CDM: Proposed new methodology expert form (version 04)

(To be used by methodology experts providing desk review for a proposed new methodology)

Name of expert responsible for completing and submitting this form	Ralph Harthan Liselotte-Herrmann-Str. 36 D - 10407 Berlin Germany Phone: + 49 – 151 – 14 74 75 97 Fax: + 49 – 30 – 280 486 – 88 E-Mail: r.harthan@oeko.de
Related F-CDM-NM document ID number	NM 0103

Note to those completing this form, as applicable: Please provide recommendations on the proposed new baseline and monitoring methodologies based on an assessment of CDM-NMB and CDM-NMM and of their application in sections A to E of the draft CDM-PDD, desk reviews and public input. Please ensure that the form is entirely filled and that arguments and expert judgements are substantiated.

A. Evaluation of the proposed new methodologies by desk reviewers:

I. Evaluation of the porposed new baseline methodology:

Title of new baseline methodology:>>Baseline methodology for district heating rehabilitation, possibly reducing use of in house devices

Abbreviations used in this form:

DHS: District heating system

DSM: Demand-side measures

IHD: In house devices

i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):

>> The methodology is applicable to other potential projects under the following conditions:

- An **existing DHS is rehabilitated**, which may be deteriorating and therefore reducing heating services to DHS customers, while DHS customers may replace or supplement reduced DHS heating services with one or several alternative means of providing heat and hot water. The rehabilitation of the DHS may lead to the reduced use of IHD, such as individual electric heaters fuelled by gas, oil, or electricity. I.e. the methodology is **not applicable to new DHS systems** (where there was no DHS system operating before).

  These applicability conditions are rather vaguely defined (“may”). It certainly does not hold true that a DHS necessarily deteriorates and reduces heating services. Certain maintenance measures may be carried out, which at least maintain the existing levels of service provided. Moreover, it is not imperative that the existing DHS necessarily leads to a replacement by IHD nor does a rehabilitation of the DHS necessarily lead to a reduced use of IHD (in the former case, some (poorer) households may not be able to buy IHD and therefore just reduce heat consumption (lower temperature, less rooms heated, etc.); in the latter case, households may choose to use the additional heat provided by the rehabilitated DHS *and* still use the IHD in order to increase convenience (increased temperature, more rooms heated)). In order for this methodology to be applicable to other projects it is therefore suggested to

concretize the vague parts of the definition ("may"). Subsequently, the baseline methodology must ensure to find out what would happen in the absence of the CDM project (deterioration of the DHS or not, extent of IHD use) and with the implementation of the project (extent of replacement of IHD, heat consumed by households, etc.).

- **No capacity increase of the DHS**. This is an appropriate condition.
- **Sufficient information** is available about local conditions that impact the operation, use and development of the DHS, about the use of IHD (if applicable), and about technical and investment alternatives to the existing DHS.

  This is a necessary condition. This condition should be reflected in the drafting of the first condition (first bullet point).
- The **decision** on the future of the DHS **is made on the basis of economic or financial considerations taking into account barriers to investment** and operation of the current and any future system configuration. This is an appropriate condition.
- The project **does not result in any significant leakage** of CO_2 emissions or an increase of **non-CO_2 emissions**.

  This is not an appropriate condition, since the methodology has to demonstrate that no leakage occurs or otherwise must address it accordingly. Leakage effects (e.g. rebound effects: increased heat consumption) may occur and must therefore be discussed. Non-CO_2 emissions must not be ruled out at the outset, either, but the authors have to *justify* if they choose to neglect other gases than CO_2.
- **No consideration of DSM**. It is adequate not to claim credits for DSM. However, DSM may happen in the absence of the project activity, which would reduce baseline emissions. Therefore, in determining the baseline, DSM have to be taken into account (see comments in (3) a) and b)).
- **Implicitly,** the methodology is **not applicable to** DHS where heat is provided by **combined heat and power plants**, since this would require a consideration of which share of emissions is attributable to heat and which to power production. **Implicitly**, the methodology is therefore **only applicable to heat only plants**.
- **Implicitly,** the methodology is only applicable **if IHD are verifiably switched off** as a result of the project. Otherwise, the baseline emission factor is not calculated correctly and project emissions are underestimated (see comments in (3) a) and b)).

ii. Strengths and weaknesses of the methodology:

>> Strengths:

- The methodology proposes both the investment and barriers analysis to perform the determination of the baseline.
- The methodology makes use of approved methodological elements (additionality tool, ACM 0002).

Weaknesses:

- The definition of the applicability conditions is rather vague.
- Leakage is not addressed.
- The neglect of non-CO_2 gases is not justified.
- Important parameters of the methodology rely on estimations, models or implicit assumptions, which allows for gaming.

iii. Any changes needed to improve the methodology:

a. Minor changes:>>

- Define applicability conditions more precisely.

- Consider non-CO_2 gases appropriately or justify neglect thereof.

b. Major changes:>>

- Address leakage adequately.
- Provide more guidance on how to handle estimations and models in a conservative manner.
- Provide guidance on how to determine the amount of IHD that are actually affected by the rehabilitation of the DHS.
- Conservatively consider effects that might happen in the absence of the project (e.g. demand-side measures, maintenance measure in the DHS, etc.)
- Make implicit assumptions explicit.

II. Evaluation of the proposed new monitoring methodology:

Title of new monitoring methodology: >>Monitoring methodology for district heating rehabilitation, possibly reducing use of in house devices

i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):

>> General applicability conditions as for the baseline methodology also apply here (see section I i)

ii. Strengths and weaknesses of the methodology:

>>Weaknesses:

- Important parameters of the methodology rely on estimations, models or implicit assumptions, which allows for gaming.
- Leakage is not addressed.
- QA/QC measures are not appropriate for estimations and models.

iii. Any changes needed to improve the methodology:

a. Minor changes:>>

b. Major changes:>>

- Address and monitor leakage adequately.
- Provide more guidance on how to handle estimations and models in a conservative manner.
- Provide guidance on how to monitor the amount of IHD that are actually affected by the rehabilitation of the DHS.
- Monitor effects that might happen in the absence of the project (e.g. demand-side measures, maintenance measure in the DHS, etc.)
- Improve QA/QC measures for most important parameter (estimations/models).

B. Details of the evaluation of the proposed new methodology by the desk reviewer:

I. Proposed new baseline methodology *(specify title here):* >>Baseline methodology for district heating rehabilitation, possibly reducing use of in house devices

(1) Short description of the methodology, including an assessment of which approach from paragraph 48 of the CDM modalities and procedures was used:

a) Describe the methodology:

>> The baseline methodology determines the heating technology that would be used in the absence of the proposed project activity and the related baseline emission factor per unit of heat demand. This emission factor is then multiplied with the monitored heat demand to calculate the baseline emissions. The methodology entails a stepwise approach in order to determine the baseline scenario:

1) **Identification of practical alternatives to the project technology:** This list should include all technical alternatives that could be implemented instead of the project heating technology taking into account the country's and sector's specific conditions. The list should consider availability of resources and technologies in the country as well as the prevailing legal and regulatory framework (e.g. related to air pollution, installation and operation of individual heaters in apartments or safety and security). The list should at least include the project technology not undertaken as CDM activity, the proposed activity, but using different fuels, the use of individual heaters only (instead of a DHS), and the continuation of the current heating technology.

2) **Choice of the baseline approach:**
   - A **barriers analysis** is carried out, which is taken from the additionality tool of the CDM Executive Board. If after this analysis only one technology is viable, this shall be considered the baseline.
   - If more than one technology is viable considering the barriers analysis, it is proposed to carry out an **economic/financial investment analysis** in order to identify the alternatives with the lowest costs per unit of heat. The technology with the lowest costs per unit of heat delivered is considered the baseline technology. It is assumed that costs remain constant over the lifetime of the project. The total annual costs consisting of the capital recovery cost as well as all other costs is divided by the annual amount of heat delivered to the end users. This indicator is used to determine the technology with the lowest costs, which is then chosen as the baseline technology.
   - If an investment analysis is not possible, the alternative with the lowest emissions should be selected as the baseline.

3) **Definition of emission factors for saved fuels (calculated for each fuel (without electricity)) and each heating technology):** Based on the annual amount of fuels used, the respective CO_2 emission factors, heating values and oxidation factors, and the annual amount of heat provided to the consumers by the respective technology and fuel (not including heat provided by IHD that are not affected by the rehabilitation of the DHS), the specific emission factor in tons of CO2 per GJ of heat and/or hot water is calculated. By considering the heat provided to consumers, losses in the system (e.g. boiler house efficiency, distribution network efficiency, etc.) are taken into account. In the case of a lack of data, the system efficiency shall be conservatively estimated based on boiler plate data and other technical data.

4) **Definition of emission factors for saved electricity:** if power savings exceed 15 GWh per annum, it is proposed to calculate the emission factor for grid electricity by using the approved methodology ACM 0002. In case power savings are less than 15 GWh, the emission factor for grid electricity is calculated as the weighted average emission factor of the current generation mix in the grid according to the simplified modalities and procedures for small-scale CDM. The latter approach is also applied, if the calculated emission factor is equal or higher than the emission factor calculated according to ACM 0002 or in the case the build margin is not relevant due to a lack of new plants construction in recent years. Transmission losses are neglected. In order to calculate the reduction of emissions by saved electricity, an efficiency of electric heaters of 100 % is assumed. The emission factor for electricity is calculated ex-ante at the beginning of each seven year crediting period.

5) **Determination of emission factors for heating technologies:** This step entails the calculation of a weighted emission factor per unit of heat delivered in the case

several heating technologies and different fuels are used in the system. Moreover, the electricity consumption of the DHS is taken into account. The calculation of the weighted emission factor per unit of heat delivered in the baseline includes all heating technologies based on combustion technology (DHS and IHD) as well as electrical devices and the electricity consumption of the DHS. For the project case, the calculation includes the DHS as well as the electricity consumed by the DHS. For the project case, it is implicitly assumed that no electricity is consumed in electrical heating devices as well as no individual combustion technologies are operating in households (IHD are supposed to be replaced by the rehabilitated DHS). For that purpose, in the baseline, only such IHD are considered in the calculation of the emission factor that are replaced by the project. IHD that are not replaced by the project are excluded from the system boundaries.

6) **Calculation of the emission reductions:** The emission reductions are calculated by the difference of emission factors per unit of heat delivered in the baseline and the project case, multiplied by the heat delivered to baseline costumers by the rehabilitated DHS. Baseline customers are customers of the new DHS that were physically connected to the old DHS and who are also connected to the new DHS. Newly acquired customers (increase of coverage of the DHS) are not taken into account.

b) State the approach selected:

>> Approach b) of paragraph 48 of the CDM modalities and procedures is chosen (emissions from a technology that represents an economically attractive course of action taking into account barriers to investment).

c) Indicate (in summary form) why the approach selected is the most appropriate. Please provide your expert judgement on the appropriateness of the selected approach to the project category:

>> The approach is chosen, because the future of a district heating system includes major investments, which makes necessary the consideration of an „economically attractive course of action“. Moreover, it is considered that other factors such as fuel availability, technology availability, sector policy, or social acceptability as well as economic distortions and organizational failure play an important role. This is covered by „taking into account barriers to investment” as stipulated in paragraph 48 b).

For investment decisions which are taken to provide a certain good (in this case heat) it is appropriate to consider an “economically attractive course of action” and to take into account barriers that may impede investments. The chosen approach is therefore appropriate.

(2) Basis for determining the baseline scenario:

a) State whether the documentation explains how the baseline scenario is to be chosen and identified:

>> Yes, the documentation explains how the baseline scenario is to be chosen. A stepwise approach is provided which identifies alternatives, determines the baseline technology using an investment analysis and/or a barriers analysis, as well as defines how baseline and project emissions and the corresponding emissions reductions are calculated. See (1) a) above.

b) State the basic underlying rationale for algorithms/formulae used (e.g. marginal vs. average basis) (see also section 4 below):

>>The underlying rationale consists in calculating a weighted emission factor per unit of heat produced in the baseline and in the project case. The difference of both emission factors multiplied with the heat delivered to consumers delivers the emissions reductions of the project. The emission factor in the baseline is determined by the old DHS system (fuel input for the boilers plus electricity consumption in the network) as well as by fuel and electricity consumption of in house heating devices. The emission factor of the project case is calculated by the fuel and electricity consumption of the rehabilitated DHS. The heat delivered to consumers refers to baseline consumers only, i.e. consumers that were connected to the DHS before the rehabilitation and are still connected to the DHS after the rehabilitation (no increase of coverage). See also (1) a) above.

c) State whether the documentation explains how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario. If so, what are the tools provided by the project participants?

>> Yes, the methodology provides clear guidance on how to determine project additionality. The proposed procedure foresees a barriers analysis and/or an investment analysis according to the EB additionality tool. The criteria included in the barriers analysis correspond to the additionality tool. For the investment analysis, the methodology proposes an approach which determines the total unit production cost of heat, which is based on the capital recovery cost of the capital investment and on annual costs. The latter are considered to be constant over the lifetime. See also (1) a) above.

d) State whether the basis for determining the baseline scenario and for assessing additionality is appropriate and adequate:

>>Yes.

(3) Assessment of the description of the proposed methodology and its applicability

a) State whether the methodology has been described in an adequate manner:

>> In general, the method is described in an adequate manner, since it is explained in a rather systematic way. However, the method includes some assumptions which are not justified and which may have significant impact on the outcome of baseline determination and the calculation of emissions reductions. These comprise:

- The methodology assumes that annual costs are constant over the lifetime of the project. This is assumption is not justified and cannot be considered as generally valid (e.g. fuel costs). The methodology is therefore only applicable to projects which comply with this assumption. Projects for which non-constant annual costs are assumed cannot be dealt with by the methodology. However, this is not mentioned under Section A.3. (Applicability conditions).
- The definition of the emission factor per unit of heat delivered in the baseline depends on estimating the fuel input and the heat provided by in house devices as well as the old DHS. Moreover, only such IHD shall be considered that are affected by the rehabilitation of the DHS. The replacement of IHD by the new DHS is one key factor for the calculation of emissions reductions. However, no guidance is provided on how to determine the amount of IHD affected by the DHS and the corresponding technologies and fuels used.
- For the calculation of the emissions reduction, the heat delivered to baseline customers is used. The definition of baseline customers (who were connected to the old DHS and who are connected to the

new system) is rather straightforward. However, the methodology does not explain how the magnitude of the heat delivery is to be determined. This is of major importance, since the heat delivered by the DHS in the baseline and in the project may not be equivalent. The following issues are not addressed in determining the heat delivery:

- What is the consumption pattern to be considered and what is the corresponding heat delivery that is eligible for the calculation of emission reductions? For instance, in the baseline, the average room temperature of connected houses may be 16 °C due to the low availability of heat by the DHS. Some rooms may even not be heated. In the project case, the average room temperature may be higher and more rooms may be heated, since a more convenient heat source (rehabilitated DHS) is available. This would mean that the heat demand has increased due to the project. The methodology does not address this issue.
- Households that are connected to the new DHS (and were connected to the old DHS) may use the heat provided by the new DHS and *still not switch off existing IHD*. This would mean that no or less IHD than planned are substituted and thus no or less reduction effect due to replacement of IHD takes place. This leakage issue is not addressed by the methodology.
- Demand side measures may occur in the baseline (e.g. the insulation is renewed). The methodology does not explain how this potential decrease of heat consumption in the baseline is reflected in determining the heat delivery which is used for the calculation of emission reductions.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMB):

>> With the exception of the issues raised in (3) a) above, the methodology is appropriate for the referred project activity and the referred project context. However, the issues raised in (3) a) are of major importance. They concern the following points in the PDD (the bullet points have the same order as above):

- The results of the investment analysis on p. 20 in the PDD show a very high sensitivity to the fuel prices. Since the current DHS is the most inefficient system of all proposed alternatives in terms of fuel consumption, the assumption of constant fuel prices is not necessarily conservative (especially if fuel prices tend to increase). The methodology should allow for changing annual costs, which could consider changing fuel costs as well. A sensitivity analysis for increasing fuel costs would show how robust the ranking provided on p. 20 in the PDD is. The same applies for changing operation and maintenance cost, since it is probable that such costs increase if the current system is maintained. Furthermore, the methodology should elaborate on the fact which influence state subsidies have on the (non-)profitability of project types. On p. 21 PDD it is said that the DHS receive significant subsidies for operation. The consideration of changing (probably decreasing) annual subsidies could change the results of the investment analysis.
- The contribution of the DHS as well as IHD (natural gas, electricity) to the baseline heat supply is estimated in the PDD (the DHS contributes by 22 %, the rest of the gap is covered by natural gas and electrical heaters to equal parts). However, the emission factor per unit of heat is very sensitive depending on the mix of technologies (from 0.06 t CO_2/GJ for natural gas to 0.34 t CO_2/GJ for the old DHS (table 6 on p. 17 PDD)). So there is significant potential for gaming in defining the emission factor per unit of heat produced. If the fuel consumption cannot be measured as foreseen in equations (4) to (6) of the baseline methodology, the methodology should provide guidance on how to estimate the fuel mix. The estimation in the PDD was carried out without any guidance in the methodology. A conservative estimation would certainly entail an overestimation of low-emitting heat sources (natural gas) and an underestimation of high-emitting heat sources (current DHS, electricity) in order to obtain a conservative baseline estimate. However, this is not foreseen by the baseline methodology. Moreover, the methodology reads that IHD that are not affected by the rehabilitation of the DHS shall not be considered. However, the methodology does not give guidance on how to determine which part of the IHD is affected. In the PDD, there is neither an explanation of which part of the IHD is actually affected by the DHS nor any reflection thereof in calculating the baseline

technology emission factor.

- Magnitude of heat delivery:
  - Consumption pattern: on p. 16 PDD an average room temperature of 16 °C is estimated as average room temperature during heating season. However, the technology emission factor for the project is calculated using a room temperature of 20 ° C and a higher demand of hot water (which increases the total heat demand from 702 MJ/m2*a to 1059 MJ/m2*a according to table 5 PDD). This means that the project activity increases the heat consumption. This means that part of the emission reductions calculated do not correspond to real emissions in the baseline (since the heat consumption in the baseline is actually smaller than in the project case). Neither the baseline methodology nor the PDD takes this aspect into account.
  - There is no information available in the PDD on whether IHD have really been switched off (or on how this could be determined) and emissions been reduced accordingly.
  - No information is available in the PDD on how potential demand-side measures are taken into account (which would reduce baseline emissions).

c) State whether the application of the methodology could result in a baseline scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity.

>>Probably not.

Please explain:

>> The baseline methodology may lead to an erroneous calculation of the emission factor per unit of heat delivered in the baseline. Moreover, the heat demand considered for the calculation of baseline and project emissions may overestimate baseline emissions. See sections (3) a) and b) above for a more detailed explanation.

(4) Assessment of algorithms/formulae and type of data needed:

a) State whether the description of the methodology includes algorithms and generic formulae that can be applied to other potential project activities (if not, the proposed new methodology will be considered as a project-specific methodology):

>> The algorithms and formulae provided in the methodology are rather generic and can be applied to other project activities: the methodology allows for a consideration of different heating technologies and different fuels in the baseline. However, the calculation of project emissions is only possible if IHD are actually switched off (the project technology emission factor only allows for the consideration of DHS emissions). Moreover, in order to be transferable to other project types, the heat demand in the baseline and in the project case must refer to the same conditions (same room temperature etc.). Otherwise, baseline emissions are overestimated. (See also applicability conditions).

b) Explain the spatial scope of data used to determine the baseline and whether the scope is appropriate:

>> Most data which is used comes from local sources related to the DHS. This is appropriate. Only in some cases (such as heating value, oxidation factor, or emission factor) international data (IPCC) may be used if other data is not available. This is also appropriate. However, many parameters are estimated and based on models. This contains a significant potential of gaming. The methodology should make clear how to deal with estimations and models. It is not appropriate to just leave this decision to the project developer. Further guidance is needed on how to carry out a conservative estimation, if measured data is not available.

c) Explain the vintage of data used (in relation to the duration of the project crediting period) and whether the vintage of data is appropriate, indicating the period covered by the data:

>> The data used for the baseline is recorded monthly or annually in the period before project start. However, it is not clear what "period before project start" means. Actually, heat demand and related fuel

consumption are very sensitive to the heating periods. It would therefore be appropriate to cover more than one heating period in order to account for differences between heating periods of different years. In addition, in order to take demand-side measures into account which may happen in the baseline (see above), it would also be useful to cover more than one heating period in order to identify the development of baseline emissions over time. The emission factor for electricity consumption as well as indicators on barriers are determined at the beginning of each crediting period, which is appropriate. Fuel costs "are only to be monitored if they play a crucial role in the determination of the baseline" (p. 10 monitoring methodology). Fuel costs are major drivers for investment decisions. These should therefore be monitored at least at the beginning of each crediting period, in order to judge whether the project is still additional or whether the registration as CDM project has only speeded up the implementation. The data used for determining project emissions is monitored on a monthly or an annual basis, which is appropriate.

(5) Definition of the project boundary related to the baseline methodology:

a) State how the project boundary is defined in terms of:

i) Gases and sources

>> Only CO2 is considered.

The project boundary includes elements of the heat generation and consumption system of which the DHS is a part, possibly including more than one heating technology and fuels. The project boundary is identified by the DHS' existing customer base (i.e. no new DHS consumers) as well as IHD. Fuel production and transportation as well as production and installation of equipment are outside of the boundaries.

ii) Physical delineation

>> The considered DHS is limited to existing consumers, i.e. no capacity increase is taken into account. IHD included in the baseline are only these IHD that will be substituted by the rehabilitation of the project.

b) Indicate whether this project boundary is appropriate:

>> It is not appropriate only to consider CO2. A methodology should depart from including all GHG and then some gases may be excluded if they are not relevant or if the exclusion adds conservativeness to the methodology. The methodology should justify this.

The methodology is not applicable if the DHS includes one or more CHP plants. In that case, the emissions of that plant would have to be assigned to electricity as well as to heat, which would require another methodology. The project boundary, as depicted in the methodology, is therefore only applicable to heat-only technologies. This should be made clear.

It is adequate to refer to existing consumers of the DHS only.

In principle, it is also adequate to refer only to IHD which are affected by the rehabilitation of the DHS. However, it is difficult to actually know which IHD are affected by the rehabilitation and are to be included in the project boundary. This is left open when defining the project boundary.

It is appropriate to exclude fuel production and transportation as well as production and installation of equipment.

(6) Key assumptions/parameters (including emission factors and activity levels) and data sources:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

>>

There are several explicit and implicit assumptions which are problematic. Besides the information provided below see also the extensive discussion in previous sections.

Explicit assumptions:

- **IHD** are **only** taken into account **if** they are **affected by the rehabilitated DHS**. In general, this is a valid assumption. However, it is not clear how to define which IHD are actually affected by the rehabilitated DHS. If no clear guidance is given, this assumption may lead to an underestimation of project emissions (if IHD are not substituted by the DHS, although they were supposed to do so) and to an erroneous calculation of the baseline emission factor (since it includes a share of IHD).
- **Annual costs are constant:** This is a problematic assumption, since fuel prices may rise and local fuel prices may merge with world market prices. Moreover, subsidies for the DHS may decrease. All these aspects show that annual costs are probably not constant. This assumption therefore may lead to an erroneous calculation of cost per unit of heat delivered and thus to an erroneous determination of the baseline technology.

Implicit assumptions:

* **CHP plants are not included** in the DHS. This assumption is valid for the proposed methodology. However, it should be made explicit. Otherwise, emission relating to heat *and* electricity would be assigned to heat only, which would be problematic.

* **No rebound effects**: The methodology calculates emission reductions of the project by multiplying the difference of emission factors per unit of heat with the heat supplied to baseline customers of the rehabilitated DHS. However, as explained extensively in previous sections, the provision of a more convenient heat source (rehabilitated DHS) probably leads to an increased heat demand (higher room temperature, more rooms heated, etc.). This assumption therefore leads to an overestimation of emission reductions. This is a very problematic assumption.

*** No DSM in the baseline:** This assumption possibly leads to an overestimation of baseline emission since DSM in the baseline are not taken into account (refurbishment of houses, insulation, etc.).

b) State whether the key assumptions are arrived at in a transparent manner:

>> The first assumption (IHD are only taken into account if they are affected by the rehabilitated DHS) is straightforward. For the second assumption (annual costs are constant) no transparent justification is given. All implicit assumptions are per definition not transparent.

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>> See comments under a) above.

d) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>> The data used are local data such as from fuel meters, fuel bills, electricity purchasing records, etc. which is adequate. In addition, if some data is unavailable on a local basis (such as oxidation factors, emission factors, etc.), international data (such as IPCC) are used. However, many decisive parameters are estimated and based on models. This refers especially to the heat delivered to consumers by the old DHS as well as to fossil fuels and electricity consumption for heating purposes in households in the baseline. This contains a significant potential for gaming and for calculating emission reductions that are not real. The methodology should make clear how to deal with estimations and models.

e) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>>Local measured data can be considered as adequate, consistent, accurate, and reliable. The international data used (such as IPCC) is also adequate, since the outcome of the methodology is not very sensitive to these parameters. However, it is left to the project developer on how to deal with data to be obtained from estimation/samples and from models. It is not clear whether the obtained data is accurate and whether samples taken or models are representative and reliable. The lack of guidance on how to obtain such data (e.g. the methodology allows for a broad range of estimations: "estimated based on electricity consumption patter (summer vs. winter), random surveys in consumers' apartments, sales data of individual electric heaters etc." (p. 9 monitoring methodology)) does not allow for a consistent calculation of emission reductions across different project activities. Data based on estimations and models are therefore no adequate the way they are presented in this methodology.

f) State possible data gaps:

>> * No data is available on whether and to which extent DSM in the baseline may occur.

* No data is available to account for rebound effects (increased heat demand due to the project activity)

* No data is available on how to determine IHD that are actually affected by the DHS.

* Annual costs are assumed as constant, which is not appropriate. Projections for annual costs are missing.

(7) Assessment of uncertainties:

a) State whether the methodology includes an assessment of uncertainties regarding:

The methodology does not provide an assessment of uncertainties. However, in the PDD, a sensitivity analysis is carried out in order to determine uncertainties related to fuel prices as well as discount factors, when calculating the cost per unit of heat delivered.

i) The basis for determining the baseline scenario:

>> Partly in the PDD (see above).

ii) Algorithms/formulae:

>> No.

iii) Key assumptions:

>> No.

iv) Data:

>> Partly in the PDD (fuel prices, discount factors). See above.

b) State whether the uncertainties presented are reasonable:

>> The way the uncertainties are determined for fuel prices and discount rates in the PDD is reasonable. However, this should also take into account that annual costs may not be constant. Moreover, the role of potentially decreasing subsidies to the DHS should also be evaluated.

For all other aspects no uncertainties are presented, which is not adequate.

(8) Leakage:

a) State how the baseline methodology addresses any potential leakage due to the project activity:

>> Leakage is not addressed in the methodology.

b) Indicate whether the treatment for leakage is appropriate and adequate:

>> No. In this methodology there is significant potential for leakage, especially related to **rebound effects** (increased heat consumption due to the project) as well as to whether IHD are actually affected by the DHS. The methodology should include these aspects either by including them in the project boundary or by considering leakage. See extensive discussion in previous sections. It is adequate to neglect emissions associated with production and transport of fossil fuels as well as related to the production of equipment used in the project case.

(9) Transparency and "conservativeness":

a) Indicate whether the baseline methodology was developed in a transparent way:

>> The methodology lacks transparency in key areas of the methodology, which may have significant impact on the outcome of emission reduction calculations:

- Lack of guidance on how to carry out estimations or on how to use models, in cases when measured data is not available.
- Lack of guidance on how to determine IHD which are affected by the DHS
- Lack of explanation why annual costs are supposed to be constant.

- Lack of explanation why only CO2 is taken into account.
- Important assumptions are made only implicitly (see above).

b) State whether the baseline methodology is conservative:

>> Probably not. The methodology leaves major parameters (such as baseline and project heat demand, IHD that are actually replaced, leakage) unaddressed or open for estimations/modelling without clear guidance. This entails major risks of non-conservative results.

(10) Potential strengths and weaknesses of the proposed baseline methodology *(please explain)***:**

>>See section I ii).

(11) Other considerations, such as a description of how national and/or sectoral policies and circumstances have been taken into account *(please explain)***:**

>>Step 2 of the baseline methodology (determination of the baseline technology) takes into account national and/or sectoral policies and circumstances. The barriers analysis (option 1) is proposed according to the additionality tool, which also contains such information. The investment analysis (option 2) also considers such information (e.g. by taking into account "subsidies/fiscal incentives where applicable").

Accordingly, in the PDD, local fuel prices versus world market prices as well as subsidies for the DHS are mentioned.

(12) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>>Once the methodology addresses the issues raised in this desk review, the methodology is applicable to other projects of that type as well as to other regions (considering the applicability conditions).

(13) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>> Documents of previous submission of the methodology.

b) Indicate any further comments:

>>

- The methodology should elaborate on how other sources of revenues (such as governmental grants or loans from development banks) influence the feasibility of the project and to which extent the recognition as CDM project is decisive for the project to come off the ground.
- p. 5 baseline methodology reads "Investment barriers, other than the economic/financial barriers in Step 2 above" and is directly copied from the additionality tool. "Step 2" refers to step 2 in the additionality tool. This should be adapted to fit with the structure of this proposed methodology.
- p. 9 baseline methodology reads: "if it can be plausibly shown that the calculated emission factor using this option is equal or higher". It must read "equal or lower". Otherwise baseline emissions would be overestimated.
- p. 11, equation (6): The baseline emission factor should be dynamic, since it may be assumed that emission factors of individual technologies as well as the shares of the individual technologies change over time (in the baseline). A fixed baseline emission factor is only legitimate if it can be shown that this adds to conservativeness (i.e. if a dynamic baseline tends to increase emissions over time).

II. Proposed new monitoring methodology *(specify title here):* >> Monitoring methodology for district heating rehabilitation, possibly reducing use of in house devices

In respect of the proposed new monitoring methodology, evaluate each section of CDM-NMM to the draft CDM-PDD. Please provide your comments section by section:

(1) Brief description of new methodology:

Describe new methodology:

>> Baseline case: The monitoring methodology consists in measuring or estimating fuel consumption, heating system efficiencies, net calorific values, oxidation factors, and supplied heat for district heating and for individual fossil fuelled heaters. Moreover, emissions from power consumption in the DHS and for electrical individual heaters are calculated from measurements or estimates of electricity consumption and a grid carbon emission factor (ACM0002 or small-scale grid methodology).

Project case: The emission factor per unit of heat delivered from a specified project technology is calculated based on monitored fuel use, efficiencies and emission factors.

The emission reductions are then calculated as the difference of emission factors per unit of heat delivered in the baseline and in the project case, multiplied with the heat delivered to baseline customers. Baseline customers are DHS costumers of the new system who were physically connected to the DHS also before the project implementation.

(2) Key assumptions/parameters:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

>>

b) State whether the key assumptions are arrived at in a transparent manner:

>>

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>>

Note: The points are discussed jointly.

The monitoring methodology does not have key assumptions which are additional to the ones of the baseline. For that reason, only some major points are highlighted. For a detailed discussion, please refer to the discussion of the assumptions in the baseline.

Explicit assumptions:

- **IHD** are **only** taken into account **if** they are **affected by the rehabilitated DHS** (item 15). Firstly, the methodology allows for many different ways of determining this parameter (estimates, surveys, sales data, etc.). If no clear guidance is given on how to monitor this data, this assumption may lead to an inconsistent calculation of emissions reductions for different project activities. This therefore leaves much room for gaming. Secondly, it is necessary to monitor ex-post whether IHD have actually been replaced by the rehabilitated DHS and to which extent. The monitoring methodology does not include such an item for the monitoring of project emissions. It is just assumed (implicitly) that IHD are actually replaced to the extent as monitored under item 15. The neglect thereof is quite problematic and may lead to an underestimation of project emissions (if IHD are not substituted by the DHS, although they were supposed to do so) and to an erroneous calculation of the baseline emission factor (since it includes a share of IHD). It is necessary to include into the monitoring IHD which are actually replaced by the rehabilitated DHS.
- **Annual costs are constant:** This is a problematic assumption, since fuel prices may rise and local fuel prices may merge with world market prices. Moreover, subsidies for the DHS may decrease. All these aspects show that annual costs are probably not constant. It is therefore necessary to *obligatorily* monitor these parameters at least at the beginning of each crediting period. This monitoring would allow finding out whether the CDM activity continues to be additional or whether the recognition as CDM project has only speeded up the implementation of the project.

Implicit assumptions:

* **CHP plants are not included** in the DHS (see also comments in other parts of this document). If CHP plants are to be considered, a more complex monitoring would be required since the fuel input for these plants must be assigned to heat *and* electricity.

* **No rebound effects**: As explained extensively in previous sections (for the baseline methodology), the provision of a more convenient heat source (rehabilitated DHS) probably leads to an increased heat demand (higher room temperature, more rooms heated, etc.). However, no monitoring of the evolution of the heat demand in the project case is included in the methodology. This assumption therefore possibly leads to an overestimation of emission reductions, which is very problematic.

*** No DSM in the baseline:** This assumption possibly leads to an overestimation of baseline emissions since DSM in the baseline are not taken into account (monitoring of this aspect is not included in the methodology). This is a very problematic assumption.

(3) Data sources and data quality:

See section I 6 d) - f) of the comments on the baseline methodology.

a) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>>

b) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>>

c) *State possible data gaps:*

>>

(4) Assessment of the description of the proposed methodology and its applicability:

a) State whether the proposed methodology has been described in an adequate manner:

>> The description of the monitoring methodology corresponds to the description of baseline methodology. It explains in an adequate way the general procedure of monitoring the project emissions. All other aspects mentioned under section (3) of the review of the baseline methodology also apply here with respect to the adequacy of the description.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMM):

>> In general, the methodology is appropriate for the referred project activity and the referred project context. All other aspects mentioned under section (3) of the review of the baseline methodology also apply here.

c) State whether this proposed monitoring methodology is compatible with the proposed baseline methodology described in CDM-NMB of the draft CDM-PDD:

>> Yes.

(5) Leakage *(please elaborate, if appropriate)***:**

>> Leakage is not considered in the monitoring methodology. However, since leakage should be included in the baseline methodology (see section (8) of the baseline methodology), it should be included in the monitoring methodology accordingly.

(6) Quality assurance and control procedures *(please explain)***:**

>> QA/QC procedures related to meters etc. comprise a regular maintenance and testing regime, which is appropriate. For other parameters (such as emission factors or heating values) a documentation of data is required (not if IPCC data is used). This seems to be adequate as well. However, with respect to parameters which are based on estimations and models, a mere documentation is not enough as QA/QC (as proposed in the methodology). These parameters are the most important and the most sensitive parameters for the outcome of the emission reduction calculation. For this reason, estimations and models should comprise more QA/QC measures such as cross-checks with other data (statistics, price lists, literature, etc.) or other model

results, or a sensitivity analysis.

(7) Potential strengths and weaknesses of the proposed monitoring methodology *(please explain)***:**

>> Weaknesses:

- Important parameters of the methodology rely on estimations, models or implicit assumptions, which allows for gaming.
- Leakage is not addressed.
- QA/QC measures are not appropriate for estimations and models.

(8) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>> Once the methodology addresses the issues raised in this desk review, the methodology is applicable to other projects of that type as well as to other regions.

(9) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>> No.

b) Indicate any further comments:

>> On p. 11 the methodology reads: "In case that data on the use of IHD cannot be measured, the methodology recommends estimating the overall heat demand of a typical consumer's apartment". More guidance should be given on how to conservatively carry out such estimation and on how such estimations can be carried out consistently across project activities. Moreover, QA/QA measures shall be implemented.

Signature of desk reviewer …… Ralph Hofman ……..

Date: 27 / 05 / 2005

Information to be completed by the secretariat	
F-CDM-NMex doc id number	
Date when the form was received at UNFCCC secretariat	
Date of transmission to the Meth Panel and EB	
Date of posting in the UNFCCC CDM web site	