) for building's heat consumption can be written:

$$Q_{csm,BSL} = Q_{fuel,BSL} - Loss_{Boiler,BSL} - Loss_{net,BSL} \quad (2)$$

or

$$Q_{csm,BSL} = Q_{fuel,BSL} - Q_{fuel,BSL} \cdot (1 - \eta_{BSL}) - Q_{fuel,BSL} \cdot \eta_{BSL} \cdot k_{net,BSL} \quad (3)$$

getting finally the following simplified formula -

$$Q_{csm,BSL} = Q_{fuel,BSL} \cdot E_{BSL} \ , \quad (4)$$

where $Q_{fuel,BSL} = V_{fuel,BSL} \cdot LHV_{BSL}$,

[7] Except for buildings with electrical heating, for which the final heat consumption is determined on the basis of given electricity consumption.

$$E_{BSL} = \eta_{boiler,BSL} \cdot \eta_{net,BSL} \quad \text{and} \qquad (5)$$

$Q_{csm,BSL}$ represents the building's heat consumption for baseline, MWh;
$Q_{fuel,BSL}$ - embedded heat for fuels used in the baseline scenario, MWh;
E_{BSL} - overall efficiency of the EHS (boiler and external network);
$Loss_{Boiler,BSL}$ - heat losses for existing boiler, MWh;
$Loss_{net,BSL}$ - heat losses for existing external network, MWh;
$\eta_{boiler,BSL}$ - efficiency of existing boiler;
$\eta_{net,BSL}$ - efficiency of existing external network, $\eta_{net,BSL} = 1 - k_{net,BSL}$;
$k_{net,BSL}$ - heat losses rate for external network (divided to its inlet heat);
LHV_{BSL} - given Low Heat Value of baseline fuels, kWh/kg or kWh/m^3.

There are four types of fuels burnt at the selected sources for baseline scenario in Moldova - coal, mazut, natural gas and wood, for which the LHV values are given in table 4.

Heat consumption determined by project activities for the reference year (2003) is presented in the Baseline Study, Annex 2, tab. A1.

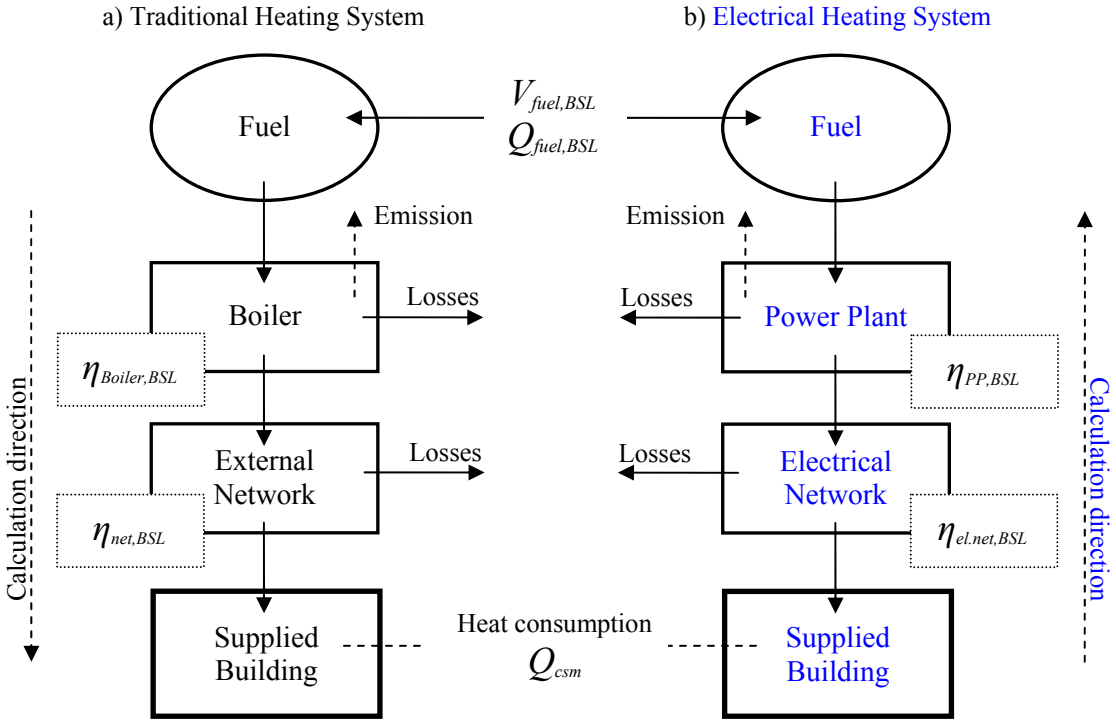

Figure 8. BSL Heat flow chart for local heating system

It is worth mentioning, since the efficiency of the existing boilers ranges between 40-60 % and external network heat losses are about 10 %, for overall efficiency E_{BSL} results -

$$E_{BSL} = \{0.4...0.6\} \cdot 0.9 = \{0.36...0.54\} \approx 0.45 \, . \qquad (6)$$

This means that because of outdated heating installations the baseline heat consumption amounts to less than 50 % of the embedded fuel heat -

$$Q_{csm,BSL} \approx 0.45 \cdot Q_{fuel,BSL} \quad . \qquad (7)$$

Table 4. Fuel types used at the PA's sources and considered in BSL Study

	Type of fuel	LOW HEAT VALUE			EMISSION FACTOR	
		Used in calculations	Recorded in Moldova	IPCC TJ / k t	Used in calculations tCO2 / TJ , [1]	IPCC tCO2 / TJ
1.	**Coal**	**20** TJ / k t	**14 - 26** TJ / k t , [2]	**15.9-28.7** Tab. 1-24, pag. 1.62	**94.6**	**94.6**
2.	**Mazut**	**39.5** TJ / kt	[2] , Tab 2.8, Pag. 35	**39...44**	**77.3**	**77.3**
3.	**Nat Gas**	**33.5** MJ/Nm3		**52.3** Tab. 1-24, pag. 1.62	**56.1**	**56.1**
4.	**Wood**	**14.49** TJ / k t		**10.9 - 20.0** Tab. 1-13, pag. 1.45	**0**	**109.6**

References top table 4:

1. Analiza situatiei din complexul energetic al Republicii Moldova si asigurarea securitatii energetice, Chisinau 2001, Institutul de Energetica al ASM, 170pp.
2. Роддатис К.Ф., Полтарецкий А. Н. *Справочник по котельным установкам малой производительностию*, Энергоатомиздат, 1989.

Heat consumption determination for the future period

The heat consumption for the years of the future period, by project activities, are calculated according to formula (1) on the basis of the reference year known consumption and justified annual growth rate. The general calculation scheme of the main baseline parameters ($Q_{csm,t}$, $Q_{fuel,BSL,t}$ and $V_{fuel,BSL,t}$) for the years of the future period is presented in fig. 9.

The resulted values for heat consumption for the future period are presented in Baseline Study, Annex 2, tab. A1.

Fuel structure and fuel consumption for baseline scenario

Types of fuels to be used in the future for baseline were determined on the basis of visits done at public institutions owning the relevant buildings included in the project.

It has to be mentioned that among the fuels used in the baseline scenario the wood is present. Emissions factor for the wood is considered zero.

Traditional local heating systems

As far as fuel consumption $V_{fuel,BSL}$ is concerned for baseline scenario, it is determined knowing the final heat consumption Q_{csm} for the given year t, applying the following formulae -

$$V_{fuel,BSL} = Q_{fuel,BSL} / LHV_{BSL} \quad , \qquad (8)$$

where $Q_{fuel,BSL} = Q_{csm} / E_{BSL}$.

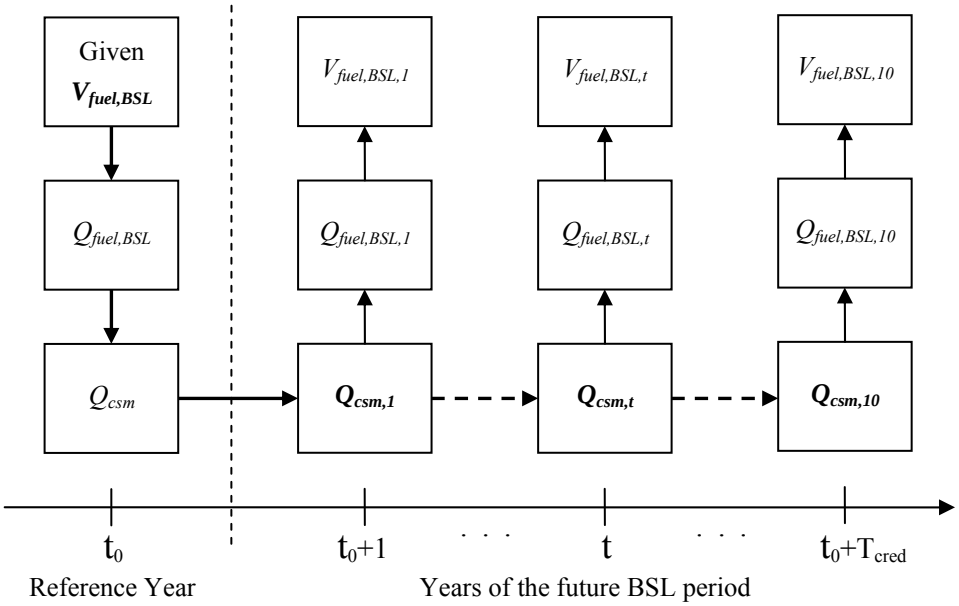

Figure 9. Calculation sequence chart for baseline basic parameters

Electrical heating PAs (II.E category)

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.

Once an additional PA category (II.E) was applied, the relevant baseline methodology has been used to 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".

According to AMS-I.D, paragraphs 7, point b - as the relevant option for Moldova's conditions, the emission coefficient (measured in kg CO2e/kWh) is to be calculated in a transparent and conservative manner as the weighted average emissions (in kg CO2e/kWh) of the current generation mix.

Thus, for PAs of II.E category the baseline calculation would include the following steps:

a) For each PA the building's electricity consumption is adjusted to take into consideration losses into electrical grid –

$$W_{power\ system} = Qcsm \cdot (1+\Delta Wd + \Delta Wd),$$

where $W_{power\ system}$ represents the electricity produced at the local power plants to meet the building's demand; Qcsm - building's electricity consumption for heating purpose; ΔWd and ΔWd normative values of the technological losses in distribution and transmission electrical networks.

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 15.5% for distribution network, according to National Agency for Energy Regulation (www.anre.md, Methodologies[8]).

b) Calculation of the weighted average emission factor (in kg CO2e/kWh) of the current generation mix in the country ($EF_{power\ system}$) is done according to formula –

$$EF_{power\ system} = \sum_{i=1}^{n} FF_i \cdot \alpha_i \quad ,$$

where EF_i represents the emission factor for i-power plant, in kg CO2equ/kWh; α_i - the share of the power plant i in the total electricity production in the country (tab.4.1).

Table 4.1. Electricity production structure in Moldova

#	Local Power Plants	Year 2003		Year 2000	Electricity production efficiency (2000) η_{PP}, %
		Electricity produced, MWt	Share (α_i), %	Share (α_i), %	
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%**	-

Note: The figures are obtained from the State Enterprise Moldelectrica - the National Electricity Transmission Operator.

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.

* * *

The above presented procedure for baseline calculation for PAs of II.E category ***is absolutely identical*** to that corresponding to formulae (8) and (9) - for PAs of III.B category. The only difference is that in case of II.E PAs in formula (8) the E_{BSL} represents the overall efficiency of the electrical networks and power plants -

[8] 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.")

$$E_{BSL} = \eta_{PP,BSL} \cdot \eta_{el.net,BSL} \quad , \qquad (9)$$

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 %).

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.

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:

$\eta_{PP,BSL}$ = 0.7581 · 0.328 + 0.2025 · 0.371 + 0.0310 · 0.343 + 0.0084 · 0.184 = 0.3359 or 33%.

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.

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 fuels used in the baseline and fuel consumption quantities are summarized in Baseline Study, Annex 2, tab. A3.

B.5.2 Date of completing the final draft of this baseline section *(DD/MM/YYYY)*:

The final draft of this baseline section was completed at 25/05/2005.

B.5.3 Name of person/entity determining the baseline:

(Please provide contact information and indicate if the person/entity is also a project participant listed in annex 1 of this document.)

The current baseline was determined by Prof. Valentin Arion, Dr. hab, WB Expert, who is not a project participant.

Contact information:
Mail Address: 168 Stefan cel Mare bd., Technical University, MD-2004 Chisinau, Republic of Moldova.

Tel/Fax: +373 22 23 72 82; Email: valarion@molddata.md

C. Duration of the project activity and crediting period

C.1 Duration of the project activity:

C.1.1 Starting date of the project activity:

(The starting date of a CDM project activity is the date on which the implementation or construction or real action of a project activity begins) (The starting date of a CDM project activity is the date on which the implementation or construction or real action of a project activity begins) Project activities starting between 1 January 2000 the date of the registration of a first clean development mechanism project, if the project activity is submitted for registration before 31 December 2005; have to provide documentation, at the time of registration, showing that the starting date fell within this period.)

Starting date of the current CDM project: January 15, 2006.

C.1.2 Expected operational lifetime of the project activity:

(Please state the expected operational lifetime of the project activity in years and months.)

Expected operational lifetime of the project activities – 15 years.

C.2 Choice of the crediting period and related information:

(Please state whether the project activity will use a renewable or a fixed crediting period and complete C.2.1 or C.2.2 accordingly.) (Note that the crediting period may only start after the date of registration of the proposed activity as a CDM project activity. In exceptional cases (see instructions for section C.1.1. above), the starting date of the crediting period can be prior to the date of registration of the project activity as provided for in paragraphs 12 and 13 of decision 17/CP., paragraph 1 (c) of decision 18/CP.9 and in any guidance by the Executive Board, available on the UNFCCC CDM web site.)

For every project activity installation of a new local heating system is foreseen, which include boiler and local network with an expected operational lifetime from 10 to 15 years. For the already installed boilers the lifetime is specified as 10 years. For example, the heating plants built in Ungheni are endowed with KCB-type boilers with the specified lifetime of 10 years.

According to Article 49, Decision 17/CP.7 M&P for a CDM, for this project a fixed crediting period of ten (10) years was selected for the proposed project activities with no option of renewal.

C.2.1 Renewable crediting period *(at most seven (7) years per crediting period)*

C.2.1.1 Starting date of the first crediting period *(DD/MM/YYYY)*:

C.2.1.2 Length of the first crediting period *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*:

C.2.2 Fixed crediting period *(at most ten (10) years)*:

C.2.2.1 Starting date: 20/01/2006

C.2.2.2 Length (max 10 years): 10 years

D. Monitoring methodology and plan

(The monitoring plan shall incorporate a monitoring methodology specified for the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities and represent good monitoring practice appropriate to the type of project activity.

The monitoring plan shall also provide information on the collection and archiving of the data specified in appendix B of the simplified M&P for small-scale CDM project activities to:
- Estimate or measure emissions occurring within the project boundary;
- Determine the baseline, as applicable;
- Estimate leakage, where this needs to be considered.

Project participants shall implement the registered monitoring plan and provide data, in accordance with the plan, through their monitoring reports.

Operational entities will verify that the monitoring methodology and plan have been implemented correctly and check the information in accordance with the provisions on verification. This section shall provide a detailed description of the monitoring plan, including an identification of the data to be collected, its quality with regard to accuracy, comparability, completeness and validity, taking into consideration any guidance contained in the methodology, and archiving of the data collected.

Please note that monitoring data required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

An overall monitoring plan that monitors performance of the constituent project activities on a sample basis may be proposed for bundled project activities. If bundled project activities are registered with an overall monitoring plan, this monitoring plan shall be implemented and each verification/certification of the emission reductions achieved shall cover all of the bundled project activities.)

D.1 Name and reference of approved methodology applied to the small-scale project activity:

(Please refer to the UNFCCC CDM web site for the most recent version of the indicative list of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

(If a national or international monitoring standard has to be applied to monitor certain aspects of the project activity, please identify this standard and provide a reference to the source where a detailed description of the standard can be found.)

A Monitoring Plan encompasses a set of requirements for monitoring and verification of emissions reduction achieved by a project. For the current project, comprising a bundle of small-scale PAs, falling into one project category, an overall monitoring plan that monitors performance of the constituent project activities is proposed.

The monitoring plan is to facilitate the collection and archiving of the data needed to:

- Estimate or measure project emissions occurring within the project boundary;
- Determine the baseline and estimate baseline emissions;
- Calculate emissions reduction.

All PAs in the current project are referring to the following CDM predefined project category - ***III.B Switching fossil fuels, Type III–Other project activities***[9], that includes PAs which primarily aim at reducing emissions through fuel switching (see the textbox below).

[9] Para 72, 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, 2004.

Description of project categories relevant to the considered activities

(EXCERPT from Appendix B to the Simplified Modalities and Procedures for small-scale CDM Project Activities)

II.E. Energy efficiency and fuel switching measures for buildings

Para. 64. This category comprises any energy efficiency and fuel switching measure implemented at a single building, such as a commercial, institutional or residential building, or group of similar buildings, such as a school, district or university. This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B. Examples include technical energy efficiency measures (such as efficient appliances, better insulation and optimal arrangement of equipment) and fuel switching measures (such as switching from oil to gas).

III. B. Switching fossil fuels

Para. 72. This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls in category II.D or II.E.

For the selected category the CDM-EB offers an indicative monitoring methodology presented in the textbox below.

INDICATIVE MONITORING METHODOLOGIES for selected project categories

(EXCERPT from Appendix B to the Simplified Modalities and Procedures for small-scale CDM Project Activities)

TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS, *Category II.E.* - Energy *efficiency and fuel switching measures for buildings*

69. In the case of retrofit measures, monitoring shall consist of:

- In the case of retrofit measures, monitoring shall consist of:

  (a) Documenting the specifications of the equipment replaced;
  (b) Calculating the energy savings due to the measures installed.

- In the case of a new facility, monitoring shall consist of:

  (a) Metering the energy use *of the building(s);*
  (b) Calculating the energy savings *of the new building(s).*

Published values for technical transmission and distribution losses may be used. Alternatively technical transmission and distribution losses for the grid that supplies the building(s) may be monitored

TYPE III - OTHER PROJECT ACTIVITIES, *Category III.C. - Switching fossil fuels*

76. Monitoring shall involve:

(a) Monitoring of the fuel use and output *for an appropriate period (e.g., a few years, but records of fuel use may be used) prior to the fuel switch being implemented - e.g. coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used in lieu of actual monitoring);*

(b) Monitoring *fuel use and output* after the fuel switch has been implemented - e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit.

77. In the case of coal, the emission coefficient shall be based on test results for periodic samples of the coal purchased if such tests are part of the normal practice for coal purchases.

D.2 Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

(Justify the choice of the monitoring methodology applicable to the project category as provided for in appendix B.)

In this project, the supply side prevail over the demand side measures in terms of energy savings and emissions reduction contribution. Building's retrofit measures yield to an insignificant ER, that's why in the Moldovan project *the emissions reduction effect produced by energy savings in buildings is neglected.* By this, *all PAs, representing the mentioned above one category, become very similar, and consequently a common monitoring methodology can be applied to them.*

Under the above assumptions results that *the emissions reduction monitoring is fully focused on the supply side, i.e. on boiler and external network of the local heating system*.

All PAs, considered in this project, are very similar and consequently a common monitoring methodology can be applied to them. The developed project specific methodology, is illustrated in

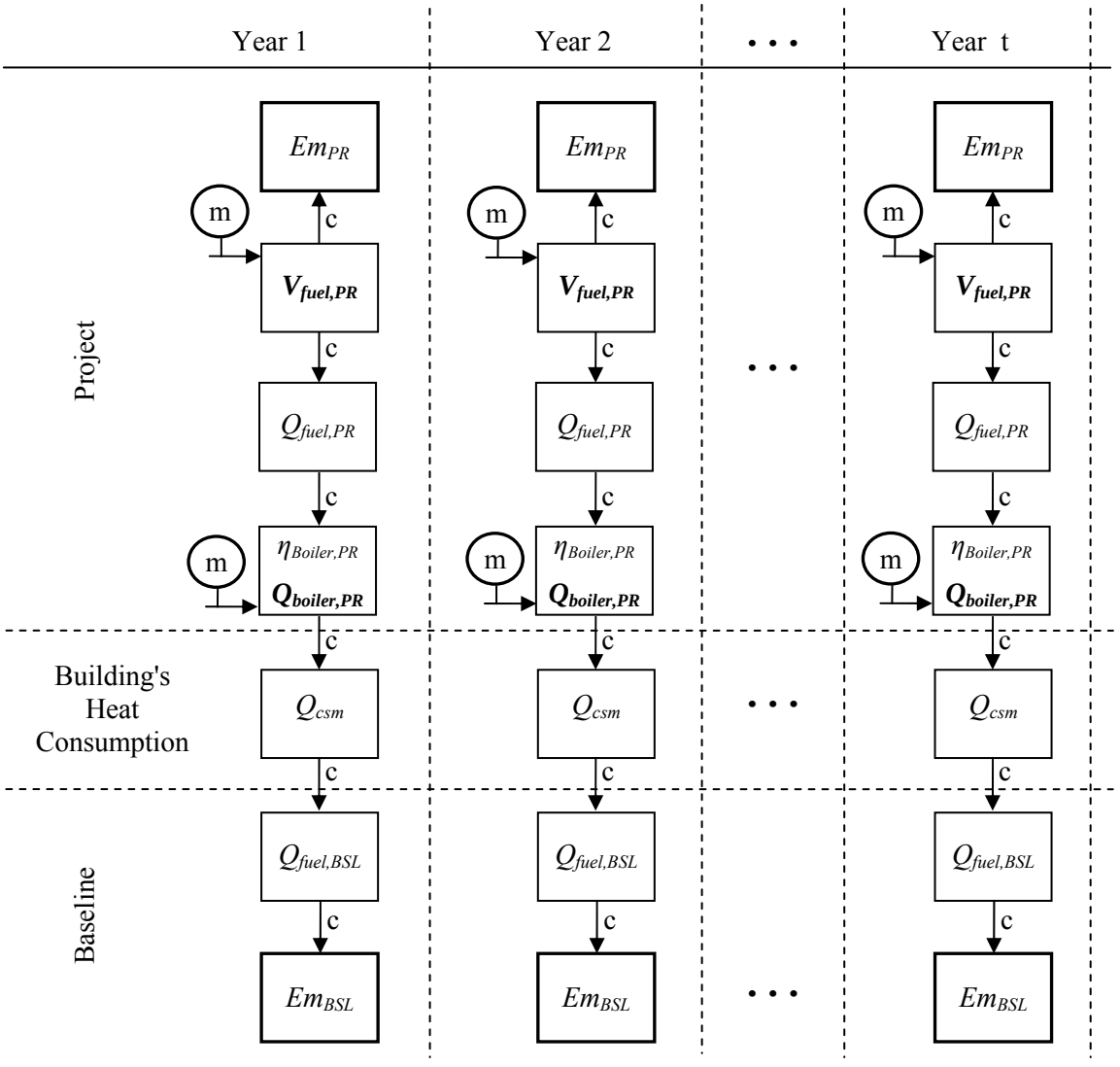

Figure 10. Emissions Monitoring: Basic info chart

figure 10.The notations applied on the figure 10 are common for all studies related to Moldovan project:

Em_{PR} - annual project emissions, tCO_2;

$V_{fuel,PR}$ - annual fuel volume used in the project scenario, m^3 or tonnes (measured);

$Q_{fuel,PR}$ - embedded heat for fuels used in the project scenario for a given year, MWh;

$\eta_{boiler,PR}$ - efficiency of boiler used in project scenario;

$Q_{boiler,PR}$ - boiler heat output in the project scenario for a given year, MWh (measured);

Q_{csm} - building's annual heat consumption, MWh;

$Q_{fuel,BSL}$ - embedded heat for fuels used in the baseline scenario for a given year, MWh;

Em_{BSL} - annual baseline emissions, tCO_2 .

In order to calculate the emissions reduction in a reliable manner, there was chosen a project specific monitoring methodology, which is based on the need for -

- the *boiler fuel use and boiler output* (where relevant meters are installed) monitoring via periodic measurements;
- the *boiler energy efficiency* monitoring via its energy input and output measurements (see more details in Para 3) for PAs where relevant meters are installed;
- the *technical transmission and distribution electricity losses* (for the grid that supplies the buildings in baseline scenario) monitoring;

The proposed monitoring procedure is common for all considered small-scale PAs and does not require the monitoring of project emissions occurring outside the project boundaries.

The present monitoring methodology implies a real measurement of the project fuel volumes and building's heat consumption (where applicable, see above), which will lead, via calculations, to emissions reduction values determination.

During the project implementation this monitoring plan can be reviewed (through DOE approvement), when necessary, in order to address properly all project aspects deemed necessary to monitor and report reliable emission reductions.

D.3 Data to be monitored:

(The table below specifies the minimum information to be provided for monitored data. Please complete the table for the monitoring methodology chosen for the proposed project activity from the simplified monitoring methodologies for the applicable small-scale CDM project activity category contained in appendix B of the simplified M&P for small-scale CDM project activities.Please note that for some project categories it may be necessary to monitor the implementation of the project activity and/or activity levels for the calculation of emission reductions achieved. Please add rows or columns to the table below, as needed. The monitored data are use to calculate baseline, project or leakage emissions. Please include a comment in the 'Comments' column, identifying the use of each data (i.e. if used for baseline, project, leakage)

Table 5. Parameters to be monitored

ID	Data type	Data variable	Data unit	Way of collecting*	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	*Natural gas consumption*	$V_{fuel,PR}$	Nm^3	*m*	*monthly*	*100%*	*electronic*	*2 years*	*Recorded from fuel meters and documented by fuel purchasing invoices*
2	*Natural gas net calorific value*	LHV_{PR}	*kcal/Nm3*	*e*	*annually*	*100%*	*electronic*	*2 years*	*More frequently if change of supplier or origin*
3	*Natural gas emission factor*	EF_{PR}	*tCO2 /MWh*	*e*	*annually*	*100%*	*electronic*	*2 years*	*-*
4	*LFO consumption*	$V_{fuel,PR}$	*tones*	*e*	*monthly*	*100%*	*electronic*	*2 years*	*Documented by fuel purchasing records*
5	*LFO net calorific value*	LHV_{PR}	*kcal/tone*	*e*	*annually*	*100%*	*electronic*	*2 years*	*More frequently if change of supplier or origin*
6	*LFO emission factor*	EF_{PR}	*tCO2 / MWh*	*e*	*annually*	*100%*	*electronic*	*2 years*	*More frequently if change of supplier or origin*
7	*Boiler heat output*	$Q_{boiler,PR}$	*MWh*	*m*	*monthly*	*100%*	*electronic*	*2 years*	*Recorded from heat meters, where available*
8	*Boiler efficiency*	η_{PR}	*-*	*c*	*monthly*	*100%*	*electronic*	*2 years*	*Calculated on the basis of metered fuel input and heat output of the boiler, where heat meters are available*
9	*Coal emission factor*	EF_{BSL}	*tCO2 / MWh*	*e*	*annually*	*100%*	*electronic*	*2 years*	*Commonly used coal for heating in the neighborhood of given the PA*
10	*Mazut emission factor*	EF_{BSL}	*tCO2 / MWh*	*e*	*annually*	*100%*	*electronic*	*2 years*	*Commonly used mazut for heating in the neighborhood of given the PA*

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures undertaken:

Calibration of monitoring equipment

The volume of natural gas consumption will be registered by gas meter installed for all project activities. This monitoring equipment must be periodically verified and tested. According to the

Moldovan regulations, the meters should be periodically verified and tested[10]. After meters verification and testing, for each meter, the authorized laboratory will submit a certificate of: (a) acceptance for operation, or (b) refusal for operation. In case any meter will be refused for operation, such one should be repaired and a certificate of reparation and calibration being submitted by an authorized entity. If the meter could not be repaired, a new meter should be purchased, receipt and technical passport being needed.

Procedures for monitoring, measurements and reporting

For most PAs activities with natural gas consumption, monitoring frequency should be in line with meter readings. Usually, natural gas meter readings will be taken by local gas supplier on a monthly basis. The reporting documents for this meter will be the monthly invoices, where metering period and meter registration are printed..

At the beginning of next reporting year the annual project emissions report should be worked out. The monitoring/reporting year should end on June 30 of each year. The annual emission reductions report should be printed and signed by the Project-monitor and Project-manager, as final responsible person. This report will be presented to DOE by the end of August of the next reporting year. The presented report will be archived to make it available for external audit and verification purposes.

The annual report should include: overall project performance, emissions reduction and comparison with Baseline Study estimations, comments concerning monitoring plan indicators, information on monitoring plan main assumptions, calculation methods and changes in the monitoring plan.

On the basis of elaborated annual reports the Project-manager will organize annual PA-owners meetings, with Minutes of Meeting issuance and their archiving.

Procedures for possible monitoring data adjustments and uncertainties

The key parameter laid down to the project emissions calculation is the monthly metered/documented fuel consumption. In the real life, there could be situations when fuel meter readings are not available. In such cases estimated values will be applied. However CFU reserves the right to argue and come up with its own estimation on the basis of other existing cases.

Procedures for internal audits of GHG

Upon request of any PA-owner can be conducted an internal audit. For this reason the Project-manager will create a working team out of three members including the representative of the respective PA-owner.

[10] Moldovan State Department of Standardization and Metrology Decision # 1445-M from January 4, 2004: The official list of the measuring equipment to be compulsory verified and tested. Official Journal, # 35-38/81 from February 27, 2004, Chisinau, Republic of Moldova.

All ERs generated by the Sub-Sub-Project until the Contracted ERs have been delivered, shall be subject to a periodic verification by an Independent Third Party selected in accordance with the ERPA ("Periodic Verification"). The CFU and the CDCF has the right to arrange for a Start-up Verification of the Sub-Sub-Project. It shall instruct the Designated Operational Entity to provide a copy of the Start-up Verification Report to the CDCF, CFU and the Sub-Sub-Project Entity.

PA-owners in conformity with the signed subsidiary agreements with CFU shall install, operate and maintain the facilities and equipment (data measurement and collection systems), and employ staff, necessary for gathering all such data as may be required by the Monitoring Plan (as it may be amended from time to time);

The CFU is responsible for data collection, archiving and reporting. Its specific responsibilities are to:

a) Contact Sub-Sub-Project entity and collect metered data as required by the monitoring methodology (the data collection is foreseen via e-mail, fax, phone or on site visiting);
b) Verify the collected data quality and integrity, enter the collected data in the emissions calculation workbook, including through regular on-site inspections;
c) Check that calculation of emission reductions are in line with the monitoring methodology requirements and assumptions and keep for each year of the crediting period a separate emissions calculation workbook;

D.5. Please describe briefly the operational and management structure that the project participant will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

Description of the authority and responsibility of project management

Each project activity, to be included in this project, shall be represented by an owner/beneficiary of the SIF II Project, which is the local authority or responsible regional division of Ministry of Health and Ministry of Education (hereinafter referred to as PA-owner*).*

PA-owner*'s specific responsibilities:*

- *handles project performances;*
- *insures the endowment of the monitoring points with appropriate measurement devices (natural gas meter) by the starting date of the project implementation;*
- *keeps the bills for fuel consumption or invoices for fuel purchase;*
- *annually provides copies of fuel bills or invoices for fuel purchase to Project-monitor;*
- *appoints the PA-operator.*

PA-owner legally designates a person responsible for PA local heating system operation and maintenance (hereinafter referred to as PA-operator*).*

PA-operator*'s specific responsibilities:*

- *reads meters offering the relevant data to PA-owner.*

Taking into consideration the similarity of energy conservation measures implemented for all considered PAs, the number of PAs, their geographical dispersion and the use of CDM *project participant* term, there will be established a *Carbon Finance Unit* for promoting the whole project to the investor.

In accordance with Appendix D of the CDM modalities and procedures, the decision on the distribution of CERs from a CDM project activity will be taken by project participants represented by the Carbon Finance Unit, which will communicate with the Executive Board, through the secretariat, in writing in accordance with the "modalities of communication" submitted together with the registration form. Thus, the project management will be under the responsibility of the Head of Carbon Finance Unit (hereinafter referred to as Project manager*).*

Project manager*'s specific responsibilities:*

- *represents PA-owners for the purposes of this project;*
- *appoints the Project-monitor;*
- *assures that the Project monitor is duly trained;*
- *submits annual monitoring report to DOE;*
- *takes decisions on the distribution of CERs per PAs.*

The Project manager shall designate a person responsible for data collection, archiving and reporting (hereinafter referred to as Project-monitor*).*

Project-monitor*'s specific responsibilities:*

- *contacts local PA-owners and monthly collects fuel consumption metered and documented data as required by the monitoring methodology (the data collection is foreseen via e-mail, fax, phone or on site visit);*
- *verifies the collected data quality and integrity, enters the collected data in the emissions calculation workbook;*
- *checks that calculation of emissions reduction are in line with the monitoring methodology requirements and assumptions;*
- *assures that data are stored and relevant measures are taken to avoid loss of information;*
- *elaborates annual monitoring report;*
- *informs PA-owners about their emissions reduction performances;*
- *submits annual monitoring report to Project-manager;*
- *keeps collected data and elaborated reports available for external audit and verification purposes at least for two years;*
- *annually, if required to make corrections on estimated parameters (table 1) in the emissions calculation workbook;*
- *keeps for each year of the crediting period a separate emissions calculation workbook;*
- *stores the saved files with annual emissions workbooks and annual reports on a local computer and CD;*
- *keeps e-mails and faxes concerning monitored data on printed paper;*

- *keeps good records of all mentioned files, reports and original reporting information for a period of two (2) years.*

- ***Project manager*** – the Head of the Carbon Finance Unit.
- ***PA-owner*** - the beneficiary of the SIF II Project.
- ***PA-operator*** - the person legally designated by the PA-owner, responsible for PA local heating system operation and maintenance.
- ***Project monitor*** - the person designated by the Carbon Finance Unit, responsible for data collection, archiving and reporting.

Emergency preparedness

All reasonable measures towards emergency preparedness are foreseen under the responsibilities of the Project-monitor and the Project-manager.

Leakage effects

There are no leakage effects foreseen under the project.

D.6 Name of person/entity determining the monitoring methodology:

(Please provide contact information and indicate if the person/entity is also a project participant listed in annex 1 of this document.)

The current monitoring methodology was determined by Prof. Valentin Arion, Dr. hab, WB Expert, who is not a project participant.

Contact information:

Mail Address: 168 Stefan cel Mare bd., Technical University, MD-2004 Chisinau, Republic of Moldova.

Tel/Fax: +373 22 23 72 82; Email: valarion@cni.md

E. Calculation of GHG emission reductions by sources

E.1 Formulae used:

(In E.1.1 please provide the formula used to calculate the GHG emission reductions by sources in accordance with the applicable project category of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.

In case the applicable project category from appendix B does not indicate a specific formula to calculate the GHG emission reductions by sources, please complete sectionE.1.2 below.)

E.1.1 Selected formulae as provided in appendix B:

(Describe the calculation of GHG emission reductions in accordance with the formula specified for the applicable project category of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

None formulae provided in appendix B.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The anthropogenic emissions for all PAs comprised in this project, can be determined by applying the following general algorithm.

For a given year t the total project emissions $Em_{PR,t}$ are calculated as the sum of emissions by sources (j) within the project boundary and type of used fuel f (f = natural gas or mazut) -

$$Em_{PR,t} = \sum_j Em_j \ . \qquad (10)$$

Since for project scenario at each heating source j is burned only one type of fuel, the CO_2 annual emission calculation is done as follows:

$$Em_j = Q_{fuel,PR} \cdot EF_f \ , \qquad (11)$$

where $Q_{fuel,PR}$ represents the annual heat embedded in the f-type of fuel to be burned to meet the heat demand of the selected public buildings belonging to source j, in MWh (calculated and presented in Baseline Study, para 3.4) and EF_f is the emission factor for the combustion of fuel f, in tCO_2/MWh.

For known $Q_{fuel,PR}$ and given EF_f CO_2 emissions are easily determined the by sources and years for project scenario.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

According to project boundary and leakage definitions there is no leakage due to project activities.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the project activity emissions:

Since there is no leakage due to project activities the result of E.1.2.1 will represent the project activity emissions.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHG's in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities: (for each gas, source, formulae/algorithm, emissions in units of CO2 equivalent)

The baseline scenario emissions can be determined in the same way as the project emissions.

Total baseline emissions for a given year t $Em_{BSL,t}$ are calculated as the sum of emissions by sources (j) within the project boundary and type of used fuel f (f = coal, mazut, natural gas or wood) -

$$Em_{BSL,t} = \sum_j Em_j \ . \qquad (12)$$

Since for a source j different types of fuel can be used -

$$Em_j = \sum_f Q_{fuel,BSL,f} \cdot EF_f \ , \qquad (13)$$

where $Q_{fuel,BSLf}$ represents the annual heat embedded in the f-type of fuel burnt to meet the heat demand of the selected public buildings, belonging to source j, in MWh (see Baseline Study, Para 3.3) and EF_f is the emission factor for the combustion of fuel f, in tCO_2/MWh.

Since formula (13) implies the parameter $Q_{fuel,BSLf}$, which takes into account the type of energy source, type of used fuel and overall efficiency of the considered heating systems (LHS, DHS, Electrical heating), there is no difference in emission calculation for project activities of the mentioned above groups 1 and 2.

There are four types of fuels burnt at the Moldovan sources, referring to the baseline scenario, namely - coal, mazut, natural gas and wood, for which the emission factor values, used in Baseline Study, are given in table 2:

Thus, for known $Q_{fuel,BSLf}$ and given EF_f the baseline CO_2 emissions are easily determined by sources and years, according to formulae (12) and (13).

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

For each project activity the total annual emission reduction ER [tCO_2] for a given year t is determined as the difference between baseline emissions $Em_{BSL,t}$ and project emissions $Em_{PR,t}$.

E.2 Table providing values obtained when applying formulae above:

Table 6. Total annual project emission reduction for the crediting period, in tonnes of CO_2

Annual CO_2 EMISSION REDUCTION, in tonnes

		Crediting Period									
Location	**PA No.**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Cantemir	**PA1**	41	43	46	48	50	53	55	58	61	65
	PA2	46	48	51	53	56	59	62	65	68	72
Fălești	**PA3**	70	73	77	81	85	89	93	98	103	109
	PA4	19	20	21	22	23	24	25	27	28	30
	PA5	18	19	20	21	22	23	24	25	26	29
	PA6	0	858	901	946	993	1,043	1,095	1,149	1,207	1,267
Florești	**PA8**	25	27	28	29	31	32	34	36	37	39
	PA9	127	133	140	147	154	162	170	178	187	197
Strășeni	**PA10**	152	160	168	176	185	194	204	214	225	236
	PA11	124	130	136	143	150	158	166	174	183	193
	PA12	53	55	58	61	64	67	71	74	78	82
Ialoveni	**PA17**	545	572	601	631	663	696	731	767	805	846
Nisporeni	**PA18**	445	467	490	515	541	568	596	626	657	690
Leova	**PA19**	155	163	171	179	188	198	207	218	229	240
	PA20	645	677	711	747	784	823	864	907	953	1,000
Ungheni	**PA24**	20	21	22	23	24	25	26	28	29	30
	PA25	1,130	1,186	1,245	1,308	1,373	1,442	1,514	1,590	1,669	1,752
	PA26	417	438	460	483	507	532	559	587	616	647
	PA27	38	40	42	44	46	48	51	53	56	59
Total annual ER, tonnes		**4,068**	**5,129**	**5,386**	**5,655**	**5,938**	**6,235**	**6,547**	**6,874**	**7,218**	**7,584**

F. Environmental impacts

F.1 If required by the host Party, documentation on the analysis of the environmental impacts of the project activity: *(if applicable, please provide a short summary and attach documentation)*

Because of the progressive collapse of the district heating systems throughout the country in the beginning of 1990s, and recovering process, which started at the end of the last decade of the previous century, the heat consumption nowadays increase and consequently decrease the electricity used for heating purposes. In spite the fact that generally the energy consumption increases, the project will lead to a substantial environmental pollution reduction.

Due to the implemented measures under the Moldova Energy II Project, the efficiency of heat production increases, thus reducing the fuel consumption and consequently the environmental pollution.

Above it, for the most installed boilers fuel switching is foreseen - instead of coal and mazut (heavy oil) a more environmentally-benign fuel (natural gas/liquid fuel) will be used. By this, a substantial diminution of GHG emissions will occur along with a significant reduction of NO_x, SO_x and other pollutants.

One more environmental benefit of the project represents the avoidance of asbestos and CFC HCFC insulation extensively earlier used in Moldova. The procurement documentation will prohibit the use of such materials.

For the mentioned above purposes an Environmental Monitoring Plan was elaborated under Moldova Energy II Project and approved by the national authorities.

G. Stakeholders comments

G.1 Brief description of the process by which comments by local stakeholders have been invited and compiled:

In order to get local stakeholders comments on the project and their support in the project implementation, the PIU of the Energy II project together with the WB team has organized a special workshop. The workshop was held on October 15, 2004 with the main scope to present to the participating municipalities and District Councils the project's scope and objectives and to agree on the implementing arrangements. The workshop was attended by about 30 participants, mostly representatives of the project beneficiaries, as well as from the Ministries of Ecology and Natural Resources and Energy, from Environmental NGOs and media. The representatives from the WB and PCF made presentations of the current trends and developments of the carbon market, as well as the opportunities were outlined for Moldova. The local consultants hired for the project preparation informed the audience on the projected emission reduction and about the possible implementing arrangements.

The National Commission of Moldova on CDM consisting of all representatives of stakeholders from government agencies, NGO's and academia during June-July 2005 has reviewed the proposed project activities approved the approach and methodology. The whole review and approval process has taken 30 days, enough to study the project activities. The Decision of Commission taken on July 22, 2005 was favourable and welcoming, all members of the Commission have supported the project activities.

G.2 Summary of the comments received:

Among the most important received comments are the following:

- The project is very welcomed and will provide additional benefits to the involved communities;
- The additional revenues from the CDCF as the result of emissions reduction sale would serve a good incentive in convincing local councils to implement thermal heating and/or other projects with a emissions reduction potential;
- It would be advisable to use the possible CDCF revenues for similar activities that would generate new emissions reduction;
- Local authorities as well as thermal heating utilities do not have relevant capacity to implement Monitoring Plans and to do emissions reduction studies for what special training would be needed;
- As the CDCF revenues for the emissions reductions are supposed to be at the level of only several US$ thousand, the most preferable way to implement the project is as a bundle all subprojects and to identify an intermediary body, responsible for project implementation;

- As an implementing institution might be a special unit that could be created either under the auspice of Ministry of Energy or under the auspice of the Ministry of Ecology and Natural Resources (MENR). The most preferable solution is to have it under the Ministry of Ecology, as this institution might promote new Carbon Financed Projects not only in the energy sector, but also in other sectors, as forestry, waste water treatment, waste management, etc.

G.3 Report on how due account was taken of any comments received:

Most important comments, received from the local stakeholders were related to the capacity to implement the project monitoring plan as well as regarding the implementing arrangements. In this regard the project team and mentioned stakeholders agreed on the creation of a special unit to assume a consolidated management of this and of forthcoming new CDCF projects. The consolidation of the implementation mechanism for both projects would provide for synergy, economic and financial efficiencies. Furthermore, such a consolidated unit would also coordinate and promote other future carbon finance activities in the country, especially of small scale, and act as a knowledge bank for carbon finance related activities in general. It was also decided that such entity is best to be created under the MENR, a focal point for Kyoto Protocol related activities.

In order to establish and strengthen the capacity of a special unit that would manage the CDCF projects the MENR requested the WB to provide relevant assistance. The Bank responded positively to this request and provides a PHRD grant in order to support creation of Carbon Finance Unit (CFU) within the Ministry. The main objectives of the grant (signed in January, 2005) will build the capacity of the CDM CFU staff to implement carbon finance projects, to organize preparation of relevant baseline and monitoring/verification methodologies and legal/contracting issues and dissemination of best practice in this area. The CFU will serve simultaneously as the CDCF counterpart for the two on-going projects and provide support for their implementation. In this respect, the CFU has the following main duties: (a) be responsible for the projects Monitoring Plans; (b) sign the subsidiary agreement with the project participants (Emissions Reduction Owners (EROs) for each of the CDCF Projects), that stipulates the CFU and EROs rights and responsibilities; (c) on behalf of the EROs negotiate with the CDCF the Emission Reduction Purchase Agreements (ERPA) and sign them; and, (d) receive the carbon payments from the CDCF and transfer this money to the EROs, pro rata, according their actual ERs. The CFU also will provide relevant training to the project participants in conducting all measuring activities that are stipulated in the Monitoring plans for scopes, - emissions reduction studies and Community Benefits Plans.

PROJECT Documents

During the period of the project design the following documents have been elaborated and presented:

- CDCF (2004): Moldova Energy conservation and greenhouse gases emissions reduction - Project Concept Note.
- CDCF (2005): Moldova Energy conservation and greenhouse gases emissions reduction - Baseline Study;
- CDCF (2005): Moldova Energy conservation and greenhouse gases emissions reduction - Emission Reduction Study;
- CDCF (2005): Moldova Energy conservation and greenhouse gases emissions reduction - Monitoring Plan;

For validation and verification purposes any additional background information, work material, data collection would be available upon request from the team designed this project.

Annex 1

CONTACT INFORMATION FOR PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Carbon Finance Unit
Street/P.O.Box:	9 Cosmonautilor str. Office 535 MD 2005
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Represented by:	
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Telephone:	
FAX:	
E-Mail:	
URL:	www.carbonfinance.org
Represented by:	
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Represented by:	
Title:	Director for International Environmental Affairs
Salutation:	
Last Name:	De Boer
Middle Name:	
First Name:	Yvo
Department:	International Environmental Affairs
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	Ferry.vanhagen@minvrom.nl

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The total Energy II project financing will be US$ 39.93 million, of which US$35 million would be financed from an IDA credit, US$4.33 million from internal cash generation and municipal contributions and US$0.6 million from the Swedish International Development Agency (SIDA). None of these public funds committed to the underlying finance of the Energy II project, and none of the public funds contributed to the Community Development Carbon Fund to purchase emission reductions from the project, result in a diversion of official development assistance. All public funds are separate from and do not count towards financial obligations [in that respect][under the UNFCCC and Kyoto Protocol].

Annex 3 **PROJECT NPV CALCULATIONS**

Total DISCOUNTED PROJECT COST of the service, in USD

Financial index		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual Depreciation		241,480	241,480	241,480	241,480	241,480	241,480	241,480	241,480	241,480	241,480
Annual fuel costs		123,779	135,551	148,543	162,887	178,730	196,235	215,583	236,976	260,638	286,818
Annual Operational and Maintenance costs		107,723	118,495	130,345	143,380	157,717	173,489	190,838	209,922	230,914	230,914
Total annual project cost		472,982	495,527	520,368	547,747	577,927	611,204	647,901	688,378	733,032	759,212
Total discounted project cost over the crediting period	**3,565,641**										

Total DISCOUNTED BASELINE COST of the service, in USD

`		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual heat consumption, MWh		13,522	14,198	14,908	15,654	16,437	17,258	18,121	19,027	19,979	20,978
Annual baseline heat price, USD/MWh		28.62	29.05	29.48	29.92	30.37	30.83	31.29	31.76	32.24	32.72
Total annual baseline cost of service		386,975	412,418	439,535	468,434	499,234	532,059	567,041	604,324	644,059	686,406
Total discounted baseline cost of the sevice over the crediting period	**3,063,817**										

Total DISCOUNTED Revenue (w/o CER's), in USD

Total PROJECT NET BENEFIT, in USD	**-501,823**

Total DISCOUNTED Revenue (with CER's), in USD

Total PROJECT NET BENEFIT, in USD	**-323,803**