JOINT IMPLEMENTATION PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
Version 01 - in effect as of: 01 November 2009[1]

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Annexes

[1] This form is in effect provisionally until it has been formally adopted by the COP

SECTION A. General description of the JI PoA

A.1. Title of the JI PoA:

"BOŚ Energy Efficiency Programme in buildings" from Bank Ochrony Srodowiska S.A (BOŚ Bank).

Version: 07

Date: 04/07/2011

Sectoral Scope: 3 – Energy demand

Table 1: Revision history of the PDD

Version	Date	Comments
Version 01	22/04/2010	Revised draft PDD; prepared for determination
Version 02	07/09/2010	Revised version according to Determination report
Version 03	22/12/2010	Revised version according to second loop Determination report
Version 04	20/01/2010	Revised version according to further AIE request
Version 05	10/05/2011	Revised version according to further AIE requests (CB)
Version 06	08/06/2011	Revised version according to further AIE requests (CB)
Version 07	04/07/2011	Revised version according to further AIE requests (CB)

A.2. Description of the JI PoA:

With the programme at hand BOŚ Bank aims at incentivising energy efficiency measures to reduce primary energy consumption in existing buildings countrywide in Poland introduced by public or private programme beneficiaries, where the measure targets supported technologies. Private sector representatives may be i.a. micro-business, small/medium enterprises and to some extend large enterprises. The supporting effects of this PoA are focused on a specific target group, which is currently lacking necessary access to attractive funding. Within this target group buildings are usually not sufficient insulated, boilers are operated as long as they are technical operational and the application of solar water heaters is very limited.

The baseline scenario is expected to be the continuation of this current situation. The objective is to generate Emission Reduction Units (ERUs) from emission reductions achieved by the implementation of activities under a programmatic JI project (JI PoA). Emission reductions shall be credited over 10 years for each participant. As the future of JI is not yet clear for the period after 2012, the achieved reductions will be split into ERUs (until 2012) and post 2012 units. The revenues of the certificate sales shall be utilized to offer attractive low interest loans and provide the target group access to funding.

The programme addresses modernization of individual heating systems with and without fuel switch (including switch to biomass use), insulation measures (including replacement of windows), installation of solar hot water systems and installation of electric heat pumps.

Table 2: Technologies implemented by JPoA and brief description

Technologies		Brief description
TM1	**Boiler Replacement**	Replacement of low efficient heating systems (hot water/steam) with and without fuel switch; this category may also include installation of heat pumps
TM2	**Insulation Measure**	Insulation measures
TM3	**Solar water heaters**	Installation of solar heating systems

Sustainability effects

With regard to sustainable development the programme contributes in several ways, addressing several aspects such as social, environmental, economic, and technological well-being in Poland.

The programme contributes to tapping the potential of energy efficiency improvements, thus also fostering sustainable development in Poland. It addresses:

- socio-economic interests by strengthening the energy security of Poland (by diversifying the import sources and diminishing the need for energy imports).
- Technological: Bringing advanced state-of the art energy technology into the Polish housing market; leapfrogging.
- Environmental: Besides mitigating CO_2 emissions the project will also help reducing other pollutants from existing combustion processes.

The PoA is furthermore supporting Poland in meeting its national energy goals until 2030 as well as its EU energy goals, i.e.

- increase of energy efficiency until 2016 (base year 2007) by 9% (=14 TWh),
- reduction of CO_2 emissions by 27% (2008-2012) and
- increase of renewable energy production to 15% of total energy consumption until 2020.[2]

The PoA is a voluntary action, initiated and managed by BOŚ Bank.

A.3. Coordinating entity and participants of the JI PoA, as appropriate:

Table 3: JI PoA and parties involved

Coordinating entity name	Bank Ochrony Srodowiska S.A (BOŚ Bank)	
Party involved*	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Poland	Bank Ochrony Srodowiska S.A	No

[2] See presentation by AHK (German Chamber of Industry and Commerce in Poland) at fair *Bauen + Energy 2009* in Frankfurt Oder, date: 13 March 2009; www.ihk-ostbrandenburg.de/res.php?id=5077 (access on 17 Sept. 2009).

	(BOŚ Bank)	
Germany	Kfw Bankengruppe	No
* Please indicate if the Party involved is a host Party. Entities that are under the coordinating entity should not be included.		

Please find contact data details in Annex 1.

A.4. Technical description of the JI PoA:

A.4.1. Location of the JI PoA:

A.4.1.1. Host Party(ies):

The Host Party for the proposed project activity is Poland. Poland has ratified the Kyoto Protocol on 13th December 2002.

Poland fulfils the requirements for 1st Track JI.

A.4.1.2. Geographical boundary:

The geographical boundaries of the PoA shall be the territory of Poland. The overall programme is not restricted to any region, but will be carried out nationwide.

Figure 1: Location of the programme[3]

A.4.2. Description of each type of JPA:

A.4.2.1. Technology(ies) to be employed, or measures, operations or actions to be implemented by each type of JPA:

The energy efficiency improvement under the project activity entails technologies of the following categories (technology measures/TM):

TM1: Replacement of low efficient water heating boilers:

- Replacement of low efficient hot water/steam boilers by one of the following boiler types:
  - Natural gas condensing or low temperature boiler;
  - Fuel oil condensing or low temperature boiler;
  - Biomass boiler.

[3] :Source: http://www.appliedlanguage.com/maps_of_the_world/map_of_poland.gif

In contrast to the conventional constant temperature boilers, low temperature boilers are operating at lower or varying temperatures. In most cases operating on partial load leads to significantly higher efficiency levels of heating systems. Condensing boilers are even more efficient, as part of the steam enthalpy contained in the water vapour of the flue gas can be used by condensation.

Further emission reductions will by achieved in case of fuel switching to a less CO_2 intensive fuel (e.g. from coal to natural gas or fuel oil) or to biomass.

- Replacement of low efficient hot water/steam boilers by electric heat pumps

  The replacement of low efficient hot water boilers by electric powered heat pumps leads to substantial GHG emission reduction in existing buildings. An annual standard efficiency parameter of four (which is achieved by modern electric powered heat pumps under favourable conditions) means, that an electric heat pump provides four times more (heat) energy compared to the electrical energy it consumes. Thus three quarters of the used primary energy is the renewable energy. Even under consideration of the losses connected to the limited efficiency for electricity generation, efficient heat pumps can be considered as ecological favourable compared to existing boilers.

- Replacement of low efficient hot water/steam boilers by connecting buildings to a district or local heating grid

  The replacement of low efficient individual heating sources by connecting buildings to district or local heating grids leads to substantial GHG emission reduction. Centralized systems operate at higher efficiencies than decentralized systems due to higher operating hours and higher utilisation ratios of larger systems.

TM2: Implementation of insulation measures:

Insulation of the building shell (external walls, ceilings, etc.) reduces unwanted heat loss. This leads to energy savings resulting from a decrease in the energy demand for heating and cooling. The insulation component of the programme will comprise measures in the field of thermal insulation, such as insulating external walls and ceilings as well as the replacement of windows in residential and public buildings.

There are two different types of building insulation:

- Thermal insulation measures which focus on insulation materials (such as cellulose, fibreglass and rock wool etc.) are applied to decrease heat loss
- Optimal replacement of building elements (e.g. windows, doors, heaters) can play another significant role in insulation, such as the application of insulated glass (e.g. Double Glazing/ Double Glazed Units or Insulating Glass Units (IGU)).
- Optimization measures related with heat distribution system (insulation of pipes, replacement of heat exchangers, etc.) and ventilation system (e.g. heat recovering installation).

These insulation measures will result in reduced temperature amplitude extremes (daily and seasonal). The reduced demand in energy consumptions will lead to less fuel consumption for space heating/cooling purposes and in turn to reduce CO_2 emissions.

TM3: Solar water heater:

Solar hot water heating systems under the programme shall provide hot water to residential buildings. Solar water heating systems are composed of solar thermal collectors that use the sun's energy. They can

provide up to 85% of domestic hot water energy. Thus, this technology provides thermal energy, which will result in less fossil fuel consumption and Greenhouse Gas (GHG) emissions.

In order to use solar energy a collector will be fastened to the roof of a building, on a wall facing the sun or may be freestanding. Like the other part of the programme this technology measure only targets existing residential buildings.

The table below sums up all feasible combinations of technologies under the PoA, which might be implemented in single JPAs under the programme:

Table 4: Combination of Technologies per JPA

<table>
<tr><th>Technology Measure TM</th><th colspan="3">Brief description</th></tr>
<tr><td rowspan="13">Boiler replacement (TM1)
replacement of low efficient heating systems in residential and public buildings</td><td rowspan="12">with fuel switch, i.e.</td><td rowspan="5">from coal</td><td>to gas</td></tr>
<tr><td>to oil</td></tr>
<tr><td>to biomass</td></tr>
<tr><td>heat pumps</td></tr>
<tr><td>to district heating grid</td></tr>
<tr><td rowspan="4">from oil</td><td>to gas</td></tr>
<tr><td>to biomass</td></tr>
<tr><td>heat pumps</td></tr>
<tr><td>to district heating grid</td></tr>
<tr><td rowspan="3">from gas</td><td>to biomass</td></tr>
<tr><td>heat pumps</td></tr>
<tr><td>to district heating grid</td></tr>
<tr><td colspan="3">without fuel switch, i.e. gas to gas or oil to oil</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Insulation (TM2)</td><td colspan="3">Insulation measures in residential and public buildings</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Solar water heaters (TM3)</td><td colspan="3">Installation of solar heating systems at one family or multi-family houses, owned by housing communities or housing cooperatives</td></tr>
</table>

Under this programme it shall also be possible to combine the tree different technology measures (TM1-TM3) as it generally makes sense to combine insulation measures with boiler replacements or include also a solar water heating installation.

A.4.3. Eligibility criteria for inclusion of a JPA in the JI PoA:

To the participation of JPAs under the PoA strict eligibility criteria apply. Table 5 below sums up all criteria for participation:

Table 5: General Participation criteria

1. General JPA Participation Criteria	
1	The participant implements one of the technology measures described in section A.4.2.1 or a combination of several of these measures.
2	The measures are implemented in one of the following target groups: • Households/residential buildings • Public buildings (e.g. schools, hospitals) • Private sector (including e.g.: Micro businesses (e.g. small, private hotels), Small, medium and to some extent large enterprises, foundations) • cooperative companies (e.g. autonomous associations of persons united to meet their common economic and social needs and aspirations through jointly owned and democratically controlled enterprises) that could meet either definition of SME or large enterprises
3	No public subsidies are used in the implementation of the measures.
4	The measures are neither registered as a JPA nor included in another registered JPoA.
5	The generated emission reductions are not being sold to any other project.
6	The JPA satisfies de-bundling rules for PoA
7	In case of boiler replacement, the old systems shall be disposed and not reused.[4]

Table 6: Technology Specific Participation Criteria

2. Technology Specific JPA Participation Criteria			
	TM1	TM2	TM3
8	The replaced installation must not be one of the following types: • Biomass boilers • Electric heaters or electric heat pumps	The heat for the building must not be provided by one of the following heating sources: • Biomass boilers • Electric heaters or electric heat pumps	The hot water supply to the building must not be provided by on of the following heating sources: • Biomass boilers • Electric heaters or electric heat pumps
9	There is no legal requirement (national and EU-Law) for modernization or replacement of the installation.	There is no legal requirement (national and EU-Law) for thermo-modernization of the building.	There is no legal requirement (national and EU-Law) for installation of solar water heating

`	The remaining lifetime[5] for old installation will be proven according to the guidelines in the "Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories", Version 12.1. The participation is restricted as follows: • maximum age of boilers at the time of participation is defined to be 39 years; • financing and crediting for boilers between 34 and 39 years will be granted only as long as the replaced boiler would have been below the defined threshold of (e.g. if a 39 year old boiler would be replaced, credits can be generated only for 5 years).For further detail information please see below.	Remaining lifetime is not a relevant issue under TM 2	Remaining lifetime is not a relevant issue under TM 3

* Currently, in Poland a new National Allocation Plan has been approved April 19, 2010, in which JI reserves for installations under the EU-ETS system are foreseen. According to the new legislation dated from 21/06/2011 JI reserves are taken into account in the National Allocation Plan. This allows to consider emissions reductions within EU-ETS installations (double counting).

As JI reserves are included in the Polish legislation, buildings connected to district-heating grids with connection to EU-ETS installations will not be excluded from the programme and therefore will generate ERUs. These emissions reductions will be monitored separately.

For more detailed information please see Section A.4.5.2.

In case of combination of several measures (TM 1 boiler modernization and TM 2 thermomodernization) the applicability criteria will be checked separately. If a participant is not eligible for one category (boiler replacement is required due to lifetime or legal issues), the participant is still eligible for participation but emission reductions have to be calculated only for the eligible measures (reduction in heat demand due to thermomodernization can be considered but reductions due to fuel switching and increase in boiler efficiency will be excluded). The following options can be chosen to calculate the emission reduction of TM 2 excluding TM1:

- The heat source of the project scenario is also applied for the calculation of estimated emissions in the baseline scenario (Assumption that the boiler would have been replaced to the new system anyway and only the reduction in energy demand due to thermomodernization will lead to emission reductions) or
- A modern natural gas boiler is applied for the calculation of baseline emissions as conservative approach (Assumption that the boiler would have been replaced by a modern natural gas boiler and only the reduction in energy demand due to thermomodernization will lead to emission reductions)

[5] Definition of Methodological Tool " Tool to determine the remaining lifetime of equipment", EB 50, Version 01: "*The remaining lifetime of the equipment is the time for which the existing equipment can continue to operate before it has to be replaced/discarded for technical reasons, such as the age of the equipment, safety reasons, or deteriorated performance. The remaining lifetime is expressed in years or hours of operation."*

In case of boiler replacement the remaining lifetime[6] for old installation will be proven by consideration of regulatory requirements in Poland as well as according to the guidelines in the "Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories", Version 12.1.

The further operation of existing boilers is controlled under Regulation of the Council of Ministers of July 16, 2002 (OJ No 120, item 1021 with amds.). This regulation requires periodic technical inspection by an Inspection Body (UDT) that is also responsible for operation permits. Two legal regulations are linked with this issue: The act on technical inspection[7] and the regulation of the Infrastructure Minister on types of technical appliances that are subject to technical inspection.

Operation of technical appliances covered with technical inspection is permissible only on the basis of the decision (operational permit) of the inspecting body. Before issuance of the permit the inspection body performs examination of the unit that consists of: documentation check (completeness and correctness), conformity check of the unit with technical documentation; technical check - before starting the operation and during standard operating mode.

In the course of unit operation periodic inspections are performed consisting of technical check, maintenance technician certification check. If the unit operator is not in compliance with the act the inspection body issues the decision on unit cessation.

Please note that there are some exemptions from this standard procedure and the act provides limited or simplified examination as well as recognizing of foreign documentation basing on mutual agreements of inspecting bodies.

In case of boiler replacement it will be checked that the installation has an operation permit available. In this case replacement of boilers is not legally required, and it is assumed that the expected lifetime of the boilers will be longer than the duration of the crediting period.

However, to show the remaining lifetime in a conservative manner the guidelines in the "Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories", Version 12.1 shall be used as well. According to the guidance the project participants may use one of the following options to determine the remaining lifetime:

> 5.1. "*The typical average technical lifetime of the equipment concerned may be determined and documented on the basis of common practices in the sector and the country (e.g. based on industry surveys, statistics, technical literature, etc.)";*
>
> 5.2. *"The practices of the responsible company regarding replacement schedules may be evaluated and documented (e.g. based on historical replacement record of similar equipment)".*

Project participants can choose between both options, depending on the available information and data.

Considering option 5.1. the following procedure can be applied as a general rule:

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[6] Definition of Methodological Tool " Tool to determine the remaining lifetime of equipment", EB 50, Version 01: "*The remaining lifetime of the equipment is the time for which the existing equipment can continue to operate before it has to be replaced/discarded for technical reasons, such as the age of the equipment, safety reasons, or deteriorated performance. The remaining lifetime is expressed in years or hours of operation."*

[7] act on technical inspection of November 21, 2000 (OJ No 122, item 1321)

According to a statistical survey, the age characteristics of water boilers in Polish heating sector is as follows[8]:

- 30% of water boilers are less than 15 years old
- 50% of water boilers are in the age between 15 and 24 years
- 19% of water boilers are in the age between 25 and 44 years
- 1% of water boilers are older than 45 years.

It can be seen that a relevant fraction of boilers is in the age between 25 and 44 years but only a very minor group is older than 45 years. Therefore, the maximum lifetime can be defined as 44 years as there are only 1% of boilers older than 45 years. To be conservative and to consider the maximum crediting time of 10 years for each participant, the participation is restricted as follows:

- maximum age of boilers at the time of participation is defined to be 39 years
- financing and crediting for boilers between 34 and 39 years will be granted only as long as the replaced boiler would have been below the defined threshold of (e.g. if a 39 year old boiler would be replaced, credits can be generated only for 5 years).

A separate documents **"Additional information sheet to credit line**" and **"Supplementary Statement of End User to Credit Contract"** (see Annex 5) are submitted along with this PDD. By signing these documents each participant is responsible for the accuracy of statements in the agreement and BOŚ Bank has to check whether the participant is in conformance with all participation criteria.

A.4.4. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI PoA or each type of JPA, including why the emission reductions would not occur in the absence of the proposed JI PoA or each type of JPA, taking into account national and/or sectoral policies and circumstances, as appropriate (assessment and demonstration of additionality):

The programme at hand is designed in a way to facilitate energy efficiency measures, which lead to substantial emission reductions. Those GHG reductions are achieved due to:

- lower fuel demand due to more efficient heating installation;
- lower carbon content of fuels in case of fuel switching;
- lower fuel demand in case of insulation measure;

Summary of the emission reduction of exemplary JPAs is provided in Annex 2.

In the absence of the PoA respective efficiency measures would not be implemented in the Polish housing/building market. This is the case as supporting effects of this PoA are focused on a specific target group, which is currently lacking necessary access to funding. This target group is housing communities/individual persons with limited capital available, which depend on credit lines with firstly rather long payback periods as well as secondly favourable interest rates. Loans that fulfil any of these two criteria are virtually not available in the Polish capital market for the implementation of efficiency measures.

[8] Small-scale cogeneration in Poland, 2003 market report

Based on the described technical information in Annex 2 and the formula provided in Section A.4.1.4 and Section A.4.4. in this PDD, the following calculations regarding expected emission reductions for one JPA have been done.

Table 7: ERUs for the period 2010-2012

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2011	8.83	None	9.21	0.38
2012	8.83	None	9.21	0.38
Total for the crediting period 2010-2012	**17.66**	**None**	**18.42**	**0.76**

Table 8: ERUs for the period 2013-2020

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2013	8.83	None	9.21	0.38
2014	8.83	None	9.21	0.38
2015	8.83	None	9.21	0.38
2016	8.83	None	9.21	0.38
2017	8.83	None	9.21	0.38
2018	8.83	None	9.21	0.38
2019	8.83	None	9.21	0.38
2020	8.83	None	9.21	0.38
Total for the crediting period 2013-2020	**70.64**	**None**	**73.68**	**3.04**

Table 9: Total emission reductions for the whole crediting period 2010-2020

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2011	8.83	None	9.21	0.38
2012	8.83	None	9.21	0.38
Total for the crediting period 2010-2012	**17.66**	**None**	**18.42**	**0.76**
2013	8.83	None	9.21	0.38
2014	8.83	None	9.21	0.38
2015	8.83	None	9.21	0.38
2016	8.83	None	9.21	0.38
2017	8.83	None	9.21	0.38
2018	8.83	None	9.21	0.38
2019	8.83	None	9.21	0.38
2020	8.83	None	9.21	0.38
Total for the crediting period 2013-2020	**70.64**	**None**	**73.68**	**3.04**
Sum 2010-2020	**88.3**	**None**	**92.1**	**3.8**

The estimated emission reductions are based on the assumptions made during development of the PIN that has been sent to the DFP for obtaining a LoE[9].

The number of new one family building for the crediting period is estimated to be 500 and for multi-family building it would be 600.

The average emission reduction units per year and building have been estimated based on research on technology specific reduction potentials for one and multi-family buildings[10].

[9] PIN "JIPoA_BOS_PIN_Buildings_2009-05-29"

[10] Annex II to PIN "AnnexII_PIN_Buildings_2009-05-29"

Table 10: Emission reductions pro measure[11]

	One family	Multi family	Realization rate
ERU p.a/insulation	4.3	51.9	0.9
ERU p.a/boiler	7	85	0.9
ERU p.a./solar	0.8	0	0.1
ERU p.a./heat pump	12.2	148.3	0.1
ERU p.a./building type	11.47	138.04	

Number of one family building	500
Number of multi-family buildings	600
ERU p.a./average building	80.51

In order to keep the emission reduction scenario as conservative as possible, the emission reductions for every following year are for only 6 months of the year.

Table 11: ERUs for the period 2010-2012

Year	New buildings	Buildings cum	ERUs
2010	200	200	8,051
2011	400	600	32,203
2012	500	1,100	68,432
Sum for the crediting period 2010-2012			**108,686**

Table 12: ERUs for the period 2013-2020

Year	New buildings	Buildings cum	ERUs
2013	0	1,100	88,559
2014	0	1,100	88, 559
2015	0	1,100	88, 559
2016	0	1,100	88, 559
2017	0	1,100	88, 559
2018	0	1,100	88,559
2019	0	1,100	88, 559
2020	0	1,100	88, 599
Sum for the			**708,472**

[11] Annex II to PIN "AnnexII_PIN_Buildings_2009-05-29"

crediting period 2013-2020			

Table 13: Overview of ERUs for the period 2010-2020

Year	New buildings	Buildings cum	ERUs
2010	200	200	8,051
2011	400	600	32,203
2012	500	1,100	68,432
Sum for the crediting period 2010-2012			**108,686**
2013	0	1,100	88,559
2014	0	1,100	88, 559
2015	0	1,100	88, 559
2016	0	1,100	88, 559
2017	0	1,100	88, 559
2018	0	1,100	88,559
2019	0	1,100	88, 559
2020	0	1,100	88, 599
Sum for the crediting period 2013-2020			**708,472**
Total sum 2010-2020			**817,158**

The incentives provided by the JPoA offer include the following features:

- lowered interest rates as compared to common market offers
- skipping of otherwise common initial loan fees
- longer maturities as compared to common market offers

For more detailed information regarding the additionality please see section E.2. of the JPoA at hand.

A.4.5. Operational, management and monitoring plan:

A.4.5.1. Operational and management plan for the JI PoA:

BOŚ Bank as the managing/coordinating entity will supervise the process of monitoring. The operational and management structure is based mostly on existing BOŚ procedures. Small adjustments are introduced in order to provide evidence on emission reductions.

The following BOŚ Bank units will be involved in the management of the Programme:

- Financial Institutions Department (FID) (at headquarters) which will be responsible for:
  - Maintaining contact with DFP, verifier;
  - Overseeing the proper implementation of the Programme;
  - Monitoring of eligibility of each customer acceding to the PoA;
  - Processing of the aggregate data on implemented measures, monitoring effects;
  - Submitting monitoring reports to the verifier and to the DFP;
- Financing and Ecology Department (F&ED) at headquarters, which will be responsible for:
  - Supporting of identification and appraisal of individual projects, the appraisal will be processed in close cooperation with FID;
  - Calculation of the ecological effect (CO_2 emission reduction);
- Supervision and account maintenance of loans to beneficiaries is the primary responsibility of the Bank branches.

Eligibility criteria checks

Credit application stage

Depending on the category of the customer, corporate or individual client advisors identify potential JPoA participants and examine their compliance with participation criteria. All necessary data about measures that qualify for the Energy Efficiency Programme is collected in a way of customer written declaration on a dedicated form - "Additional information sheet to credit line".

It is a common practice in BOŚ that every customer who applies for an "ecological loan" provides specific data in a dedicated form. In this form a customer discloses inter alia:

- the scope of the investment,
- the technology which shall be implemented,
- the actual energy consumption
- the expected ecological effect, measured in emission reductions

Customer qualification process is executed under the supervision of the main ecologist that works in each of 22 (regional) branches.

Advisors are responsible to collect all data on measures that qualify to one of the Programmes. At the stage of loan application potential project participant provides all data linked with JI procedure on intended investment using Additional Information Sheet (BOŚ provides separate sheets for each Programme). After completion of this stage a client advisor sends to Financial Institutions Department the documentation in order to get the final approval of the client evaluation. This procedure ensures double checking of project and participant eligibility criteria and proper development of central data storage.

In consequence, essential data derives from supplementary statement to the contract or from customer written declaration submitted at the stage of credit line application.

After eligibility checks the branch's ecologist does evaluate the investment from a technical and ecological perspective, thus gaining a comprehensive overview of the planned measure. Within this

procedure the ecologist checks whether the data from the agreement or from Bank's form conform to the data provided by technology providers.

In parallel to eligibility checks a dedicated risk management department scrutinises creditworthiness of the customer in order to assess potential credit risk and to verify the financial feasibility of the investment.

Another important factor that should be controlled are the debundling rules.

It should be ensured that each JPA requesting registration under this PoA is in fact no de-bundled component of a large-scale activity. This check shall be done according to the rules provided in paragraph 2 "Guidelines on assessment of de-bundling for SSC project activity", Version 02, EB 47. According to that rule:

> *"If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoA is no greater than 1% of the small scale thresholds defined by the methodology applied, than that CPA of PoA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity."*

As it can be shown that each subsystem/measure (small different efficiency measures) included in the proposed JPA leads to annual energy savings that are no greater than 1% of the small scale threshold defined by the methodology AMS-II.C. It stipulates a threshold of 60GWh for aggregate energy savings by a single project, which means 0.6GWh annual energy savings per measure.

As the considering that the foreseen measures are small it will be ensured that in either case each JPA is smaller than the 0.6GWh per annum. Thus, the JPA is exempt from performing the de-bundling check, as it is not considered to be a de-bundled component of a large-scale activity.

Credit agreement stage

At the stage of credit agreement conclusion customer is obliged to declare in written some additional conditions that reflect its obligations under JPA project. The statement of End User constitutes an integral part of credit agreement. Copy of duly signed credit agreement is stored in Financial Institutions Department (FID).

In order to facilitate latter verification both forms used at the credit application and credit agreement stage are bilingual.

Project feasibility checks

In parallel to eligibility checks a dedicated risk management department scrutinises creditworthiness of the customer in order to assess potential credit risk and to verify the financial feasibility of the investment. The procedure of financial risk assessment is performed in accordance with dedicated procedures described in section 1.2 Financial policy.

A.4.5.2. Monitoring plan for each technology and/or measure under each type of JPA:

The calculation of emission reductions will be performed for all JPAs based on historic and estimated fuel consumption (**ex-ante calculation**). There will be a differentiation of family houses and other

buildings regarding the used tool for fuel consumption calculations. For further details please see description in Option A and Option B below.

The process of monitoring of CO_2 emission reductions is based on "Calculation of CO_2 reductions methodology". This document constitutes an integral part of an internal regulation dedicated to JI PoA implementation within BOŚ structures.

Option A: Monitoring of CO_2 emission reduction for one to two family houses:

In case of thermo-modernization measures within the Energy Efficiency Programme for one to two family houses, the ecologist, responsible for EIA in BOŚ Bank enters the technical data into the calculation tool that is integrated in the electronic loan management database. The tool calculates energy demand prior and after investment. The outcome is transferred to separate sheet in order to get CO_2 emission reduction to be achieved after the implementation of PoA measure. All files are stored in the respective branch.

The calculation of fuel consumption in the baseline and in the project scenario is predicated on a "simplified data collection method for the assessment of the energy performance of residential buildings" that has been developed by "Institut Wohnen und Umwelt GmbH". The tool requires a minimum set of input data for each JPA about the building and the heating system. The tool calculates the heat demand of the building and the fuel demand of the heating system according to the input data and stored statistical data. Further information about the tool is provided in **Annex 3** and **Annex 4**.

The monitoring plan includes individual input data per JPA and the stored statistical parameters of the tool. These monitoring parameters are listed in section E.4.

The tool and its parameter have been developed based on the German residential building stock. Still as the German standard of buildings is generally higher than the Polish standard, the estimation of baseline emissions is conservative/is likely to underestimate the real energy demand. Climatic data of the tool will be adjusted to Warsaw data.

The monitoring plan includes individual input data per JPA and the stored statistical parameters of the tool. These monitoring parameters are listed in section E.4.

Option B: Monitoring of CO_2 emission reduction for other buildings:

In case of thermo-modernization measures within the Energy Efficiency Programme for other buildings, the project participant is obliged to provide an energy audit performed or verified by one of energy auditors listed on the special list managed by Energy Auditors Association or by energy auditor or company with a list of references (there are companies on the market which offer comprehensive services including audit and construction workmanship.

BOŚ Bank provides on its dedicated web page a link to the website where the list is published (BOŚ web page http://www.bosbank.pl/?page=3234 and the link to the list http://www.zae.org.pl/audytorzy/lista-audytorow.aspx). Energy audits provided by customers constitute grounds of emission reductions calculation. Only ecologists are responsible for calculation of these figures. Based on this data emission reduction calculations shall be estimated by BOŚ Bank. All data will be stored in the central database of BOŚ Bank. In some cases energy audit may contain section that refers to Ecological effects" of desired measure, where CO_2 reductions are estimated. In such cases estimations derived from energy audit shall be processed for Programme purposes.

The calculation of fuel consumption in the baseline and in the project scenario is predicated on the energy audit and renovation audit according to the ordinance of the Polish Minister of the Infrastructure of 17th march 2009 (OJ No 43, item 346). The ordinance regulates and describes the detailed scope and form of the energy audit and renovation audit, the template of the audit cards and the formula of the

thermo- modernization undertaking profitability assessment. The outcome of the audit is a so called "building's energy audit sheet" - a synthetic combination of essential information on: the building, its energetic parameters and energy audit outcome, which is the heat demand of the building and the fuel demand of the heating system. This sheet together with detailed information regarding the whole audit with formulas and estimations will be provided to BOŚ Bank. BOŚ Bank intends to recommend members of the Energy Auditors Association[12] in order to achieve best possible quality and reliability of energy audits outcomes. In cases where energy audit already exists BOS will require verification of the document by energy auditor from EAA list or a list of references.Further information about the energy audit is provided in **Annex 3** and **Annex 4**.

Monitoring of district heating

Currently, in Poland a new National Allocation Plan has been approved April 19, 2010, in which JI reserves for installations under the EU-ETS system are foreseen. According to the new legislation dated from 21/06/2011 JI reserves are taken into account in the National Allocation Plan. This allows to consider emissions reductions within EU-ETS installations (double counting).

As JI reserves are included in the Polish legislation, buildings connected to district-heating grids with connection to EU-ETS installations will not be excluded from the programme and therefore will generate ERUs. These emissions reductions will be monitored separately.

BOS Bank Staff

Branch Main Ecologists staff in BOS Bank is represented by 20 persons with high technical education: environmental engineering, protection of the environment, construction engineering or related fields. All employees are experienced persons who were engaged into environmental issues working in: design offices, construction companies, central administration (the Ministry of the Environment) or local administration (Department of the Environment Protection of Country Office). In most cases ecologists have been working in BOS for several years gaining their experience on calculating and accounting of ecological and material effects (as it is required by donors of financial sources that are component of pro-environmental loans offered in BOS).

Branch Main Ecologists who work in branches are materially supervised and supported by experts of the Ecological Unit placed within the Department of Finance and Ecological Projects at headquarters of BOS Bank and the Principal Ecologist of the BOS Bank. All experts who work in the Unit graduated Warsaw University of technology with engineer and M.A. degree. Multiannual experience was gained when accounting agreements with following donors:

The National Fund for Environmental Protection and Water Management, Voivodshaft Funds for Environmental Protection and Water Management or calculating and accounting of implemented measures within energy efficiency that were maintained by BOS under Global Environmental Facility in years 1994-2004.

In order to adjust the experience to JI requirements a group of experts from Ecological Unit and two persons from Financial Institution Department underwent a dedicated training course "JI mechanism in practice" following topics were presented and discussed legal basis of JI, phases of JI project implementation, role of external and internal verifiers, role of managing entity, management and monitoring of the project. The training course was provided by DET NORSKE VERITAS POLAND SP.ZO.O DNV Industry Region North and West Europe.

In total, 20 ecologists from the different Main Branches will be engaged in the whole process. 6 person staff from the Ecological Department in the Head Quarter of BOS Bank will be as well supporting the monitoring process with assistance of the Principal Ecologist of BOŚ Bank.

[12] see http://www.zae.org.pl/

A.6. JI PoA approval by the Parties involved:

BOŚ Bank received a Letter of Endorsement (LoE) by Ministry of Environment as Polish DFP on 02/09/2009.

An approval by the Ministry of Environment will be given after receiving the determination report on application by the project coordinating/managing entity BOŚ Bank.

Furthermore, an approval by the DFP of the investor country has to be issued before the project registration and the first verification report upon request of the project coordinating/managing entity BOŚ Bank.

SECTION B. Duration of the JI PoA / crediting period

B.1. Starting date of the JI PoA:

The starting date of the programme is considered to be 01/07/2010.

Table 14: Timeline table indicating the milestones of the programme

Date	Actions
10/11/2008	Memorandum of Understanding with KfW
10/11/2008-10/04/2009	Elaboration of preliminary concept (Project Idea Note)
06/10/2009	Kick Off Workshop BOS Bank (KfW)/FutureCamp Climate
29/06/2009	Application for LoE
02/09/2009	Receiving LoE
01/03/2009-30/04/2010	Elaboration of Design Documentation - in cooperation with KfW, BOS Bank and FutureCamp Climate
29/06/2010-30/06/2010	Audit meeting TUEV Sued and BOS Bank/Future Camp Climate
29/06/2010	Meeting with TUEV Sued, BOS Bank and FutureCamp Climate with the Polish DFP

B.2. Expected operational lifetime of the JI PoA:

The expected lifetime of technical installations depends on the technology applied. In general the lifetime of boilers is 30 years or longer. The lifetime of insulation measures at buildings can generally exceed this (50 years).

Thus the measures under the PoA are expected to generate lasting effects for several decades.

B.3. Length of the crediting period:

A fixed crediting period of 10 to 12 years for each JPA shall be applied.

At JPoA level new participants will be accepted in the period 2010-2012. Therefore, the crediting period is assumed to last from the year when the particular JPA starts until maximum 2022, for example 2012 until 2022. As under current JI regulations crediting is not possible longer than 2012, the period will be split in a Kyoto phase and a post Kyoto phase (2013-2022). Respective separation is already introduced into Emission Reductions Delivery Agreement.

The Polish Act of 17 July 2009 on the "System to Manage the Emissions of Greenhouse Gases and Other Substances"[13] provides detailed information regarding the process related to the JI projects in Poland. However, no country specific rules for the duration of JI projects in Poland are provided in this document.

However, as soon as Polish or international regulations sets for an extension or limitation of the existing JI project, the coordinating entity will adjust the programme accordingly.

[13] http://ji.unfccc.int/UserManagement/FileStorage/XPN3UEOW4MYJ97CKZLAS5Q2I8DTBHG

SECTION C. Environmental impacts

C.1. Documentation on the analysis of the environmental impacts of each type of JPA, including transboundary impacts, in accordance with procedures as determined by the host Party(ies):

The programme activity shall contribute towards achieving the targets and objectives of the country's policy regarding emission reductions. The following **environmental aspects** are linked to the programme activities:

In case of natural gas/oil:

- Reduction of flue gas emissions (NO_X, SO_2, dust, soot);
- Lower emissions from production and transport of coal in case of fuel switch from coal to natural gas/or oil;
- Lower emissions from production, transport and refining of oil in case of fuel switch from oil to natural gas.

In case of biomass:

- Lower emissions from natural gas losses in production process and in transport of natural gas;
- Possibly lower emissions from production, transport and refining of fuel oil or from production and transport of coal;
- Increase of dust emissions in case of switch from natural gas to biomass;
- Decreased dust emissions in case of switch from coal to biomass;
- Increase of noise, e.g. from transportation of biomass.

The only possible negative environmental effects are linked to the handling and burning of biomass. This might result in increased dust emissions (compared to natural gas installations). However, fuel switching from natural gas to biomass is not the focus of the programme and in all other cases the positive aspects are prevailing.

In case of heat pumps:

Potential negative impacts are the emissions from the

- HFC emissions of the working fluid during the operation of some heat pump systems and
- upstream emissions from burning fossil fuels for meeting electricity demand of the pump.

The first aspect is considered in section E.4.1.2 under project emissions. The second aspect is further discussed in the section on potential leakages (cf. E.4.3) where also justification for the negligibility of such effects is given.

In case of insulation and solar-thermal application:

- Lower emissions from natural gas losses in production process and in transport of natural gas;
- Possibly lower emissions from production, transport and refining of fuel oil or from production and transport of coal;
- Reduction of flue gas emissions (NO_X, SO_2, dust, soot);

The following **socio-economic aspects** are linked to the programme activities:

- Creating an incentive for investment;
- Stimulating technology diffusion;
- Stimulating cost cutting;
- Raising activity in the handcraft sector;
- Development of the Polish rural areas (in the case of biomass);
- Domestic action;
- Reduction of energy demand and costs for consumers.

C.2. If environmental impacts are considered significant by the participants or the host Party(ies), please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party(ies):

1. Environmental Impact Assessment is done at PoA level ☐
2. Environmental Impact Assessment is done at JPA level ✗

The negative environmental impacts are not considered to be significant and therefore an environmental impact assessment is not required by the local legislation and therefore not necessary on the programme level. However, on project activity level, environmental impact **assessments will be done as required by BOŚ Bank's internal regulation (No B/23/2009)**.

Internal regulation No B/23/2009 enforces rules on the assessment and monitoring of ecological risk of investments. This regulation provides standard as well as simplified procedures of ecological impact assessment of defined group of projects, which obtain financing from BOŚ Bank's credit lines.

The aim of this regulation was to develop a procedure for defining and minimizing ecological risks of specific investments. The definition of ecological risk is as follows: likelihood of appearance of specific factors, emerging form ecological conditions that may constitute a threat as a customer could fail in meeting his obligations deriving from a credit agreement.

The Main Ecologist or Ecologist of the Branch performs an ecological risk assessment. The outcome of the assessment influences the final credit decision. Within the assessment process, the Main Ecologist scrutinizes all required documentation of the investment (inter alia: construction permit, environmental agreements, agreements with technology suppliers, contractors, builders, material and financial plan,

timelines for payments and corresponding purchases, required licences and concessions, expert reports, evaluations etc.).

The BOŚ Bank's internal process regarding the Environmental Impact Assessment for enterprises and public entities is described in a stepwise Diagram 1 below. Diagram 2 shows stepwise process for private persons as well as households.

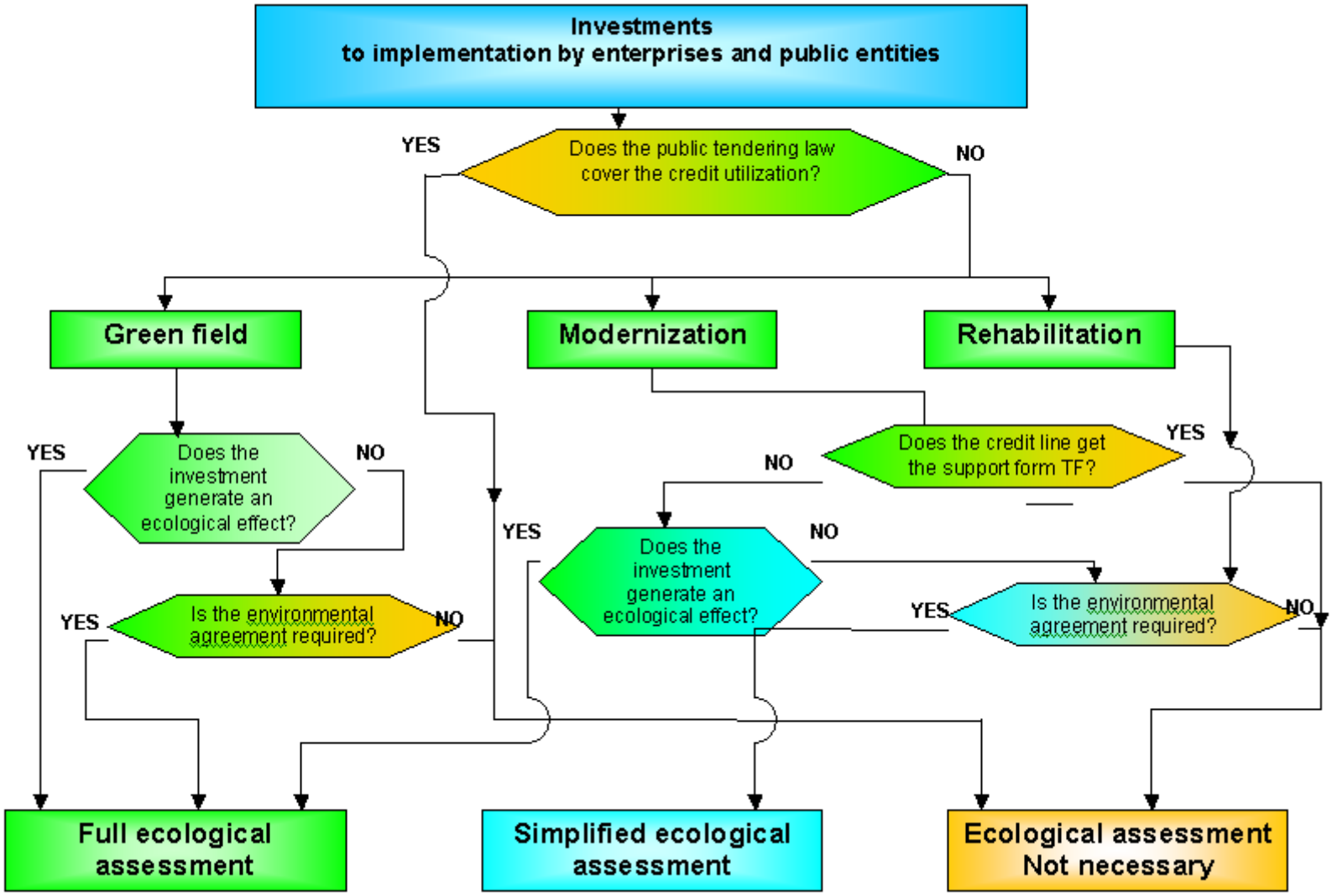

Diagram 1: Stepwise the BOŚ Bank's internal process regarding the Environmental Impact Assessment for enterprises and pubic facilities

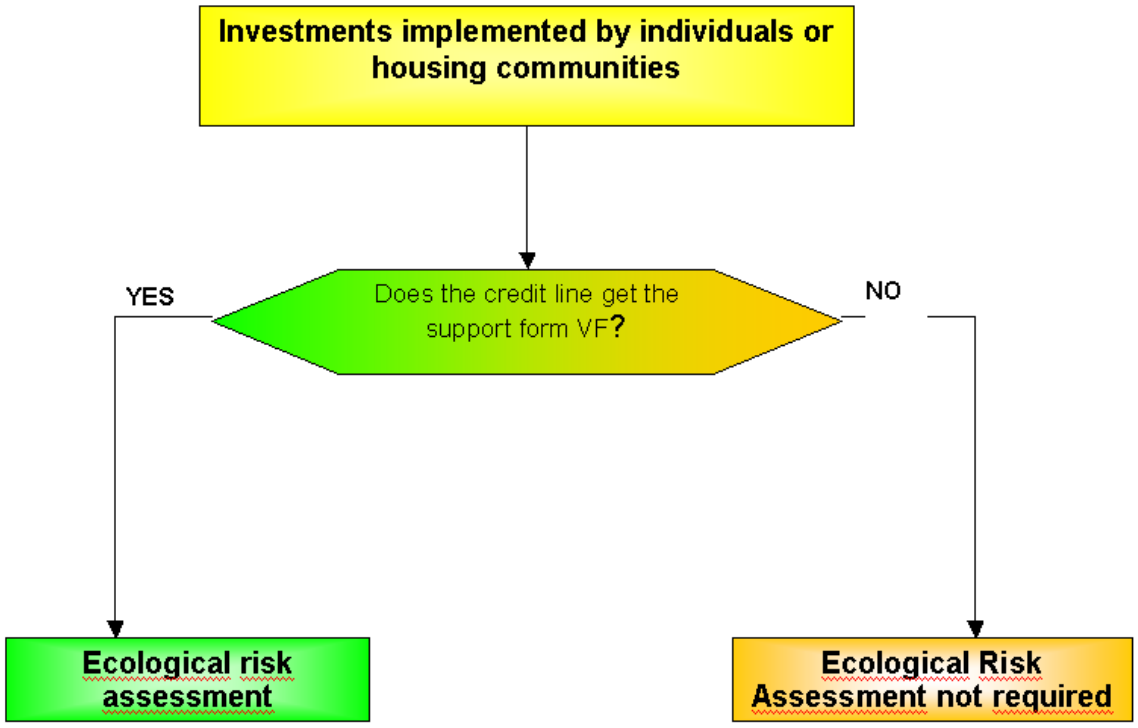

Diagram 2: Stepwise the BOŚ Bank's internal process regarding the Environmental Impact Assessment for individuals and households

SECTION D. Stakeholders' comments

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at JPA level ☐

A local stakeholder process is required neither on PoA level nor on JPA level as confirmed in a meeting with the Polish DFP on 29th of June 2010.

D.1. Information on stakeholders' comments on the JI PoA, as appropriate:

Not applicable.

SECTION E. Application of a baseline and monitoring plan for each technology and /or measure under each type of JPA

E.1. Description and justification of the baseline chosen for each technology and/or measure under each type of JPA:

The "Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories", Version 12.1 describes simplified baseline methodologies for selected small-scale CDM project activity categories, including maximum output[14] of baseline equipment. According to those guidelines project activities including renewable energy equipment the maximum output is as follows:

"(c*) For biomass, biofuel and biogas project activities, the maximal limit of 15MW(e) is equivalent to 45 MW thermal output of the equipment or the plant (e.g. boilers). For thermal applications of biomass, biofuels or biogas (e.g. the cookstoves), the limit of 45 MWth is the installed/rated capacity of the thermal application equipment or device/s (e.g. biogas stoves).* "

Regarding general retrofit measures the following recommendations are made:

"For project activities that seek to retrofit or modify an existing unit or equipment, the baseline may refer to the characteristics (i.e., emissions) of the existing unit or equipment only to the extent that the project activity does not increase capacity or output or level of service unless detailed specifications are provided as part of the indicated methodology. For any increase of capacity or output or level of service beyond this range, which is due to the project activity, a different baseline shall apply."

Furthermore, the UNFCCC provides approved CDM baseline methodology applied to small-scale project activities, which are in general appropriate and applicable.

For the programme activities related with fuel **switch to biomass**, the following category is applicable:

[14] Definition of maximum output according to the "Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories": *"output is the installed/rated capacity, as indicated by the manufacturer of the equipment or plant, disregarding the actual load factor of the plant."*

Main Category:	**Type I –Renewable Energy Projects**
Sub Category:	**C. Thermal Energy for the User with or without Electricity; Version 18, Scope 1 (EB 56)**

The programme of activities uses the baseline approach mentioned in paragraph 13 of the AMS I.C:

"*For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. For calculation the emission factor, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data is not available or demonstrable difficult to obtain."*

However, as the programme activities are very small and the methodologies requires direct measuring of energy use for every participant, the programme developer considers a more general and standardized approach to be applied. **Therefore, this methodology is not applicable.**

For the programme activities related with **energy efficiency improvement combined with fuel switch in buildings**, the following category is applicable:

Main Category:	**Type II. – Energy Efficiency Improvement Projects**
Sub Category:	**E. Energy Efficiency and Fuel Switching Measures for Buildings"; Version 10, Scope 04, EB 35**

As per the methodology "*AMS II E"* version 10, Scope 03, EB35, this category defines measures as follows:

"1. 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.[15]*"*

[15] *"Thus, fuel-switching measures that are part of a package of energy efficiency measures at a single location may be part of a project activity included in this project category."*

The programme at hand is aiming also at energy efficiency measures this criterion is applicable.

The baseline approach mentioned in paragraph 5 and 6 of the AMS II.E is as follows:

"5. The energy baseline consists of the energy use of the existing equipment that is replaced in the case of retrofit measures"

"6. Each energy form in the emission baseline is multiplied by an emission coefficient. For the electricity displaced, the emission coefficient is calculated in accordance with provisions under category I.D. For fossil fuels, the IPCC default values for emission coefficients may be used."

However, as the programme activities are very small and the methodologies requires direct measuring of energy use for every participant, the programme developer considers a more general and standardized approach to be applied. **Therefore, this methodology is not applicable.**

Therefore, the baseline is set in accordance with appendix B of the JI guidelines and further guidance on criteria for baseline setting and monitoring developed by the JISC. In the following the baseline is established on a JI specific basis, thus taking into account relevant national and/or sectoral policies and circumstances as well as uncertainties and using conservative assumptions. Therefore, the following baseline approaches are further applicable in general:

Option 1 - Historical emissions: If the historic situation remains the same, hypothetical emissions are applied from the calculated fuel demand. Every participant shall be considered individually. Within this baseline approach the actually achieved emission reductions are accurately calculated (for more information see Annex 2. Thus, this option approach is most suitable for the preparation of a reference scenario.

Option 2 - Least Cost Alternative: This programme addresses mainly residential customers where the continuation of the existing situations is the most economically reasonable situation as shown under sub step 3a below. Therefore, the Least Cost Alternative approach is not applicable for the conversion of the existing installations.

Option 3 - Benchmark: A comparison with the best 20% of comparable projects is not appropriate here. For the same reasons as described above, the continuation of the existing situation is the most likely scenario. Therefore, applying a benchmark does not make sense.

In consequence, the Option 1: Historical emissions approach is most suitable for the preparation of a reference scenario.

Historical emissions approach is most suitable for the preparation of a reference scenario. Due to the differences in total emissions regarding the installation type as well as in operation lifetimes, the plant-specific emissions will be taken into account. This approach will allow a calculation of the actual emission reductions.

$$BE_y = FC_{BE,fuelold,participanti} \cdot EF_{CO2,fuelold}$$

with:

$FC_{BE,fuel\ old,participanti}$:= Fuel consumption of participant I before implementation of the measures as calculated by the tool

$EF_{CO2,\ fuel\ old}$:= Emission factor of the previous used fuel before implementation as listed in Annex 3

For detail information regarding the model for calculation the emissions reductions please see Annex.

E.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI PoA or the JPA, as appropriate:

The assessment of **additionality analysis** for a typical JPA is performed based on the "*Additionality Tool"* of the CDM Executive Board (Version 05, 2 EB 39). The additionality tool is generally made from perspective of JPoA participant **and** coordinating/ managing entity in order to ensure a wide view of all aspects of the project partners. The general approach of the additionality analysis with information relevant for the PoA is described in this section. Thus, where reasonable the **discussion will take into account both additionality perspectives**, i.e.both

Section E.2.2: Coordinating/managing entity (JPoA level) and

Section E.2.2.: JPoA participants (JPA level)

Furthermore, it is considered that demonstrating the additionality for one JPA is sufficient for the whole programme and no further additionality assessment is to be carried out with the inclusion of further JPAs.

The evaluation of the alternatives is based on economic attractiveness and other critical considerations. The programme proponent carried out a complete analysis among the credible and realistic alternatives (as mentioned above) based on the following key parameters:

1. Possible public funding
2. Legal framework;
3. Possible Barriers;
4. Other important considerations in order to determine the baseline and additionality.

E.2.1. Public funding of the programme of activities relevant for JPoA and JPA level:

Currently, there are just two funding programmes put in place, which could theoretically affect the additionality of the planned PoA. This is firstly the ***Thermo-Modernization Fund (short: TF),*** which was established by law in December 1998.

Table 15: Measures under the Thermo-Modernization Fund

Thermo-Modernization Fund measures are
▪ **Energy demand reduction measures at heating systems of residential and local government buildings.**
▪ Energy loss reduction measures at heat distribution systems or district heating sources.
▪ Link-up measures of so far individually heated buildings to central heating systems.
▪ **Partial or complete switch from conventional to renewable heating systems** or highly efficient cogeneration systems.
Generally eligible for a bonus are efficiency measures at residential buildings like[16]

[16] art. 5 in the act on support of thermo-modernization and rehabilitation measures

▪ **One-family houses,** ▪ **multifamily houses,** ▪ **nursing homes,** ▪ **old people homes/rest houses,** ▪ **workers hotels,** ▪ **dormitories,** ▪ **orphanages,** ▪ **night-shelters for the homeless**
Furthermore, measures seeking funding must achieve a defined efficiency improvement, i.e
▪ Where a previous modernization of the heating system only has been realized, energy demand shall be reduced by at least 10%; ▪ Where a modernization of the heating system has already been realized since 1984, energy demand shall be reduced by at least 15% ▪ Elsewhere heat demand of buildings shall be lowered by at least 25%

Measures fulfilling fund specific criteria as presented in tables 8 are generally eligible for participation in the funds. All bold marked criteria in table 12 apply to the Thermo-modernization funds as well as to the JPAs under the JPoA.

Secondly, there are ***Regional/Voivodshaft Funds (short: VF).*** These funds address similar target groups as the TF. It is only available in certain regions and furthermore has different features defined by the implementing regional funds**.**

Both TF and VF funds provide support to defined groups of voluntary measures in the residential sector. To **exclude eventual double-funding** with these existing schemes, the participants of the JPoA accept within the participation agreement to indicate any subsidies received for the respective measure which shall be implemented during the crediting period. The exclusion modalities for participation are determined in the PDD at hand (cf. participant criteria) and will be furthermore indicated and explained in the supplementary agreement. It is regulated, that in order to qualify for this JI project, JPoA **participants must not use any public subsidies for the implementation of the activities** (cf. Table 5 of A.4.3). This issue will be checked by BOS already during the first application phase for a credit line for every participant.

E.2.2: Additionality from the perspective of the coordinating/managing entity (JPoA level):

Step 1: Identification of alternatives to the programme of activities consistent with current laws and regulations

Regarding the planned JI-Project, the following alternatives have been identified:

Alternative 1. Status quo

The coordinating/managing entity has not up to now implement any JI project and does not provide incentives to implement replacement of the installations for steam or hot water generation with fuel switch to natural gas/oil or biomass as well as replacement of natural gas/oil boilers without fuel switch within the scope of existing incentive programmes. Since there are no legal requirements to do so, this status quo would be a realistic alternative.

Alternative 2. Increased incentive for fuel switch and/or efficiency measures without a programme

The coordinating/managing entity does not implement any JI project, but provides other incentives to implement the efficiency increase activities such as boiler replacement without fuel switch beyond the scope of existing programmes. Here again no national or state specific legal or other obligation enforces such incentives.

All alternative investments are in compliance with the mandatory applicable legal and regulatory requirements in Poland.

Step 3+4: Barrier analysis/Common practice analysis

From the perspective of the coordinating/managing entity the following investment barriers exist:

- High expenditure for the preparation and implementation of the programme, as well as for payment of the incentive;
- Additional expenses connected with the payment of an incentive to JPoA participants of the incentive program;

The first status quo alternative (no JI related payment for replacement or modernization of the steam/hot water installation and/or fuel switch to natural gas or biomass) is not affected by the mentioned barriers. From the perspective of the coordinating/managing entity the main reasons are as follows:

- No obligation to provide incentives to promote fuel switch and increase energy efficiency;
- No additional expenses necessary.

Furthermore, the BOŚ Bank has never provided subsidies in any form to any pro-environmental investments it helps financing. It is common practice that BOŚ acts as a subsidiary of different funds (e.g. TF, VF or NFOŚiGW) but conditions of such programs are developed by respective authorities of the subsidy provider. Within such cooperation only the donor has the right to approve that the investment conforms to eligibility criteria. Therefore, this is not relevant for the targeted measures at all. Therefore, it can be stated that the programme is not common practice in Poland.

Outcome of Additionality analysis for JPoA:

It can be stated, that due to its features (no legal obligation, not affected by the barriers mentioned) the status quo alternative must represent the baseline of the JPoA project.

E.2.3. Additionality from the perspective of typical JPA (JPA level):

Step 1: Identification of alternatives to the programme of activities consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

Regarding potential JPAs, the following two alternatives have been identified:

Alternative 1. Status quo

The current situation is continued, i.e. there is no change in existing fossil fuelled systems; thus

- no modernization or replacement of boilers including possible installation heat pumps is conducted (TM1);
- no insulation measures are to be implemented (TM2);
- no solar water boilers are to be installed (TM3).

Alternative 2. Programme scenario without JI income – implementation of energy efficiency measures (TM1, TM2, TM3), i.e.

- boiler renewal with or without fuel switch/heat pump installation (TM1);
- insulation measures (TM2);
- installation of solar water heating (TM3).

In this second scenario one or several of the above mentioned measures are implemented.

Sub-step 1b: Consistency with mandatory laws and regulations:

The following three laws are relevant and thus considered here:

Regulation of the Council of Ministers of July 16, 2002 (OJ No 120, item 1269 with amds.)

The Act of Parliament indicates the types of devices, which are subjected to periodic technical inspection in order to continue operating. UDT - Inspection Body, working under the Act, shall fulfil these technical inspections. The compliance with this regulation is ensured by the Participant criteria and Supplementary agreement.

Directive on Energy Performance of Buildings in Poland, valid as of 1 January 2009

By means of the directive it was intended to create strong support for thermo-modernization by making energy certification mandatory. Thus, the purchaser of a building would be informed on the efficiency standards of the respective estate via a certificate, which is not older than 10 years.

However, according to many experts, the policy design suffers from substantial flaws. In fact while the implemented legal framework defines an obligation by the property owner (hold and present energy efficiency certificate to the seller) it fails to address the question of penalties in case of non-compliance. Firstly purchase agreements are not negatively affected by the inexistence of such a certificate.[17] As a consequence even the National Council of Notaries advises its members only to take notice of the certificate if the purchaser requests it.[18] Only in case of new buildings (not within the project boundaries) the directive is better enforced as here the investor does only obtain the utilization permit if he also holds the certificate.[19]

Professor Tomasz Skoczkowski, the chairman of The Polish National Energy Conservation Agency, describes the status of energy certificates as a tragedy. From his perspective the legislators had ignored them by not paying attention to the actual implementation and accountability.[20] Furthermore, the knowledge about the directive in the general public is very poor.[21]

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[17] "Energieeffizienz in Polen", presentation by AHK (German Chamber of Industry and Commerce in Poland) at fair *Bauen + Energy 2009* in Frankfurt Oder, date: 13 March 2009; www.ihk-ostbrandenburg.de/res.php?id=5077 (access on 17 Sept. 2009).

[18] "Energy Certificates in practice", Article by Monika Pojadlowicz, (Property Management Institute), 04 July 2009;

http://www.cire.pl/item,38225,2,swiadectwa_energetyczne_w_praktyce.html (access on 21 Sept. 2009);

"Transfer of property without energy certificates practicable", Official statement of the Warsaw Chamber of Civil Law Notaries, published on 17 December 2008; http://www.notariusze.pl/informacje_dla_prasy.php

[19] "Energy Certificates without mystery" a repertory of opinions, views and judgments of experts, http://doradcaenergetyczny.pl//content/blogcategory/7/14/ , 22 January 2009. I recommend you the last part of this elaboration; it refers to methods of counting energy factors of buildings. Mr. Jan Król, expert from Lebiedź Consulting explains how and why it is difficult to apply those methods in practice. I am not keen on technical aspects of this issue therefore it is hard to me to make a short summary of this problem. In my opinion we should include some arguments to PDD.

[20] "Discredit of Energy certificates for buildings", article by Tomasz Skoczkowski, http://www.wnp.pl/wiadomosci/t-skoczkowski-kape-kompromitacja-ze-swiadectwami-energetycznymi-budynkow,82040_1_0_0_0.html, 08 June 2009;

"Energy and Building" – list of mistakes and failures in Decree of the Minister of Infrastructure dated on 06 of November 2008, http://www.śe.pl/?p=28 – abstract of the article.

[21] "Internet users about certificates" – Energetic Advisor 3/2009, abstract available at: http://doradcaenergetyczny.pl//content/view/553/14/ ,

Act on Energy Efficiency

Currently, there is only a draft of legislation (*Act on Energy Efficiency*), which was supposed to come into force on 1 January 2010. This law was foreseen to address efficiency improvements in the energy consumption (besides improvements in production and distribution). Concrete measures for 9 consecutive years shall be determined every three years in legislative acts.[22]However, this Act has not been implemented. And no further information is available regarding timeline for implementation.

Furthermore, currently, all legal regulations relevant for the programme at hand are taken into account. In case new legislations or regulations come in the time frame of the programme, the relevance for the participants and the programme will be checked within the eligibility criteria as well as the "Supplementary agreement".

Outcome of Step 1a and 1b: All alternative investments are in compliance with the mandatory applicable legal and regulatory requirements in Poland. At the same time there is no effects from mandatory requirements regarding the use of any technology scenario (cf. E.1 where baseline is discussed in face of systematic non-implementation of the Energy Directive). Therefore, every future JPoA participant may freely chose between the different scenarios.

Step 3: Barrier analysis

[22] Presentation by AHK (German Chamber of Industry and Commerce in Poland) at fair *Bauen + Energy 2009* in Frankfurt Oder, date: 13 March 2009; www.ihk-ostbrandenburg.de/res.php?id=5077 (access on 17 Sept. 2009).

The paper "Guidelines for objective demonstration and assessment of barriers"[23] provides guidelines for assessing additionality by proving quantitative approaches to the demonstration of barriers. According to the guidelines, exemplary calculations can be provided to show the additionality. Please see further below the exemplary calculations different implemented measures.

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed Programme of activities

Investment Barriers:

Currently investments in the targeted group in Poland suffer from the following unfavourable conditions for financing:

- high interest rates (typical interest rates for measures implemented under the thermo-modernization fund are 8.5%, see examples below)
- short loan maturity times (e.g. 7 years for measures implemented under the regional fund; for TF it varies between 7 and 10 years, however 10 is very rare)
- difficult access to credit lines for people with weaker incomes.

All technologies and measures included in this PoA require relevant amounts of investments and the cost savings due to less energy costs help financing the investment generally only over long time periods (see examples below). Therefore, credit lines with long maturities are needed at least for people who can not afford to pay back the loan in short time frames. Existing subsidy programs like thermo-modernization fund cannot eliminate this barrier as they subsidize part of the investment costs but the interest rates remain still high and make the investment only attractive if it can be paid back in short time frames. Furthermore the maturity of credits under the VF is limited to 7 years only.

Incentives to overcome the barrier:

The approach to eliminate the investment barriers under the JI programme will be as follows:

[23] "Guidelines for objective demonstration and assessment of barriers", 50th EB Meeting Report, Annex 13.

- lowering the interest rates by use of expected JI revenues (exact amount has still to be determined but will likely be in the range of one percentage point lowering);
- skipping/lowering (depending on the client category) any fees by use of expected JI revenues (e.g. current fees under the BGK thermo-modernization fund are as follows: Initial fee: 0.1% min. 100 max. 500PLN, preparation fee: 1.5%, BGK grant fee: 0.6%);
- increasing access to credit lines to people with less credit worthiness (lowered volume of own capital from 30% to 15%);
- providing longer maturities than current loans (10 years or longer in individual cases);

The programme is focused on target groups that are dependent on longer running credit lines where such energy efficiency wouldn't be implemented, as they have no access to attractive credit lines. As the participation in the JI programme is restricted to activities where no other subsidies like thermo-modernization fund are received, the attractiveness of the JI programme is mainly limited to this target group. Under this approach, it can be excluded that measures that would have been implemented anyway by the use of existing subsidy programs will join the JI programme as the direct subsidies of the thermo-modernization fund will remain more attractive to people who can quickly pay back the loans.

Exemplary calculations for implemented measures:

In the following some exemplary calculations show the necessary investment costs for each of the categories under this JI programme. The calculations are based on recently implemented measures under the thermo-modernization fund:

TM1: boiler replacement:

Short description: one family house placed in Radom, fuel switch from coal to gas - replacement of two boilers: heating coal boiler and small gas boiler used for warm water preparation with one bi-functional condensing gas boiler.

Table 16: TM 1: coal to gas switch

Basic data[24]		**gas boiler**	**coal boiler**
Period of assessment	a	10	
Interest rate	%/a	8.5%	
Fuel costs	PLN/kWh	0.14[25]	0.08[26]
Technical data		gas boiler	coal boiler
Utilization ratio of the boiler	%	97%	60%
Total heat demand	kWh/a	42,375	42,375
fuel demand coal	kWh/a		57,292
fuel demand gas		43,686	10,000
Investment		gas boiler	coal boiler
Total Investment	PLN	12,446	
Costs		gas boiler	coal boiler
Capital costs	PLN	1,897	
Fuel costs	PLN/a	6,235	6,260
Total annual costs	PLN/a	8,132	6,260

[24] If not indicated different, all data are obtained from an earlier credit line assessment of the specific case

[25] source: eurostat: Residential natural gas prices for first semester 2009

[26] source: http://www.kopalnia.com.pl/cennik.htm

TM2: thermo-modernization

Short description: a block of flats owned by a small housing community, placed in Nowa Iwiczna city, thermo-modernization, bi-functional gas boilers in each flat.

Table 17: TM 2: thermo-modernization of building, gas boiler

Basic data[27]		**modernized building**	**before modernization**
Period of assessment	a	20	20
Interest rate	%/a	8.5%	
Fuel costs	PLN/kWh	0.14[28]	0.14
Technical data		mod. building	before mod.
Total heat demand	kWh/a	258,738	348,889
Required fuel for the boiler	kWh/a	401,497	541,389
Investment		mod. building	before mod.
Total Investment	PLN	481,236	
Costs		mod. building	before mod.
Capital costs	PLN	50,853	
Fuel costs	PLN/a	57,307	77,274
Total year costs	PLN/a	108,159	77,274

[27] If not indicated different, all data are obtained from an earlier credit line assessment of the specific case

[28] source: eurostat: Residential natural gas prices for first semester 2009

TM3: solar water heating

Short description: one family home, 150m², estimated gas savings of 1,200m³/a.

Table 18: TM3: solar water heating, replacing natural gas

Basic data[29]		**with solar**	**without solar**
Period of assessment	a	10	
Interest rate	%/a	8.5%	
Fuel costs	PLN/kWh	0.14[30]	0.14
Technical data		with solar	without solar
Total heat demand	kWh/a	0	12,000
Investment		with solar	without solar
Total Investment	PLN	15,416	
Costs		With solar	without solar
Capital costs	PLN	2,350	
Fuel costs	PLN/a		1,713
Total year costs	PLN/a	2,350	1,713

[29] If not indicated different, all data are obtained from an earlier credit line assessment of the specific case

[30] source: eurostat: Residential natural gas prices for first semester 2009

Real Case: combination of TM 1 and TM 2 (see Annex 2 for details)

Table 19: real case calculation

Basic data		**modernized building**	**before modernization**
Period of assessment	a	20	20
Interest rate	%/a	8.5%	
Fuel costs	PLN/kWh	0.14[31]	0.14
Technical data[32]		mod. building	before mod.
Total heat demand	kWh/a	32,046	59,907
Required fuel for the boiler	kWh/a	35,528	79,857
Investment		mod, building	before mod,
Total Investment	PLN	75,000[33]	
Costs		mod, building	before mod,
Capital costs	PLN	7,925	0
Fuel costs	PLN/a	5,071	11,398
Total year costs	PLN/a	12,996	11,398

[31] source: eurostat: Residential natural gas prices for first semester 2009

[32] see Annex 2 for details about heat and fuel demand calculations

[33] estimation based on statement for credit application

Examples in all categories show that investment costs are a very relevant parameter compared to the yearly fuel costs. Due to the low fuel costs all examples need additional financial support to get economically more attractive than in the status quo scenario.

Lowering of interest rates plays an important role for all considered measures. In case of the thermo-modernization example TM2, lowering the interest rate by one percentage point would result in a yearly cost reduction of 3,647 PLN/a. This would increase the attractiveness relevant and adds to the yearly fuel costs savings an additional yearly saving of 7% of capital costs. In the solar thermal case TM3 the yearly fuel costs savings would be complemented by an additional yearly saving of 104 PLN/a, equivalent to 4% of capital costs. In case of boiler replacement TM1 there are no fuel cost savings due to the fuel switch from coal to gas. Nevertheless a reduction of 1% in the interest rate would compensate for nearly 9% of the yearly fuel cost increase.

In summary it can be stated that making the loan conditions as attractive as possible by the use of JI revenues is a requirement if the investment barriers in this sector shall be eliminated.

Outcome of sub-step 3a: In summary it can be stated, those investment barriers are one of the main barriers. Furthermore, the chosen measures without any legal requirements are not common practice.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives under Step 1

The first status quo alternative number 1 (continuation of operation of the old system) is not affected by the mentioned barriers. From the perspective of all JPoA participants the main reasons are as follows:

- No legal obligation for fuels switch to natural gas or biomass (in case of contracting) and replace or modernize steam/hot water boilers;
- No necessary investment costs for energy supply and demand (instead investments in key business!);
- No technical enforcement to replace the steam and hot water boilers;

Step 4: Common Practice Analysis

The goal of the JI project activities is to implement technologies, which could be respectively common practice, in order to cut emissions to zero and to save energy and costs.

Sub-step 4a: Analyse other activities similar to the proposed programme of activities:

TM1: Fuel switch to biomass:

The market share of biomass in the commercial and industrial heating segment is still small. A survey about renewable energies in Poland states the overall contribution of biomass in the heating segment at 3.7 % in 2004.[34] The majority of this contribution is mainly by individual heating systems, in some co-generation plants and local central heating systems. As stated in L.J. Nilsson et al. / Energy Policy 34 (2006), nearly all investment in industrial and district heating applications using biomass have been made with investment subsidies.

TM1: Fuel switch to natural gas/or oil or replacement of natural gas/or oil installations without fuel switch:

According to the European Commission study solid fuels dominate greatly in the primary energy supply with a share of 58%. Furthermore, the share of oil is about 24%. The market share of natural gas is smallest compared with all the other conventional fuels, with only 13%. [35]

[34] "Renewable Energy Sources in Poland-Conditions and Possible Developments", Lidia Gawlik, Eugeniusz Mokrzyck, Roman Ney, Mineral and Energy Economy Research Institute, Krakow, Poland

[35] "Poland-Energy Mix Fact Sheets", European Commission Energy, http://ec.europa.eu/energy/energy_policy/doc/factsheets/mix/mix_pl_en.pdf

TM1: Heat pumps:

The contribution of heat pumps technologies to the heating segment is still very small. A survey about renewable energies in Poland states the overall contribution of all renewable energy sources in the heating segment at about 5% in 2004, from which 92% are covered from biomass.[36]

TM2: Thermo-modernization:

According to a publication by EcoFund Poland Most buildings in Poland are not sufficiently protected from heat loss from building interiors. The building regulations in force in previous years laid down rather undemanding requirements, which were not observed anyway. Therefore, the building 'shell' i.e. external walls, ceilings of the top stories under lofts or roof slabs and basement ceilings or floor slabs placed on the ground, let much more heat out then currently acceptable."[37]

TM3: Solar water heating:

According to a paper Konferencje_9th Solar Symposium: the "contribution of solar heat to the total heat supply is still negligible". Therefore, solar water heating cannot consider as common practice in Poland.

Sub-step 4b: Discuss any similar options that are occurring

TM1: Fuel switch to biomass

Taking into account the consideration described above under sub-step 4a, it can be stated that the programme activities is not common practice in the considered market segment and **sub-step 4b** can be skipped regarding biomass installations.

[36] "Renewable Energy Sources in Poland-Conditions and Possible Developments", Lidia Gawlik, Eugeniusz Mokrzyck, Roman Ney, Mineral and Energy Economy Research Institute, Krakow, Poland

[37] "Environmental Protection in Practice. 15 years of Polish EcoFund", p. 36, Maciej Nowicki et al. (ed.), Warsaw 2007.

TM1: Fuel switch to natural gas/or oil or replacement of natural gas/or oil installations without fuel switch

Taking into account the consideration described above under sub-step 4a, it can be stated that the programme activities is not common practice in the considered market segment and **sub-step 4b** can be skipped regarding natural gas and oil installations.

TM 1: Heat pumps

Taking into account the consideration described above under sub-step 4a, it can be stated that the programme activities is not common practice in the considered market segment and **sub-step 4b** can be skipped regarding natural gas and oil installations.

TM2: Thermo-modernization

Taking into account the consideration described above under sub-step 4a, it can be stated that the programme activities is not common practice in the considered market segment and **sub-step 4b** can be skipped regarding natural gas and oil installations.

TM 3: Solar water heating

Taking into account the consideration described above under sub-step 4a, it can be stated that the programme activities is not common practice in the considered market segment and **sub-step 4b** can be skipped regarding natural gas and oil installations.

Outcome of Step 4: In summary, it can be stated that the considered technologies are state of art and therefore the programme activities cannot be considered as common practice from the perspective of either programme participant or coordination/managing entity.

Outcome of additionality analysis:

It can be stated, that due to its features (no legal obligation, not affected by the barriers mentioned) the status quo alternative (alternatives 1 and 3) must represent the baseline of the JPoA project.

E.3. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline for each technology and/or measure under each type of JPA:

Name of entity setting the baseline information: FutureCamp Climate GmbH

FutureCamp Climate is not a project participant.

Version: 07

The date of completion: 04/07/2011

Table 20: Contact information of entity setting the baseline

Organisation:	FutureCamp Climate GmbH
Street:	Aschauer Str. 30
Postcode & Town:	81549 München
Country:	Germany
Represented by:	
First , surname:	Thomas Mühlpointner
Position:	Project Manager
Fax:	
Tel:	+49 (089) 45 22 67 35
E-Mail:	Thomas.Muehlpointner@future-camp.de

E.4. Description of monitoring plan chosen for each technology and/or measure under each type of JPA:

For each activity, strict application of requirements is assured by applying the participation criteria, described under Section A, in Annex 4 and Annex 5.

The monitoring plan chosen for each type of JPA has been developed by BOŚ and FutureCamp Climate. The calculation of emission reductions will be performed for all JPAs based on historic and estimated fuel consumption (**ex-ante calculation**). There will be a differentiation of family houses and other buildings regarding the used tool for fuel consumption calculations. For further details please see descriptions in Option A and Option B below.

Option A: Monitoring of CO_2 emission reduction for one to two family houses:

The monitoring plan for one to two family houses is based on a simplified assessment method to compile an energy profile for buildings developed by the "Institut Wohnen und Umwelt GmbH" on behalf of the "Federal office for building and regional planning" (Bundesamtes für Bauwesen und Raumordnung).[38] This method comprises a calculation tool for the heat demand of buildings considering data of the building and the heating system and new developed simplified standard proceedings for energy demand calculations. The tool and its parameter have been developed based on the German residential building stock but climatic data from Warsaw will be utilized for this programme instead of German climate data. As the German standard of buildings is in general higher than Polish standard, the estimation of baseline emissions is conservative and may underestimate the real energy demand. The tool has been adjusted according to the programme requirements. Please see Annex 4.for further information about the method and the adjustments.

The required data will be collected ex-ante within the loan application process by BOŚ consultants from the clients. The calculation tool "short-cut method energy profile"[39] will be filled out together with the client. After entering all necessary input data, fuel consumption and emissions reduction will be calculated automatically.[40] Within the tool there are two separate entry forms to be filled out, one for the building (thermal envelope) and the other for the heating system. For the JPA type one to two family houses, both sheets have to be filled out. The calculation results in the total heat demand of the building and the fuel demand for the heating system. Emissions will be then calculated by applying fuel specific emission factors[41] to the calculated fuel demand. The data will then be stored

[38] Bundesamtes für Bauwesen und Raumordnung, http://www.iwu.de/de/forschung/energie/abgeschlossen/kurzverfahren-energieprofil/

[39] based on "simplified data collection method for the assessment of the energy performance of residential buildings", developed by "Institut Wohnen und Umwelt GmbH" on behalf of the "Federal office for building and regional planning" (Bundesamtes für Bauwesen und Raumordnung)

[40] For detailed information see the scientific report: http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

[41] Source: "Zuteilungsverordnung ZuV2012", Annex 1

in a central database with indication of the type of JPA. Please see Annex 4 for detailed information regarding monitoring information. Detailed information on standard values is given in Annex 3.

The calculation of baseline emissions will be performed with historical data about the building and the heating system. For project emissions, the planned activities will be added to the tool and the difference of the results presents the annual emissions reduction. The monitoring parameters are listed table E.4.1. below.

Option B: Monitoring of CO_2 emission reduction for other buildings:

The monitoring plan for other buildings is based on the energy audit and renovation audit according to the ordinance of the Polish Minister of the Infrastructure of 17th March 2009 (OJ No 43, item 346). The ordinance regulates and describes the detailed scope and form of the energy audit and renovation audit, the template of the audit cards and the formula of the thermo- modernization undertaking profitability assessment The outcome of the audit is a so called "building's energy audit" - a synthetic combination of essential information on: the building, its energetic parameters and energy audit outcome, which is the heat demand of the building and the fuel demand of the heating system. This sheet together with the detailed information regarding the whole audit, including background data, used emission factors, formula, specific calculations, will be provided to BOŚ Bank by the JPA.

The JPA is responsible to provide the audit, which needs to be performed or verified by certified auditors. BOŚ Bank recommends members of the Energy Auditors Association[42]. However, also other certified auditors are possible. The JPA has to provide within the loan application process the "building's energy audit sheet" together with detailed information regarding the whole audit, including background data, used emission factors, formula, specific calculations to the BOŚ consultants. The calculation of baseline emissions will be performed with historical data about the building and the heating system. For project emissions, the planned activities need to be analysed during the energy audit and the difference of the results presents the annual emissions reduction. Further information about the energy audit is provided in **Annex 3** and **Annex 4**.

[42] see Energy Auditors Association, http://www.zae.org.pl/

E.4.1. Option 1 – Monitoring of the emissions in the JPA scenario and the baseline scenario:

E.4.1.1. Data to be collected in order to monitor emissions from the JPA, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to E.5.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e), registered (r), standard (s)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	Name and address of the owner	Tool		r	Once at registration		Electronic database	
2	Address of the building	Tool		r	Once at registration		Electronic database	
3	Number of storey proper	Tool	No.	r	Once at registration		Electronic database	*For family houses only*
4	Number of apartments	Tool	No.	r	Once at registration		Electronic database	*For family houses only*
5	Heated living space	Tool	m^2	r	Once at registration		Electronic database	*For family houses only*
6	Year of construction of the building	Tool	year		Once at registration		Electronic database	*For family houses only*
7	Clear room height (ca.)	Tool	m	r	Once at registration		Electronic database	*For family houses only*
8	Surrounding	Tool		r	Once at		Electronic	*For family*

	neighbouring buildings				registration		database	*houses only*
9	Plan view of construction	Tool		r	Once at registration		Electronic database	*For family houses only*
10	Characteristic of attic heating	Tool		r	Once at registration		Electronic database	*For family houses only* Same as in baseline
11	Dormer or other roof structures existing	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only* Same as in baseline
12	Characteristic of basement heating	Tool		r	Once at registration		Electronic database	*For family houses only* Same as in baseline
13	Construction design of roof, top floor, exterior walls and ground floor – project case	Tool		r	Once at registration		Electronic database	*For family houses only* Massive or wood
14	Supplementary insulation of roof, top floor, exterior walls and ground floor – project case	Tool	Size in [cm] and % from area	r	Once at registration		Electronic database	*For family houses only*
15	Year of windows	Tool	Year	r	Once at		Electronic	*For family*

	installation – project case				registration		database	*houses only*
16	Characteristic of windows – project case	Tool		r	Once at registration		Electronic database	*For family houses only* Wooden window (simply glazed), wooden dual glazed window, plastic dual-pane glazing window, aluminium or steel dual-pane glazing window
17	Type of boiler – project case	Tool		r	Once at registration		Electronic database	*For family houses only* Constant, gliding, condensing
18	Fuel type boiler – project case	Tool		r	Once at registration		Electronic database	*For family houses only* Gas, heating oil, wood chips/pellets
19	Year of construction of boiler – project case	Tool	year	r	Once at registration		Electronic database	*For family houses only* Till 1986, 1987-1994, from 1995
20	Insulation standard (year) – project case	Tool		r	Once at registration		Electronic database	*For family houses only*

								50s-70s (with or without additional insulation), 80s-90s, newest standard
21	Electrical heat pump – project case	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only* In the tool there are more parameters, but they do not have any influence on the calculation of project emissions as the electricity input is multiplied by an emission factor. of zero anyway. Therefore, it is not necessary to monitor further sub-parameters in this case.
22	District heating – project case	Tool		r	Once at registration		Electronic database	*For family houses only* Only eligible, if no CHP – (boiler/heat plant or CHP)

23	District heating – connected to EU-ETS installations - project case (see Annex 5)	supplementary agreement	Y/N	r	Once at registration		Electronic database	*
24	District heating – fuel source - project case (see Annex 5)	supplementary agreement	type	r	Once at registration		Electronic database	If biomass, project emissions are zero
25	Apartment heating (gas-floor heating) – project case	Tool	Y/N year	r	Once at registration	Only if applicable	Electronic database	*For family houses only* Year of construction (till 1995 or from 1995 on)
26	Apartment heating – condensing boiler – project case	Tool	Y/N	r	Once at registration	Only if applicable	Electronic database	*For family houses only*
27	Room heating – project case	Tool		r	Once at registration	Only, if applicable	Electronic database	*For family houses only* Single stove, gas heater, electro heaters or night storage heater
28	Fuel type for single room heating stove –	Tool		r	Once at registration	Only, if applicable	Electronic database	*For family houses only* Heating oil, coal,

	project case							wood
29	Type of hot water generation – project case	Tool		r	Once at registration		Electronic database	*For family houses only* See tool
30	Construction year of hot water system – project case	Tool		r	Once at registration		Electronic database	*For family houses only* till 1995 or from 1995 on
31	Hot water circulation – project case	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only*
32	Thermal solar plant – project case	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only*
33	Hot water generation - Insulation standard heat distribution – project case	Tool		r	Once at registration		Electronic database	*For family houses only* 50s-70s, 80s-90s, newest standard (with or without additional insulation)
34	Fuel source new installation	Supplementary agreement	Type	r	Once at registration		Electronic database	For other buildings only
35	$EF_{CO2,\ fuel\ new,\ participanti}$ Specific emission factor for the used fuel(s) – project	Fixed value, ex ante definition; Standard, see Annex 3.	tCO_2/ GJ	s	Automatically given in database		Electronic database	

	case							
36	$FC_{PJ,fuel\ new,participant\ i}$, fuel consumption calculated by the tool – project case	Tool	kWh/a GJ (based on net calorific value)	c	Once at registration		Electronic database	
37	PE_{HFC} HFC emissions from heat pump	Standard, see E.4.1.2.	$kgCO_2eq/a$	c	Annually	Only for participants with heat pumps	Electronic database	
38	Date of implementation of measure(s) (see Annex 5)	participant information	date	r	after implementation		Electronic database	

* Currently, in Poland a new National Allocation Plan has been approved April 19, 2010, in which JI reserves for installations under the EU-ETS system are foreseen. According to the new legislation dated from 21/06/2011 JI reserves are taken into account in the National Allocation Plan. This allows to consider emissions reductions within EU-ETS installations (double counting).

As JI reserves are included in the Polish legislation, buildings connected to district-heating grids with connection to EU-ETS installations will not be excluded from the programme and therefore will generate ERUs. These emissions reductions will be monitored separately.

E.4.1.2. Description of formulae used to estimate JPA emissions (for each type, gas, source etc.; emissions in units of CO_2 equivalent):

$$PE_y = FC_{PJ,fuelnew,participanti} \cdot EF_{CO2,fuelnew} + PE_{HFC}$$

with:

$FC_{BE,fuel\ new,participanti}$:= Fuel consumption of participant I after implementation of the measures as calculated by the tool

$EF_{CO2,\ fuel\ new}$:= Emission factor of the used fuel after implementation as listed in Annex 3

PE_{HFC} = Project emissions in case of installation of heat pumps, if no heat pumps are installed, emissions would be zero.

In case of electrical heat pumps, there are no direct CO_2 emissions generated, only indirect emissions, which almost exclusively occur in power plants, which are subject to emissions trading. In order to avoid double counting these emissions shall not be included in the project boundaries.

However in some heat pump systems as working fluid HFCs are used. They are exhausted during the operation and have a high Global Warming Potential (GWP). Often the HFC blends R 404A (GWP: 3,260), R 407C (GWP:1,525) and R 410A (GWP: 1,725) are used or the HFC R134a (GWP: 1,300) (Source GWP: http://www.grida.no/climate/ipcc_tar/wg3/144.htm). Most manufacturers use volumes of 2-4kg. German Federal Environmental Agency (UBA) in its annual report HFC assumes, that the leakages rate is ca. 2% (Source: UBA 2004: Fluorierte Treibhausgase in Produkten und Verfahren). Therefore, the maximum annual emissions from a heat pump using 4kg of R 404A amount to ca. **260 $kgCO_2eq/a$.** This value is applied as a conservative maximum value to consider HFC emissions for heat pump applications. (see formula above).

E.4.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the JPA boundary, and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e), registered (r), standard (s)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
39	Name and address of the owner	Tool		r	Once at registration		Electronic database	
40	Address of the building	Tool		r	Once at registration		Electronic database	
41	Number of storey proper	Tool	No.	r	Once at registration		Electronic database	*For family houses only*
42	Number of apartments	Tool	No.	r	Once at registration		Electronic database	*For family houses only*

43	Heated living space	Tool	m²	r	Once at registration		Electronic database	*For family houses only*
44	Year of construction of the building	Tool	year		Once at registration		Electronic database	*For family houses only*
45	Clear room height (ca.)	Tool	m	r	Once at registration		Electronic database	*For family houses only* Only if the room height is <2.3 or > 2.7
46	Surrounding neighbouring buildings	Tool		l	Once at registration		Electronic database	*For family houses only* Non, from one side or from both sides
47	Plan view of construction	Tool		l	Once at registration		Electronic database	*For family houses only* Compact or elongate/angulate/complex
48	Characteristic of attic heating	Tool		l	Once at registration		Electronic database	*For family houses only* Flat roof, hot heated, partly heated or completely heated
49	Dormer or other roof structures existing	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only*
50	Characteristic of basement heating	Tool		l	Once at registration		Electronic database	*For family houses only* Without, not heated, partly heated, or completely heated
51	Construction design of roof,	Tool		l	Once at registration		Electronic database	*For family houses only* Massive or wood

	top floor, exterior walls and ground floor- baseline							
52	Supplementary insulation of roof, top floor, exterior walls and ground floor - baseline	Tool	Size in [cm] and % from area	r	Once at registration		Electronic database	*For family houses only*
53	Year of windows installation - baseline	Tool	Year	r	Once at registration		Electronic database	*For family houses only*
54	Characteristic of windows - baseline	Tool		l	Once at registration		Electronic database	*For family houses only* Wooden window (simply glazed), wooden dual glazed window, plastic dual-pane glazing window, aluminium or steel dual-pane glazing window
55	Type of boiler old system	Tool		l	Once at registration		Electronic database	*For family houses only* Constant, gliding, condensing
56	Fuel type boiler old system	Tool		l	Once at registration		Electronic database	*For family houses only* Coal, gas, heating oil
57	Year of construction of boiler old	Tool	Year	r	Once at registration		Electronic database	*For family houses only* Till 1986, 1987-1994,

	system							from 1995
58	Insulation standard (year) old system	Tool		l	Once at registration		Electronic database	*For family houses only* 50s-70s (with or without additional insulation), 80s-90s, newest standard
59	Electrical heat pump	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only* If yes, no participation is possible
60	District heating – project case	Tool		l	Once at registration		Electronic database	*For family houses only* Only eligible, if no CHP – (boiler/heat plant or CHP)
61	District heating – connected to EU-ETS installations - project case (see Annex 5)	supplementary agreement	Y/N	r	Once at registration		Electronic database	*
62	District heating – fuel source - project case (see Annex 5)	supplementary agreement	type	r	Once at registration		Electronic database	Only eligible, if not biomass or other renewable energy source
63	Apartment heating (gas-floor heating) old system	Tool	Y/N year	l	Once at registration	Only if applicable	Electronic database	*For family houses only* Year of construction (till 1995 or from 1995 on)
64	Apartment heating old system – condensing	Tool	Y/N	r	Once at registration	Only if applicable	Electronic database	*For family houses only*

	boiler							
65	Room heating old system	Tool		l	Once at registration	Only, if applicable	Electronic database	*For family houses only* Single stove, gas heater, electro heaters or night storage heater
66	Fuel type for single room heating stove old system	Tool		l	Once at registration	Only, if applicable	Electronic database	*For family houses only* Heating oil, coal, wood
67	Type of hot water generation - old system	Tool		l	Once at registration		Electronic database	*For family houses only* See tool
68	Construction year of hot water system - old system	Tool		l	Once at registration		Electronic database	*For family houses only* till 1995 or from 1995 on
69	Hot water circulation - old system	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only*
70	Thermal solar plant old system	Tool	Y/N	r	Once at registration		Electronic database	*For family houses only*
71	Hot water generation old system: insulation standard heat distribution	Tool		l	Once at registration		Electronic database	*For family houses only* 50s-70s, 80s-90s, newest standard (with or without additional insulation)
72	Fuel source old installation	Supplementary agreement	Type	R	Once at registration		Electronic database	For other buildings only

73	$EF_{CO2,\ fuel\ old,\ participanti}$ Specific emission factor for the used fuel(s) for old system	Fixed value, ex ante definition; Standard, see Annex 3.	tCO_2/ GJ	s	Automatically given in database		Electronic database	
74	$FC_{BL,fuel\ old,participant\ i}$, fuel consumption calculated by the tool for the old system	Tool	kWh/a GJ (based on net calorific value)	c	Once at registration		Electronic database	
75	Target group (see Annex 5)	Supplementary agreement	type	l	Once at registration		Electronic database and paper document	
76	Subsidies received (see Annex 5)	Supplementary agreement	Y/N		Once at registration		Electronic database and paper document	Confirmation, that no subsidies received, otherwise rejection
77	Legal requirement for boiler replace-ment or thermo-modernization existing (see Annex 5)	Supplementary agreement	Y/N		Once at registration		Electronic database and paper document	Confirmation, that no legal requirements applicable, otherwise rejection
78	Technical obligation (operation permit) (see Annex 5)	Supplementary agreement	Y/N		Once at registration		Electronic database and paper document	Confirmation, that installation is in operation

79	Building's energy audit sheet submitted	Supplementary agreement	Y/N		Once at registration		Electronic database and paper document	For other buildings only

* Currently, in Poland a new National Allocation Plan has been approved April 19, 2010, in which JI reserves for installations under the EU-ETS system are foreseen. According to the new legislation dated from 21/06/2011 JI reserves are taken into account in the National Allocation Plan. This allows to consider emissions reductions within EU-ETS installations (double counting).

As JI reserves are included in the Polish legislation, buildings connected to district-heating grids with connection to EU-ETS installations will not be excluded from the programme and therefore will generate ERUs. These emissions reductions will be monitored separately.

E.4.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

$$BE_y = FC_{BE,fuelold,participanti} \cdot EF_{CO2,fuelold}$$

with:

$FC_{BE,fuel\ old,participanti}$:= Fuel consumption of participant I before implementation of the measures as calculated by the tool

$EF_{CO2,\ fuel\ old}$:= Emission factor of the previous used fuel before implementation as listed in Annex 3

E. 4.2. Option 2 – Direct monitoring of emission reductions from JPA:

Not applicable.

E.4.2.1. Data to be collected in order to monitor emission reductions from each technology and/or measure under each type of JPA, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to E.5.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable.

E.4.2.2. Description of formulae used to calculate emission reductions for each type of JPA (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

Not applicable.

E.4.3. Treatment of leakage in the monitoring plan:

Preliminary production chain and fuel transformation are outside the project boundary, as they are beyond the influence of BOŚ BANK. This particularly applies to the production, distribution and transformation of the fuels considered in the programme.

For those emissions, the current "*EU Emissions Trading Directive*" and the Kyoto Protocol require that emissions certificates are to be held from companies or countries, where the fuels are produced, distributed or transformed. Therefore, by including those emissions (reductions) this would lead to double-counting. For systematic and methodological reasons these emissions are not accounted for project emissions and are not included in the project boundary.

Moreover, in the methodology *ACM0009 "Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas"* (Version 03.2, Sectoral scope 01 & 04, 28nd July 2006) it is set that to the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1st January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.

Biomass boilers

In case of biomass boilers, part of leakage emissions will result from biomass transportation. The biomass would be mainly from regional suppliers within a radius of 150 km and so the transport emissions in the programme scenario should be in general slightly lower than in the baseline scenario where oil or natural gas would be delivered over greater distances. The biomass used for the installations included in this programme will be from regional biomass suppliers.

Calculations by the "*Global Emission Model for Integrated Systems (GEMIS*)" from the German "*Öko-Institut*" are listed in table 16 below and show that even for greater transport distances the emissions in the production chain of wood chips or wood pellets are lower than the emissions in the production chain of fuel oil and natural gas. Therefore in case of biomass boilers, leakage emissions are negligible.

According to the *"General guidance on leakage in biomass project activities"* (Version 03, EB47 Report, Annex 28) leakage should be considered for biomass residues or waste[43], if competing demand for biomass exists (in the absence of the project activity the respective biomass may be used elsewhere, for the same or a different purpose). This is not the case if a surplus of the product can be proved (Paragraphs 17 and 18).

The *"General guidance on leakage in biomass project activities"*, (Version 03, EB47 Report, Annex 28) provides information how to deal with leakage from competing uses in case of biomass. According to the guidance the project participant shall.

[43] The UNFCCC refers to biomass by-products, residues and waste streams from agriculture, forestry, and related industries (see Annex 8: *"Clarifications on definition of biomass and consideration of changes in carbon pools due to a CDM project activity"* of the report of the twentieth meeting of the Executive Board; http://cdm.unfccc.int/EB/Meetings/020/eb20rep.pdf)

"e*valuate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions."*

The JPoA at hand fulfils the requirements from the guidance as a surplus of the product is proved (Paragraphs 17 and 18). According to a study by the Polish EcoFund there is big surplus of biomass resources available locally. According to this study, the solid biomass availability in Poland is about 60,475,000 t/year, while the actual use is only 14,400,000 t/yr. As the surplus of at least 25% can be guaranteed, the leakage factor can be neglected.

Table 21: CO_2e-emissions per MWh calculated by GEMIS, ver.4.4 including emissions in the production chains and transport emissions

	Wood chips[44] [kg CO_2e/MWh]	Wood pellets[45] [kg CO_2e/MWh]	Light fuel oil[46] [kg CO_2e/MWh]	Natural gas[47] [kg CO_2e/MWh]
100 km	3.86	16.38		
150 km	5.42	17.95		
200 km	6.99	19.52		
500 km	16.41	28.93	69.01	72.90

Heat pumps:

[44] GEMIS process " Hacker-gross\Holz-HS-Wald-CON-2010"

[45] GEMIS process " Fabrik\Holz-Pellets-CON-2010"

[46] GEMIS process " Raffinerie\Öl-leicht-PL-2010"

[47] GEMIS process " Pipeline\Gas-PL-2010-lokal"

In case of heat pumps CO_2 emissions occur upstream in the generation of electrical energy in fossil fuel power plants. These emissions mostly stem from plants, which are subject to emissions trading. In order to avoid double counting these emissions shall not be included in the project boundaries.

Even if accruing CO_2 emissions from electricity generation were to be taken into account, only little changes would occur – compared to the total emissions from fuel oil combustion/heating systems and, in most cases, also compared to natural gas-fired heating. That means that the ecological benefit of heat pumps still exists. If conditions are not favourable (55°C/45°C heat distribution in combination with an air-water heat pump system), then modern heat pumps are comparable to the gas combustion boilers with regard to primary energy requirement and CO_2 emissions. In the more common combination of floor heating (35°C/30°C) and ground/water heat pumps, primary energy savings of about 21% and CO_2 emissions reductions of 22% are feasible. Here emission levels correspond to the ones that pertain to gas condensation boilers (calculations according to IZW, 1999)[48]. For these reasons the indirect emissions from heat pumps are not included in the project boundary.

E.4.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects each type of JPA:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable (cf. E.4.3 above)

[48] IZW (1999): Untersuchung von Praxisdaten zum Primärenergiebedarf und den Treibhausgasemissionen von modernen Wärmepumpen – Endbericht erstellt im Auftrag des Fachinformationszentrums Karlsruhe, April 1999 - (Review of primary energy requirements and emissions of modern heat pumps).

E.4.3.2. Description of formulae used to estimate leakage for each type of JPA (for each gas, source etc.; emissions in units of CO_2 equivalent):

Not applicable (cf. E.4.3 above)

E.4.4. Description of formulae used to estimate emission reductions for each type of JPA (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

$$ER_y = BE_y - PE_y - LE_y = FC_{BE,fuelold,participanti} \cdot EF_{CO2,fuelold} - FC_{PJ,fuelnew,participanti} \cdot EF_{CO2,fuelnew} + PE_{HFC} - 0$$

with:

$FC_{BE,fuel\ new,participanti}$:= Fuel consumption of participant I after implementation of the measures as calculated by the tool

$EF_{CO2,\ fuel\ new}$:= Emission factor of the used fuel after implementation as listed in Annex 3

PE_{HFC} = Project emissions in case of installation of heat pumps, if no heat pumps are installed, emissions would be zero

$FC_{BE,fuel\ old,participanti}$:= Fuel consumption of participant I before implementation of the measures as calculated by the tool

$EF_{CO2,\ fuel\ old}$:= Emission factor of the previous used fuel before implementation as listed in Annex 3

E.4.5. Where applicable, in accordance with procedures as required by the host Party(ies), information on the collection and archiving of information on the environmental impacts of each type of JPA:

Not applicable (cf. section C above)

E.5. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
E.4.1.1.: 1-22, 25-33, 36	Medium	Data obtained from the simplified assessment tool will be annually verified. For detailed information see Annex 4**.**
E.4.1.1.: 23-24, 34	Low	Data given in the supplementary agreement will be annually verified. For detailed information see Annex 5.
E.4.1.1.: 35	Low	QA/QC not necessary, as standard factors are used.
E.4.1.1.:37	Low	Calculated with standard values. QA/QC not necessary
E.4.1.1.:38	Medium	Participant information. Data will be verified annually.
E.4.1.3.: 39-60, 63-71, 74	Medium	Data obtained from the simplified assessment tool will be annually verified. For detailed information see Annex 4**.**
E.4.1.3.: 61-62, 72, 75-78, 79	Low	Data given in the supplementary agreement will be annually verified. For detailed information see Annex 5.
E.4.1.3.: 73	Low	QA/QC not necessary, as standard factors are used.

E.6. Name of person(s)/entity(ies) establishing the monitoring plan:

Name of entity setting the monitoring plan: FutureCamp Climate GmbH
Aschauer Str. 30
81549 Munich
Germany

FutureCamp Climate is not a JPoA project participant.

Version: 07

The date of completion: 04/07/2011

Annex 1

CONTACT INFORMATION ON CORDINATING ENTITY AND PARTICIPANTS OF THE JI POA

Organisation:	Bank Ochrony Srodowiska S.A. (BOŚ Bank)
Street/P.O.Box:	Al. Jana Pawla II 12
Building:	
City:	Warsaw
State/Region:	Mazowia
Postal code:	00-950
Country:	Poland
Phone:	+48 22 850 8953
Fax:	
E-mail:	
URL:	http://www.bosbank.pl/
Represented by:	
Title:	
Salutation:	Mrs
Last name:	DUSZA
Middle name:	
First name:	Malgorzata
Department:	FINANCIAL INSTUTUTIONS DEPARTMENT
Phone (direct):	
Fax (direct):	
Mobile:	
Personal e-mail:	malgorzata.dusza@bosbank.pl

Organisation:	KfW Bankengruppe
Street/P.O.Box:	Palmengartenstr. 5-9
Building:	
City:	Frankfurt a. M.
State/Region:	
Postal code:	60325
Country:	Germany
Phone:	+49(69)-7431-0
Fax:	
E-mail:	
URL:	http://www.kfw.de
Represented by:	
Title:	Dr.
Salutation:	
Last name:	Ruffing
Middle name:	
First name:	Michael
Department:	Environment and Climate
Phone (direct):	
Fax (direct):	
Mobile:	
Personal e-mail:	michael.ruffing@kfw.de

Annex 2

JPA'S INFORMATION TABLE

JPAs included in the JI PoA											
No.	*Name of the JPA*	*Type of JPA*	*Brief summary*	*Geographical reference*	*Name and contact detail of the responsible for the operation of the JPA*	*Host Party(ies)*	*Starting date*	*Length of the crediting period*	*Estimation of emission reduction*	*Information confirming that all eligibility criteria described in Section A.4 and Section E of the JI PoA-DD are met and a description on how they are met*	*Confirmation that the JPA has not been determined as a single JI project or under a different JI PoA*
1	JPA-1	one family house	Boiler replacement, modernisation of heat distribution and window replacement (see questionnaire in Appendix A to Annex 2 for details)	see questionnaire in Appendix A to Annex 2	BOS Bank	Poland	01.01.2011	10 years	0.38 tCO_{2e}/a	All eligibility criteria are fulfilled, see questionnaire in Appendix A to Annex 2	It has been checked that this JPA has not been determined as a single JI project or under a different PoA

APPENDIX A TO ANNEX 2

The following questionnaire has been filled out for the real case participant at the credit application stage. It includes all necessary data for the calculation of emission reductions using option A (simplified tool) for one family houses).

Sample used during onsite visit

Stempel Wnioskodawcy

Applicant Stamp

KARTA INFORMACJI DODATKOWYCH
DLA KREDYTU Z LINII ZAGRANICZNEJ KfW6
Additional information sheet for credit line KfW6

Program JI Efektywności Energetycznej w Budynkach (Energy Efficiency in Buildings Programme JI)

1. Koszt realizacji zadania wynosi ogółem (total cost of investment including): .....
(kwota i waluta (amount and currency)) w tym:

Środki własne (own funds) **20 000.(20%)**

Wnioskowany kredyt inwestycyjny złotowy/*walutowy/*(loan type) **.80 000 (80%)**
Kredyt inwestycyjny pochodzący z innego źródła (other sources loan) ----(….0...%)

2. Informacje o Wnioskodawcy (uczestnik Programu JI (Information on the Applicant/JI Programme)

Grupa docelowa (Target group):

- ☐ **Osoba fizyczna/budynek mieszkalny(dom jednorodzinny)(natural person/residential building),**
- ☐ Wspólnota mieszkaniowa/budynek mieszkalny (housing communnity/residential building),
- ☐ Podmiot finansów publicznych/budynek publiczny (szkoła, szpital) (public entity- public building (e.g. schools, hospitals))
- ☐ Mikroprzedsiębiorca (np mały hotel, pensjonat, warsztat) (Micro business (e.g. small, private hotels, pensions, small service stations)

☐ Małe i średnie przedsiębiorstwo w przypadku, gdy nie korzysta z Programu JI Modernizacji Kotłów (SME only if no participation in boiler JI programme of BOS)

Confidential (Name/Company/ Facility/ Institution)

Andrzej KalinowskiAdres Wnioskodawcy (address)

Ulica (street) **Confidential**

Kod pocztowy i miasto (Postcode & Town) __ -___ Józefów

Reprezentowany przez (Represented by): **Confidential**

Imię i nazwisko (First name and surname): …….

Stanowisko (Position): ..…....…….……

Fax: ……..……..……

Tel:(phone) ……..

E-mail: ……..……

3. Informacja dot. stanu inwestycji przed wdrożeniem (information on the situation before implementation)

a) Czy instalacja grzewcza budynku jest podłączona do ciepłowni lokalnej.

☐ **Nie, posiada własne źródło ciepła - przejść do punktu 5**

(no, it is equiped with own heating source – then go to point 5

☐ Tak– przejść do lit b)

(yes, then go to letter b)

b) Czy instalacja grzewcza budynku jest podłączona do ciepłowni lokalnej objętej Systemem Handlu Emisjami Wspólnot Europejskich (pow. 20 MW) (Is the installation connected to a EU-ETS installation?)

☐ Nie (no)

☐ Tak (yes)

☐ Nie wiem – jeśli "nie wiem" podaj nazwę ciepłowni lub dostawcy ciepła ……..……..

c) Jaki rodzaj paliwa wykorzystywany w lokalnej kotłowni? (Fuel source of district heating system?)

☐ Węgiel (Coal)

☐ Inne, należy podać (Other, specify) gaz, elektryczność

☐ Nie wiem

4. Planowane wykorzystanie środków publicznych? (Usage of any public subsidies)?

☐ Nie (No)

☐ Yes (tak)

5. Informacje dot. charakterystyki budynku oraz systemu grzewczego

(information on the building and the heating system)

a) Czy inwestycja dotyczy budynku jednorodzinnego

(Does the investmen apply to the one family house?)

☐ Nie (No) - *Jeśli inwestycja nie dotyczy budynku jednorodzinnego należy dostarczyć Audyt energetyczny, sporządzony przez uprawnionego Audytora Energetycznego z listy na stronie www.bosbank.pl (When an investment is implemented on other buildings than one family house energy audit prepared by the Energy Auditor is required. List of Energy Auditors is published on www.bosbank.pl)).*

☐ **Tak – proszę o przejście do lit b i uzupełnić tabele z punktu 6.**

(yes, then go to letter b) and fill the Table provided in point 6

b) Szczegółowe informacje na temat systemu grzewczego w budynku (Information on the heating system):

Dopuszczenie do eksploatacji (Authorisation status)

Zgodnie z Rozporządzeniem Rady Ministrów z 16 lipca 2002r. w sprawie rodzajów urządzeń technicznych podlegających dozorowi technicznemu instalacja jest objęta dozorem technicznym (Dz.U. Nr 120, 1021 z późn. zm.) (Installation under Regulation of the Council of Ministers of July 16, 2002 (OJ No 120, item 1021 with amds.)

☐ Nie (No)

☐ **Tak (Yes)**

Czy instalacja uzyskała zezwolenie Urzędu Dozoru Technicznego na eksploatację? (Does the installation have an operation permit from the UDT-Inspection Body regarding technical inspection?)

☐ Nie (No)

☐ **Tak (Yes)**

Czy zgodnie z wymaganiami wynikającymi z dozoru technicznego instalacja powinna zostać wymieniona albo zmodernizowana do 2012r.? (Does the installation have to be replaced or modernised until 2012 according to requirements, which result from this technical inspection?)

☐ **Nie (No)**

☐ Tak (Yes)

6. Informacje dot. charakterystyki budynku oraz źródła ciepła dla budynków jednorodzinnych (information on the building and heating system in one family house)

Tabela nr 1a

CHARAKTERYSTYKA BUDYNKU PRZED REALIZACJĄ INWESTYCJI

(building characteristics before investment)

1.	Adres budynku (Address of building)	**Confidential**
2.	Właściciel (Owner)	**Confidential**
3.	Ilość kondygnacji (no of story)	Piwnica, parter, piętro
4.	Ilość mieszkań/pokoi (no of apartments)	6 pokoi
5.	Powierzchnia do ogrzania (heated living space)	220 m2
6.	Rok budowy (Year of construction)	1990
7.	Wysokość pomieszczeń (Room height ca.)	2,7 do 3 m
8.	Rodzaj zabudowy* (Sorrounding neighbouring buildings)	**a) wolnostojąca (none)** b) bliźniak (from one side) c) szereg (from both sides)
9.	Plan* (Plan view)	**a) zwarty (compact)** b) podłużny (elongate) lub narożny/inny
10.	Poddasze* (Attic)	a) płaski dach (flatroof)  b) **nieogrzewane poddasze**  (not heated attic floor) c) częściowo ogrzewane poddasze  (partly heated attic floor) d) całkowicie ogrzewane poddasze  (całkowicie ogrzewane poddasze)

		☐ okna dachowe (dormer)
11.	Piwnica* (Basement)	a) bez piwnicy (without basement)  **b) podłoga piwnicy nie ogrzewana**  **(not heated basement floor)** c) podłoga piwnicy częściowo ogrzewana  (party heated basement floor) d) podłoga piwnicy ogrzewana  (completely heated basement floor)
12.	Projekt budowlany i dodatkowa izolacja (Construction design and supplementary insulation) ☐ Murowany (Massie) ☐ Drewniany (wood)	Grubość izolacji: a) dach (roof) ….cm % powierzchni b) ostatnia kondygnacja (top floor) cm powierzchni c) ściany zewnętrzne (Exterior walls) cm powierzchni d) parter (groundfoor) ….cm ….% powierzchni
13.	Okna (Windows) 1990 Rok instalacji (Year of Window installation)	☐ Drewniane, pojedyncze szkło (wooden, simply) ☐ **Drewniane, podwójne szkło (wooden dual)** ☐ PCV, dwuwarstwowe (plastic dual-pane) ☐ Aluminiowe, dwuwarstwowe (aluminium, dual-pane)

* zaznacz wybraną opcję

Tabela nr 1b

CHARAKTERYSTYKA BUDYNKU PO REALIZACJI INWESTYCJI

(building characteristics after investment)

1.	Poddasze* (Attic)	a) częściowo ogrzewane poddasze  (partly heated attic floor) b) całkowicie ogrzewane poddasze

		 (całkowicie ogrzewane poddasze) ☐ **okna dachowe (dormer)**
2.	Piwnica* (Basement)	a) bez piwnicy (without basement)  b) podłoga piwnicy nie ogrzewana  (not heated basement floor) **c) podłoga piwnicy częściowo ogrzewana**  **(party heated basement floor)** d) podłoga piwnicy ogrzewana  (completely heated basement floor)
3.	Projekt budowlany i dodatkowa izolacja (Construction design and supplementary insulation) ☐ murowany (Massie) ☐ Drewniany (wood)	Grubość izolacji: bez zmian a) dach (roof) ….cm ….% powierzchni b) ostatnia kondygnacja (top floor) ….cm ….% powierzchni c) ściany zewnętrzne (Exterior walls) ...cm ….% powierzchni d) parter (groundfoor) ….cm ….% powierzchni
4.	Okna (Windows) 2010 Rok instalacji (Year of Window installation)	☐ Drewniane, pojedyncze szkło (wooden, simply) ☐ **Drewniane, potrójne szkło** (☐ PCV, dwuwarstwowe (plastic dual-pane) ☐ Aluminiowe, dwuwarstwowe (aluminium, dual-pane)

* zaznacz wybraną opcję

…… ……..

Podpis Wnioskodawcy Data

Tabela nr 2a

CHARAKTERYSTYKA SYSTEMU GRZEWCZEGO PRZED REALIZACJĄ INWESTYCJI

(heating system characteristics before investment)

1.	Kocioł* (Boiler)	Paliwo (Fuel) ☐ **Gaz ziemny (Natural gas)** ☐ Lekki olej opałowy (Light fuel oil) ☐ Węgiel (coal) Rok instalacji (Year of installation) ☐ Do (till) 1986 ☐ **1987-1994** ☐ Od (from) 1995 Dla kotłów gazowych i olejowych (for Gas or oil) - temperatura ☐ **Stała (constant)** ☐ Zmienna (gliding) ☐ Kocioł kondensacyjny (condensing boiler)
2.	Dystrybucja ciepła* (Heat distribution)	Izolacja standardowa ☐ **Do lat 70-tych (till 70s years)** ☐ 80 i 90 –lata ☐ Najnowsze standardy (newest standards)
3.	Pompy ciepła* (Elektro heat pump)	Wytwarzanie ciepła (heat generation) ☐ Tylko pompy ciepła (only heat pomp) ☐ Pompy ciepła + kocioł (heat pump + boiler) Źródło ☐ Powietrze (air) ☐ Geotermalne źródło (geothermal) Rok instalacji (Construction year) ☐ Do 1994 (till) ☐ Od 1995 (from) Źródło paliwa dla kotła ☐ Gaz ziemny (natural gas) ☐ Węgiel (coal) ☐ Lekki olej opałowy (light fuel oil)

4.	Lokalna ciepłownia* (district heating)	Wytwarzanie ciepła (heat generation) ☐ Kocioł/ciepłownia (Boiler/haet plant) ☐ Elektrociepłownia (heating power plant) ☐ Udział generacji ciepła w skojarzeniu > 50% (heat amount from cogeneration > 50%) Źródło paliwa dla kotła ☐ Gaz ziemny (natural gasl) ☐ Węgiel (coal) ☐ Lekki olej opałowy (light fuel oil)
5.	Ogrzewania mieszkania* (apartament heating) Rok budowy (Construction year) ☐ Do 1994 (till) ☐ Od 1995 (from)	☐ Ogrzewanie podłogowe (gas floor heating) ☐ Z kotłem kondensacyjnym (with condensing boiler)
6.	Ogrzewanie pokoju* (room heating)	☐ Pojedynczy piec (single stove) ☐ Piecyk gazowy (gas heater) ☐ Grzejnik elektryczny (elektro heater) Źródło paliwa dla pojedynczego pieca ☐ Gaz ziemny (natural gas) ☐ Węgiel (coal) ☐ Lekki olej opałowy (light fuel oil)
7.	Ciepła woda* (Hot water generation)	☐ Razem z CO (with central heating system) ☐ Piec gazowy z zasobnikiem ciepła central (gas thermal storage heater) ☐ Centralny piec akumulacyjny (central electro-storage) ☐ Pompa ciepła (heat pump) ☐ Ogrzewanie podłogowe na gaz (gas floor heating) ☐ **Elektryczny podgrzewacz wody (electric continuous-flow water heater)** ☐ Podgrzewacz gazowy (gas- continuous-flow water heater) ☐ Mały piec akumulacyjny (electric storage heater/ - small storage) **Wytwarzanie ciepłej wody (Central hot water generation)**

		☐ Z obiegiem ciepłej wody (with hot water circulation) ☐ Z systemem baterii słonecznych (with thermal solar plant) Izolacja instalacji (insulation heat distibution) ☐ Do lat 70-tych (till 70s years) ☐ **80 i 90 –lata** ☐ Najnowsze standardy (newest standards) ☐ Dodatkowa izolacja (additional isulation) Rok instalacji (Construction year) ☐ **Do 1994 (till)** ☐ Od 1995 (from)

* zaznacz wybraną opcję

Tabela nr 2b

CHARAKTERYSTYKA SYSTEMU GRZEWCZEGO PO REALIZACJI INWESTYCJI

(characteristics of heating system after investment)

1.	Kocioł* (Boiler)	Paliwo (Fuel) ☐ **Gaz ziemny (Natural gas)** ☐ Lekki olej opałowy (Light fuel oil) ☐ Biomasa (biomass) Rok instalacji (Year of installation) ☐ **Od (from) 1995** Dla kotłów gazowych i olejowych (for Gas or oil) - temperatura ☐ Stała (constant) ☐ Zmienna (gliding) ☐ **Kocioł kondensacyjny (condensing boiler)**
2.	Dystrybucja ciepła* (Heat distribution)	☐ **Najnowsze standardy izolacji (newest standards)**
3.	Pompy ciepła* (Elektro heat pump)	Wytwarzanie ciepła (heat generation) ☐ Tylko pompy ciepła (only heat pomp) ☐ Pompy ciepła + kocioł (heat pump + boiler) Źródło ☐ Powietrze (air)

		☐ Geotermalne źródło (geothermal) Rok instalacji (Construction year) ☐ Od 1995 (from) Źródło paliwa dla kotła ☐ Biomasa (biomass) ☐ Gaz ziemny (Natural gas) ☐ Lekki olej opałowy (light fuel oil)
4.	Lokalna ciepłownia* (district heating)	Wytwarzanie ciepła (heat generation) ☐ Kocioł/ciepłownia (Boiler/haet plant) ☐ Elektrociepłownia (heating power plant) ☐ Udział generacji ciepła w skojarzeniu > 50% (cogeneration > 50%) Źródło paliwa dla kotła ☐ Gaz ziemny (natural gas) ☐ Biomasa (biomass) ☐ Lekki olej opałowy (light fuel oil)
5.	Ogrzewania mieszkania* (apartament heating) ☐ Od 1995 (from)	☐ Ogrzewanie podłogowe (gas floor heating) ☐ Z kotłem kondensacyjnym (with condensing boiler)
6.	Ogrzewanie pokoju* (room heating)	☐ Pojedynczy piec (single stove) ☐ Piecyk gazowy (gas heater) ☐ Grzejnik elektryczny (elektro heater) Źródło paliwa dla pojedynczego pieca ☐ Gaz ziemny (natural gas) ☐ Biomasa (biomass) ☐ Lekki olej opałowy (light fuel oil)
7.	Ciepła woda* (Hot water generation)	☐ **Razem z CO (with central heating system)** ☐ Piec gazowy z zasobnikiem ciepła central (gas thermal storage heater) ☐ Centralny piec akumulacyjny (central electro-storage) ☐ Pompa ciepła (heat pump) ☐ Ogrzewanie podłogowe na gaz (gas floor heating) ☐ Elektryczny podgrzewacz wody (electric

		continuous-flow water heater) ☐ Podgrzewacz gazowy (gas- continuous-flow water heater) ☐ Mały piec akumulacyjny (electric storage heater/ - small storage) **Wytwarzanie ciepłej wody (Central hot water generation)** ☐ **Z obiegiem ciepłej wody (with hot water circulation)** ☐ **Z systemem baterii słonecznych (with thermal solar plant)** **Izolacja instalacji (insulation heat distibution)** ☐ **Najnowsze standardy (newest standards)** ☐ Dodatkowa izolacja (additional isulation) Rok instalacji (Construction year) ☐ **Po 1995 (from)**

- zaznacz wybraną opcję wyłącznie w polach, w którym wystąpiła zmiana

…… ……..

Podpis Wnioskodawcy Data

APPENDIX B TO ANNEX 2: EMISSION REDUCTIONS OF REAL CASE

The emission reductions provided below are calculated based on Option A, using the simplified tool for one family houses. Input data for the calculation of baseline and project emissions are the results of the questionnaire as listed in Appendix A to Annex 2.

The simplified tool delivers the following results for the calculation of Baseline emissions:

BASELINE Emissions

Heating system			kWh/a	CO_2 Emissions factor [t CO_2/kWh]	CO_2 Emissions [t CO_2/a]
Heat demand			**33861**		
Final energy demand	Energy source 1	natural gas	45703	0,0002016	9,21
	Energy source 2	not allocated	0	0,0000000	0,00
	Auxiliary energy (electricity)		495		
Primary energy demand heating system			**51758**		
Warm water preparation			kWh/a	[t CO_2/kWh]	[t CO_2/a]
Useful heat demand			3872		
Final energy demand	Energy source 1	electricity mix	5144	0,0000000	0,00
	Energy source 2	not allocated	0	0,0000000	0,00
	Auxiliary energy (electricity)		0		
Primary energy demand warm water preparation			**15432**		
			kWh/a		[t CO_2/a]
Primary energy demand whole system			**67190**	**Sum CO_2 emissions**	**9,21**

Results for the Project emissions are as follows:

Project Emissions

Heating system			kWh/a	CO_2 Emissions factor [t CO_2/kWh]	CO_2 Emissions [t CO_2/a]
Heat demand			**33037**		
Final energy demand	Energy source 1	natural gas	36550	0,0002016	7,37
	Energy source 2	not allocated	0	0,0000000	0,00
	Auxiliary energy (electricity)		495		
Primary energy demand heating system			**41690**		
Warm water preparation			kWh/a	[t CO_2/kWh]	[t CO_2/a]
Useful heat demand			3872		
Final energy demand	Energy source 1	natural gas	7266	0,0002016	1,46
	Energy source 2	Not	0	0,0000000	0,00
	Auxiliary energy (electricity)		192		
Primary energy demand warm water preparation			**5998**		
			kWh/a		[t CO_2/a]
Primary energy demand whole system			**50258**	**Sum CO_2 emissions**	**8,83**

In total the following emission reductions will be expected:

Table 22: ERUs for the period 2010-2012

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2011	8.83	None	9.21	0.38
2012	8.83	None	9.21	0.38
Total for the crediting period 2010-2012	**17.66**	**None**	**18.42**	**0.76**

Table 23: ERUs for the period 2013-2020

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2013	8.83	None	9.21	0.38
2014	8.83	None	9.21	0.38
2015	8.83	None	9.21	0.38
2016	8.83	None	9.21	0.38
2017	8.83	None	9.21	0.38
2018	8.83	None	9.21	0.38
2019	8.83	None	9.21	0.38
2020	8.83	None	9.21	0.38
Total for the crediting period 2013-2020	**70.64**	**None**	**73.68**	**3.04**

Table 24: Total emission reductions for the whole crediting period 2010-2020

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
2011	8.83	None	9.21	0.38
2012	8.83	None	9.21	0.38
Total for the crediting period 2010-2012	**17.66**	**None**	**18.42**	**0.76**
2013	8.83	None	9.21	0.38
2014	8.83	None	9.21	0.38
2015	8.83	None	9.21	0.38
2016	8.83	None	9.21	0.38
2017	8.83	None	9.21	0.38
2018	8.83	None	9.21	0.38
2019	8.83	None	9.21	0.38
2020	8.83	None	9.21	0.38
Total for the crediting period 2013-2020	**70.64**	**None**	**73.68**	**3.04**
Sum 2010-2020	**88.3**	**None**	**92.1**	**3.8**

APPENDIX C TO ANNEX 2

This appendix C to Annex 2 includes additional information regarding real already implemented cases which are basis for the investment analysis in the additionality section E.2.

Exemplary JPA TM1

The measures foreseen for the **exemplary JPA (TM1)** include boiler replacement with fuel switch from coal to natural gas in one family house. The old installation consists of one coal boiler Zrembiec S1 W18 K-1 for heating and one 17.4kW natural gas boiler for hot water preparation. The fuel demand for the coal boiler is 7.5 t/a and for natural gas 1,000 m^3/a. While the new installation consist of bifunctional condensing natural gas boiler Vaillant VCW PLUS with 9.8 kW-26kW heating, and 9.2-29 kW for hot water preparation. The fuel demand for the new installation is 4,369m^3/a. Summary of the basic technical information regarding the exemplary JPA is provided in the table below.

Table 25: Summary of the basic technical information of exemplary JPA (TM1)

	Old installation	New installation
Fuel type	Coal for heating, natural gas for hot water preparation	Natural gas
Boiler type	Coal boiler Zrembiec S1 W18 K-1 Gas boiler 17.4 kW	Condensing gas boiler Vaillant VCW PLUS 9.8kW-26kW heating, 9.2kW-29kW hot water preparation
Fuel demand	Coal : 7.5 t/a Natural gas : 1,000m^3/a	4,369m^3/a

Exemplary JPA TM2

The measures foreseen for the **exemplary JPA (TM2)** include thermo-modernization, bi-functional gas boiler in each flat in a block of flats owned by a small housing community plased in Nowa Iwiczna city. The old installation consists of one coal boiler Zrembiec S1 W18 K-1 for heating and one 17.4kW natural gas boiler for hot water preparation. The energy demand of both boilers excluding efficiency of the heating system is 1,256 GJ/a, while the energy demand including efficiency of the heating system is 1,949 GJ/a. While the new installation consist of condensing natural gas boiler Vaillant VCW PLUS with 9.8 kW-26kW heating, and 9.2-29 kW for hot water preparation. The energy demand of both boilers excluding efficiency of the heating system is 931 GJ/a, while the energy demand including efficiency of the heating system is 1,445 GJ/a. Summary of the basic technical information regarding the exemplary JPA is provided in the table below.

Table 26: Summary of the basic technical information of exemplary JPA (TM2)

	Before modernization	Modernized building
Fuel type	Natural gas	Natural gas
Boiler type	Coal boiler Zrembiec S1 W18 K-1 Gas boiler 17.4 kW	Condensing gas boiler Vaillant VCW PLUS 9.8kW-26kW heating, 9.2kW-29kW hot water preparation
Energy demand excluding efficiency of the heating system	1,256GJ/a	931GJ/a
Energy demand including efficiency of the heating system	1,949GJ/a	1,445GJ/a

Exemplary JPA TM3

The measures foreseen for the **exemplary JPA (TM3)** include solar water heating for one family home, 150 m^2 with estimated gas savings of 1,200 m^3/a. Summary of the basic technical information regarding the exemplary JPA is provided in the table below.

Table 27: Summary of the basic technical information of exemplary JPA (TM3)

	Solar water heating
Fuel type	Natural gas
Fuel savings	1,200Nm³/a

Annex 3

BASELINE INFORMATION

Calculation of fuel and heat demand for family houses:

The calculation of baseline and project emissions will be done with the help of a "simplified data collection method for the assessment of the energy performance of residential buildings" developed by the "Institut Wohnen und Umwelt GmbH" on behalf of the "Federal office for building and regional planning" (Bundesamtes für Bauwesen und Raumordnung).[49] For a detailed description of the procedure please see the scientific report. [50]

Here, only a description of the general approach with the basic calculation formulas will be given.

The energy balance is calculated in a conventional way (according to EN 832 respectively the German building regulations DIN V 4108-6 and DIN V 4701-10 or DIN V 4701-12). However, the number of input data is strongly reduced by applying typological data for the following three sectors:

Sectors for heat demand calculations of buildings within the tool: "Short-cut method energy profile"

Part I – Estimation of the building envelope area – "envelope typology"

A calculation procedure for the estimation of the area of building envelope components has been developed based on the statistical evaluation of the data records of more than 4000 buildings. The result of these analyses are mean values for the area of walls, windows, cellar ceilings and roofs and their dependency of the following basic factors: the area of living space, the number of heated storeys, the number of adjoining buildings.

This dependency of the different building component areas from those variables have been quantified (see example of figure 1 and respective parameters have been compiled in a table. The building envelope area will be estimated with the variables and the parameters from the table. The variables will be obtained from the questionnaire (see Annex 4). The statistical parameters and its functional relation with the variables provide the estimated component areas. An example is the formula of the calculation of the envelope area per floor A_{Fa}:

$$A_{Fa} = p_{Fa} \cdot A_{W/G} + q_{Fa}$$

with p_{Fa} Parameter "envelope area per m² living area floor"

q_{Fa} Parameter "additional area envelope per floor"

[49] http://www.iwu.de/de/forschung/energie/abgeschlossen/kurzverfahren-energieprofil/

[50] http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

$A_{W/G}$ Living area per floor ("living area floor")

The accuracy of this procedure has been quantified with the building database. The standard deviation is with 15 % relatively high, but errors with the inquiry are reduced compared to a more detailed procedure. [51]

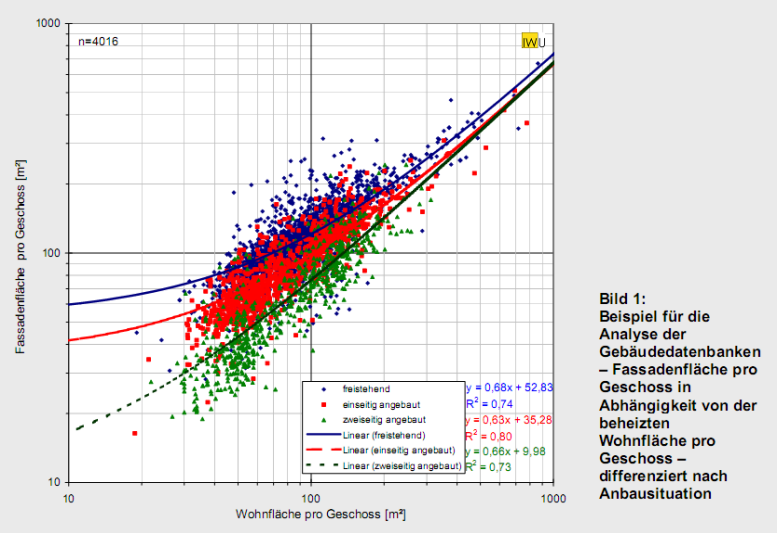


Figure 1: Example of the Analysis of the building database – areas of the building envelope per floor dependent on the heated living area per floor, differentiated according to number of adjoining buildings. [52]

The detailed information regarding the specific calculations is provided in the excel tool with spreadsheet name "Flaechenschaetzverfahren".

Part II – Standard U-values (coefficient of heat transmission) – „construction typology"

Typical envelope construction types that are found in the German building stock have been compiled in a catalogue. By analysing this catalogue a simple chart was derived that delivers U-values for different age groups and construction types of buildings. The effect of later applied insulation measures can be simply considered. An abridgement of this catalogue is given in the excel tool with spreadsheet name "Pauschale U-Werte". [53]

[53] http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

Applying those values with the variables obtained from the questionnaire, following exemplary U-values have been calculated within the tool for a simple house without any additional insulation measures (see excel tool spreadsheet with the name "Pauschale U-Werte").[54]

Part III – Standard performance values for the heating system – „heating system typology"

A simple procedure for the assessment of the heating system performance of existing buildings have been developed. The relevant German standards standards (DIN V 4701-10 and DIN V 4701-12) and additional research studies were considered as a data basis. For typical boundary conditions and different sizes of buildings the losses of the components of commonly used systems were calculated. The result is a table with characteristic values for the generation, storage, distribution and emission of heat for heating and domestic hot water system. For further information please see the excel tool and spreadsheet with the name "AT Daten"[55]

An energy balance is then performed for the building, with results in the heat demand for the building. The formulas are given in the excel tool spread sheet "Bilanz Gebaude". The energy balance for the heating system uses the heat demand for the building to calculate the fuel demand and the primary energy demand. The formulas are provided in the excel tool (spreadsheet name "Energiebilanz Anlagetechnik")

The tool and its parameter have been developed based on the German residential building stock but climatic data from Warsaw will be utilized for this programme instead of German climate data. The climatic data is obtained from the relevant meteorological station in Warsaw[56]: As the German standard of buildings is in general higher than Polish standard, the estimation of baseline emissions is conservative and may underestimate the real energy demand. The tool calculates with a high heating period of 275 d/a. This results in relatively high values in case of modernization of buildings (e.g. insulation), where the heating period will significantly reduce. For this programme, however, this value will not corrected to be conservative.

Result of the tool is the heat demand for heating and domestic hot water system. For emissions calculations, fuel-specific emission factors will be applied.

Calculation of fuel and heat demand for other buildings:

The calculation of fuel consumption in the baseline and in the project scenario is predicated on the energy audit and renovation audit according to the ordinance of the Polish Minister of the Infrastructure of 17th March 2009 (OJ No 43, item 346). The ordinance regulates and describes the detailed scope and form of the energy audit and renovation audit, the template of the audit cards and the formula of the thermo- modernization undertaking profitability assessment The outcome of the audit is a so called "building's energy audit sheet" - a combination of essential information on: the building, its energetic parameters and energy audit outcome, which is the heat demand of the building and the fuel demand of

[54] http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

[55] http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

[56] http://www.mi.gov.pl/2-48203f1e24e2f-1787735-p_1.htm.

the heating system. The JPA is responsible to provide the audit, which will be performed by certified auditors, BOŚ Bank recommends members of the Energy Auditors Association[57].

An Energy audit of the building contains the following issues.

1. Description of the building, including as follows:
   a) in case of the building – technical and constructional characteristic of the building (description of building construction, characteristic of the heating, hot water and ventilation installation structure paced in the building) and energy characteristics of the building,
   b) in case of the local heating source – technical parameters of: heating source and other appliances, fuel used and heat transferring source, energy balance of the heating source
2. Evaluation of the technical condition of the object and its exploitation.
3. Determination of available variations of modernization measures, costs of their implementations and expected results.
4. Economic analysis of above mentioned variations with application of Single Pay Back Time SPBT factor and consequently indication of the most optimal measure.
5. Detailed description of the most optimal measure and recommended corresponding activities.

An energy audit contains a so called "building's energy audit sheet" - it is a synthetic combination of essential information on: the building, its energetic parameters and energy audit outcome.

In Annex 7 a summary of the ordinance is given in English.

Emissions factors:

For the fuels such as natural gas H, light fuel oil, liquid gas and biomass the following emission factors are used:

Natural gas:	**0.056 t CO_2/ GJ (IPCC)**
Light fuel oil:	**0.074 t CO_2/ GJ (IPCC)**
Coal Poland:	**0.094 t CO_2/ GJ (Zuteilungsverordnung)**
Lignite:	**0.101 t CO_2/ GJ (IPCC)**
Liquid gas:	**0.063 t CO_2/ GJ (IPCC)**
Biomass:	**0 t CO_2/ GJ**
Electricity:	**0 t CO_2/ GJ**

Other fuels:

For the JPoA participants, who have already used or will use other fuels than those mentioned above, especially coal, the standard factors will be used according to the *2006 IPCC guidelines.*

[57] see http://www.zae.org.pl/

District heating:

In case of connection to district heating, there will be a two step approach to estimate an emission factor:

1. in the first step it will be checked whether information about fuel sources on boilers in the grid are available and whether they can be utilized. This approach is applicable when there is only one installation feeding into the grid or when there are several installations that use the same fuel source.
2. in all cases where the first step is not applicable, a special conservative approach will be used, which uses the development of a fixed Emission factor using Polish statistics about fuel structure in the district heating sector (please see graphic below). The factor is calculated as follows.

$$EF_{Districtheating} = 0.65 \cdot EF_{coal} + 0.35 \cdot EF_{gas} = 0.65 \cdot 0.094 \frac{tCO_2}{GJ} + 0.35 \cdot 0.056 \frac{tCO_2}{GJ} = 0.081 \frac{tCO_2}{GJ}$$

To be conservative the share of coal is underestimated (65% instead of 69.4%) and the remaining 35% are considered to be natural gas only (neglecting the relevant part of fuel oil).

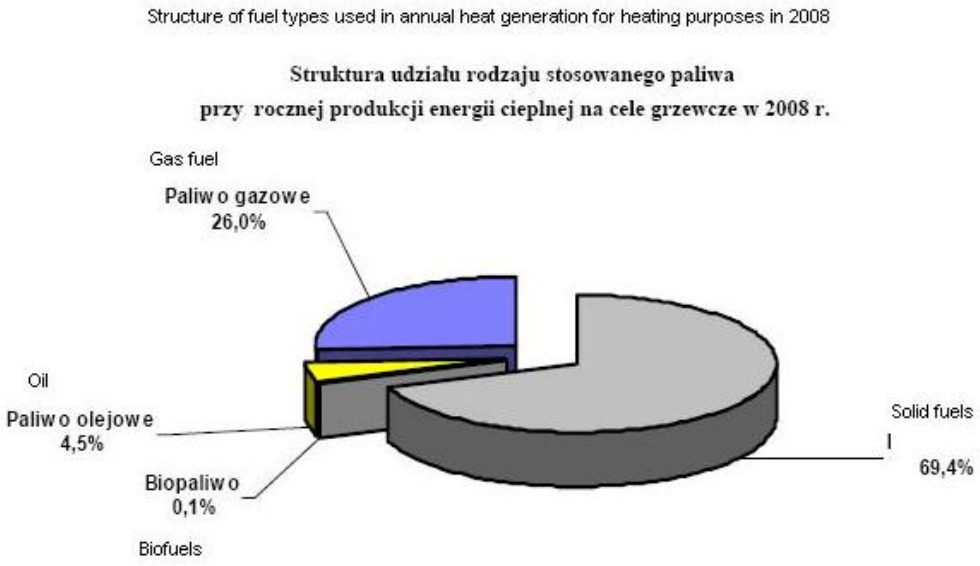


Figure 2: Structure of fuel types in annual heat generation for heating purposes in 2008

Annex 4

MONITORING PLAN

A. Preparatory steps by Retail Customer Adviser (RCA):

As the programme is very complex and it will be difficult for potential customers to assess if they are eligible or not (according to the eligibility criteria), the following approach will be applied: The applicant has a direct contact person, the RCA, in BOS Bank. The Applicant and the RCA arrange personal meeting. During this meeting the RCA provides detailed information regarding the programme and the loan. Some of the provided information is:

- ***Ad. Leaflet:*** provides very general information about the new credit line in BOŚ dedicated to energy efficiency improvement - the line is branded as Credit with Climate. The information relates to scope of the investment and eligible customers separate for each Programme.
- ***BOŚ Ulotka KfW CO_2***: this is a leaflet that is attached to the agreement with the customer. The document provides general information about climate change, JI mechanism and its role in CO2 emission reduction.
- ***Oferta sprzedażowa:*** more detailed offer that is used by customer advisor during meeting with client. (On pages 1 and 3 are information about climate change, energy efficiency increase, JI mechanism and their role in CO_2 emission reduction, on following pages potential customer can find more detailed information about eligibility criteria and base credit line offer (information relates to both programmes).
- ***Prezentacja sprzedażowa***: more detailed presentation used by customer advisor during meeting with client. Provided general information on the eligibility criteria and base credit line offer.

After the customer has been well informed, he can provide to RCA:

- ***Standard application for special purpose investment loan;***
- ***Additional information sheet for credit line KfW6:*** (AIS) dedicated to single houses. A separate form has been developed for family houses.

The RCA performs initial rough verification for every customer taking part in the programme, if there exists:

- a supplementary agreement to the loan contract with the customer's consent to participate in generating emission reductions (for essential terms and conditions see Annex 5),
- the completely filled out questionnaires (one for the building and one for the heating system) for baseline and for project scenario

The RCA sends PDF copies of all provided documents via e-mail to the Financial Institution Department (FID) of BOS Bank. The FID verifies whether the applicant and the investment meet the Programme Eligibility Criteria (PEC) and correctness of provided data. This is done by at least two persons. If there is a positive feedback during verification, the FID sends back via e-mail permission for standard creditworthiness check, which is done by BOS Bank team. They verify the customer credit worthiness

and the investment feasibility is conducted. After this final check, the applicant signs the Statement of End User (SoEU). For further information please see further below.

B. Data assessment:

The required data for all JPA types will be collected ex-ante within the loan application process by BOŚ consultants from the clients. For family houses the calculation tool "short-cut method energy profile" will be filled out together with the client. After entering all necessary input data, fuel consumption and emissions reduction will be calculated automatically. Within the tool there are two separate questionnaire sheets to be filled out, one for the building (thermal envelope) and the other for the heating system. See figure 8 on next page for a picture of the questionnaire. For each type of JPA, both sheets have to be filled out. The data will then be stored in a central database with indication of the type of JPA.

The number of input data is strongly reduced compared to conventional calculation by applying typological data for the following three sectors:

1. estimation of the building envelope area – "envelope typology",
2. standard coefficient for heat transmission (U-values) – "construction typology" and
3. standard performance values for the heating system – "heating system typology".

The required input data for the first and second sector (envelope and construction typology) and the input data for the third sector (heating system typology) are shown in figure 8.

For other buildings the submitted "building's energy audit" will be checked and the necessary data will be entered into the calculation tool to calculate the emissions reductions. The data will be stored in a central database.

CO_2 emission reduction monitoring, preparation of emission reduction report is done in cooperation with Bank Ecologists (calculation of emission reduction may be performed by RCA but is verified by Ecologist or FID) Monitoring report prepared by FID. After BOS Bank team (see also A.) verify the customer credit worthiness and the investment feasibility, the applicant signs the Statement of End User. Following step is BOS Bank granting the loan to the applicant.

C. Internal quality assurance:

Check if the data in the datasets of the excel reporting tool conform to the data from the supplementary agreements and the questionnaires.

The project developer (BOS Bank) verifies the data finally. If the data do not conform to the monitoring requirements, as stated in the programme documentation, the project developer must ask for an amendment from the participant, if the reductions are to be counted.

D. Data storage (responsible department: FID and BOS Bank Ecologists):

According to the legal requirements and after the JI guidelines all paper documents (credit application equivalent to Programme application, Supplementary agreements, supply contracts, invoices) must be stored in the original form or confirmed copy for at least five years after the loan repayment. According to internal procedures a portion of the information derived from paper documents is processed in

detailed electronic database. It is further determined that all essential data covered by the programmes conditions will be processed electronically in way of central database system. At least every six months electronic data are to be secured on a storage data medium, which is to be stored as long as paper version of documentation. In case of system break or data losses, data can be reconstructed from a securing database file that makes monthly logs and thus allows reconstruction of lost files. Therefore, immediate access to the database during the verification process is assured. A screenshot of the internal database is provided below. It is a very detail database, which ensures the complete transparency. The excel file has separate sheets dedicated to each programme. Dedicated sheet contains a database table where general information are gathered all information derive from copies sent to Financial Institutional Department by customer advisor. One additional sheet is dedicated for statistical purposes.

Table 28: BOS Bank database

	A	B	C	D	E	F	G	H
1	EURO exchange rate at the date of agreement conclusion	Loan agreement number	Date of application/agreement	Loan period	Branch where paper documents are stored and where an advisor responsible for contact with customer works	Sub-branch/name of responsible client advisor/name of cooperating ecologist	Entity type	Name of entity
2	UMOWY/Agreements							
3								
4								
5								
6								
7								
8								
9								
10								
11	SUMA							
12								
13	WNIOSKI/Applications							
14								
15								
16								
17								
18								
19	SUMA							
20								
21	WSTĘPNE REZERWACJE/initial contact							
22								
23								
24								
25								
26								
27								
28	SUMA							
29								
30	ODRZUCONE/refusals							

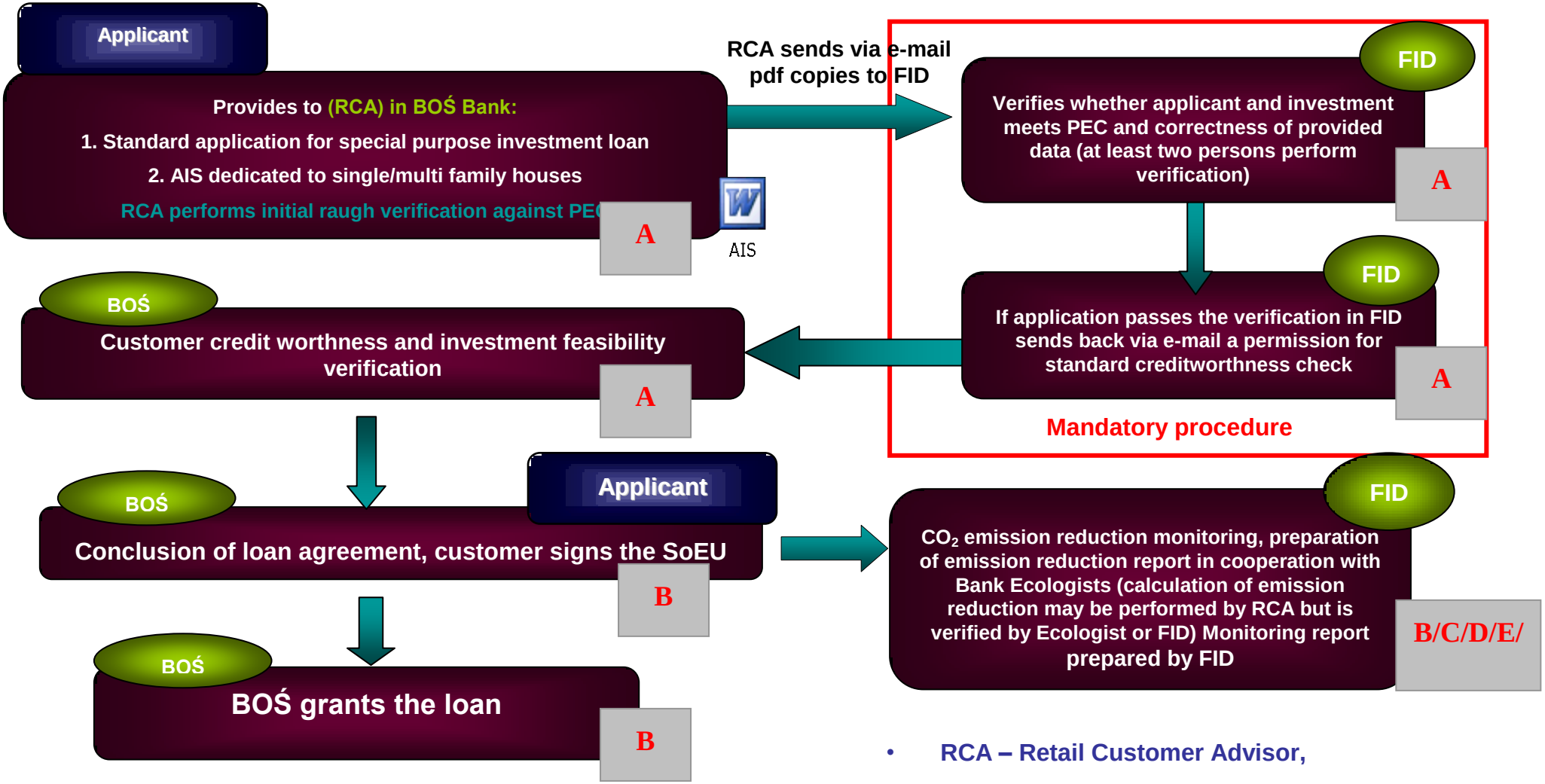
	I	J	K	L	M	N	O	P	Q	R	S	T
1	Short investment description	Investment value in PLN	Investment value in EUR	Credit line value in PLN	Credit line value in EUR	Own capitals in PLN	Own capitals in EUR	Comments and remarks	Number of loan tranches	Value of the tranche in PLN	Value of the tranche in EUR	Date of disbursement
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12		0,00	0,00	0,00	0,00	0,00	0,00					
13												
14												
15												
16												
17												
18												
19												
20		0,00	0,00	0,00	0,00	0,00	0,00					
21												
22												
23												
24												
25												
26												
27												
28												
29		0,00	0,00	0,00	0,00	0,00	0,00					
30												
31												
32												
33												
34												
35												
36		0,00	0,00	0,00	0,00	0,00	0,00					

Boiler Modernization Programme | En Eff Programme in Build

E. Permanent monitoring (responsible department: FID and BOS Bank Ecologists):

The responsible department at project developer regularly controls the current statutory requirements, which could affect the programme. The monitoring plan is therefore regularly adjusted according to the current internal company procedures and statutory requirements.

A flow chart providing the described steps (A/B/C/D/E) is provided below.



- RCA – Retail Customer Advisor,
- PEC – Programme Eligibility Criteria,
- FID – Financial Institution Department
- SoEU – Statement of End User

Monitoring Tool: "Short-cut method energy profile" [58]

The monitoring of the JI-PoA with a family house is based on a simplified assessment method to compile an energy profile for buildings developed by the "Institut Wohnen und Umwelt GmbH" on behalf of the "Federal office for building and regional planning" (Bundesamtes für Bauwesen und Raumordnung).[59]

Usage for Calculation of Baseline and Project emissions

This method comprises a calculation tool for the heat demand of buildings considering data of the building and the heating system and new developed simplified standard proceedings for energy demand calculations. It also calculates the respective fuel demand in kWh/a. Within the tool there are two separate entry forms to be filled out, one for the building (thermal envelope) and the other for the heating system (see figures 8 and 9) for a picture of the questionnaire sheets). For each type of JPA, both sheets will be filled out. The calculation of the baseline heat demand will be performed with historical data (situation before implementation of measures) about the building and the heating system. For project emissions, the planned activities will be added to the tool. Emissions reductions will then be calculated considering the indicated fuel type(s), the calculated fuel consumption per type(s) and the respective emission factor(s) by comparing Baseline and Project emissions.

Calculation procedure of the tool

The tool and its parameter have been developed based on the German residential building stock. As the German standard of buildings is in general higher than Polish standard, the estimation of baseline emissions is conservative and may underestimate the real energy demand. The tool calculates with a high heating period of 275 d/a. This results in relatively high values in case of modernization of buildings (e.g. insulation), where the heating period will significantly reduce. For this programme, however, this value will not corrected to be conservative.

The energy balance is calculated in a conventional way (according to EN 832 respectively the German building regulations DIN V 4108-6 and DIN V 4701-10 or DIN V 4701-12). However, the number of input data is strongly reduced by applying typological data for the following three sectors:[60]

1. Estimation of the building envelope area – "envelope typology";
2. standard U-values (coefficient of heat transmission) – „construction typology";
3. standard performance values for the heating system – „heating system typology".

Please see Annex II for a short explanation of the three sectors.

Adjustments according to the programme requirements (see also Fig. 9,10):

[58] Monitoring Tool: "Short-cut method energy profile" developed by IWU (Insitut Wohnen und Umwelt GmbH); http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil.zip

[59] http://www.iwu.de/de/forschung/energie/laufend/kurzverfahren-energieprofil/

[60] For detailed information see the scientific report: http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/iwu-kurzverfahren_energieprofil-endbericht.pdf

1. Translation of the questionnaires into English (for the PDD)
2. climatic data from Warsaw will be utilized instead of German climate data;
3. changes in input selection possibilities for sheet 2 of the questionnaire (heating system), e.g. different fuel sources selection for baseline and project situation, additional fuel source selection possibilities for heat pump + boiler and district heating, reducing the selection possibilities for heat pump – all changes are indicated in Fig.3,4,5;
4. addition of extra table sheets for the automatic calculation of Baseline and Project emissions;

Other current practical application of the tool (a selection):

- Simplification residential buildings of the German „EnEV 2007“: The for the tool developed standard U-values (coefficient of heat transmission) – „construction typology“ have been taken over by the „BMVBW” (Federal Ministry of Traffic, Construction and Housing) for data assessment purposes[61];
- evaluation of the „CO_2-Gebäudesanierungsprogramms“ of the KfW[62];
- online energy-checks[63];
- energy analysis of 1000 residential buildings for the Stadtwerke Fellbach (2007)[64] ;

Energy audit – ordinance of the Polish minister of infrastructure

The ordinance of the Minister of Infrastructure of 17 march 2009 (OJ No 43, item 346) on the detailed scope and form of the energy audit and renovation audit, template of the audit cards and the formula of the thermo- modernization undertaking profitability assessment.

The main idea of the regulation is to assure:

- the correctness of energy audit performance and
- selection of the most optimal variations of the thermo-modernization undertaking

More detailed information about the ordinance is given in annex 7.

[61] http://www.portal-darmstadt.de/files/miete/mietspiegel_2008.pdf
[62] http://www.iwu.de/forschung/energie/laufend/effekte-kfw-programm/
[63] http://www.vz-nrw.de/UNIQ125801956800865/link501841A.html or http://www.energie-fachberater.de/modernisierung/onlineratgeber_services/onlinerechner/energiespar_rechner.php
[64] www.fellbach.de

Questionnaire sheet 1 and 2 of the tool: "Short-cut method energy profile"

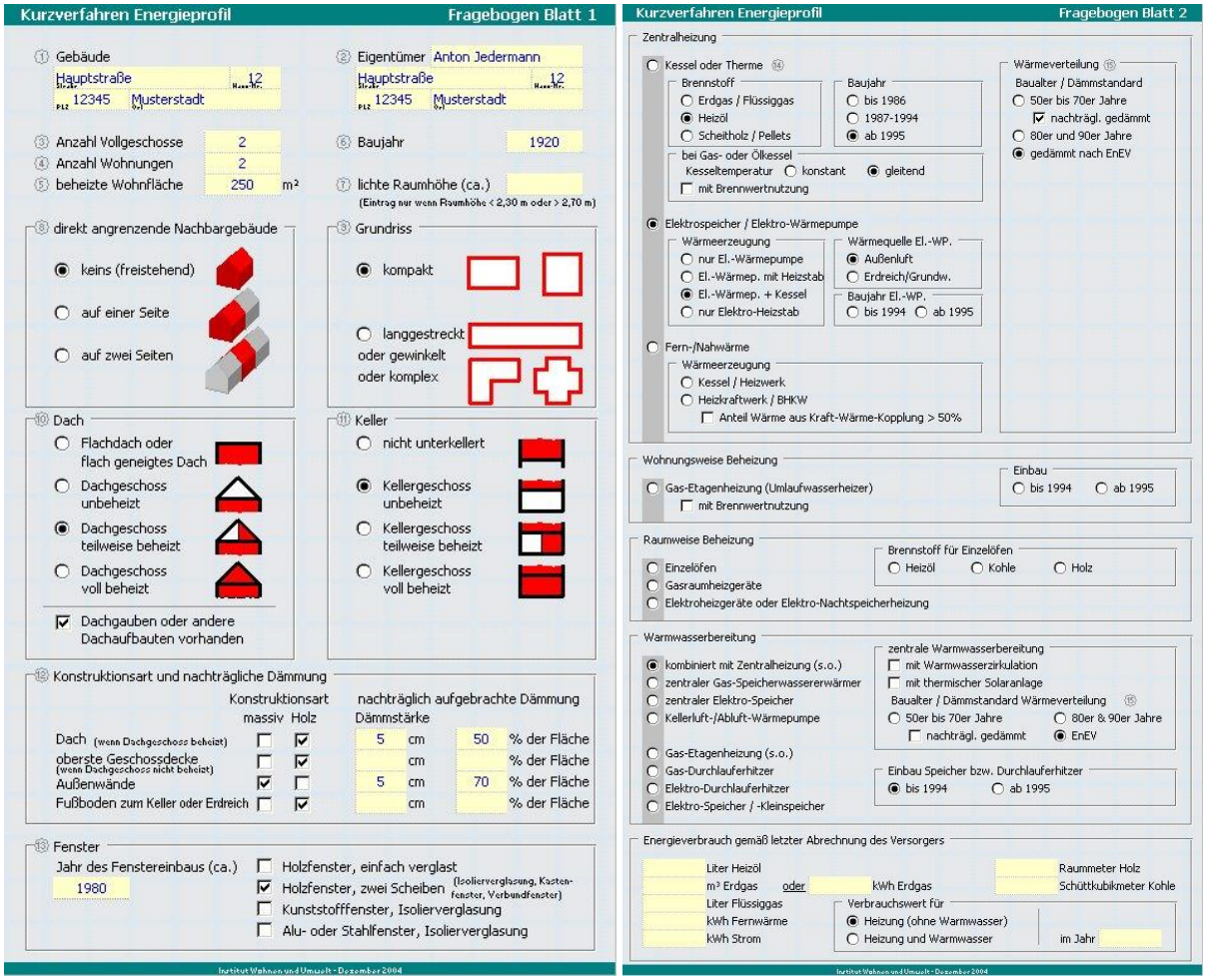


Figure 3: Questionnaire sheet 1 and 2 in its original version

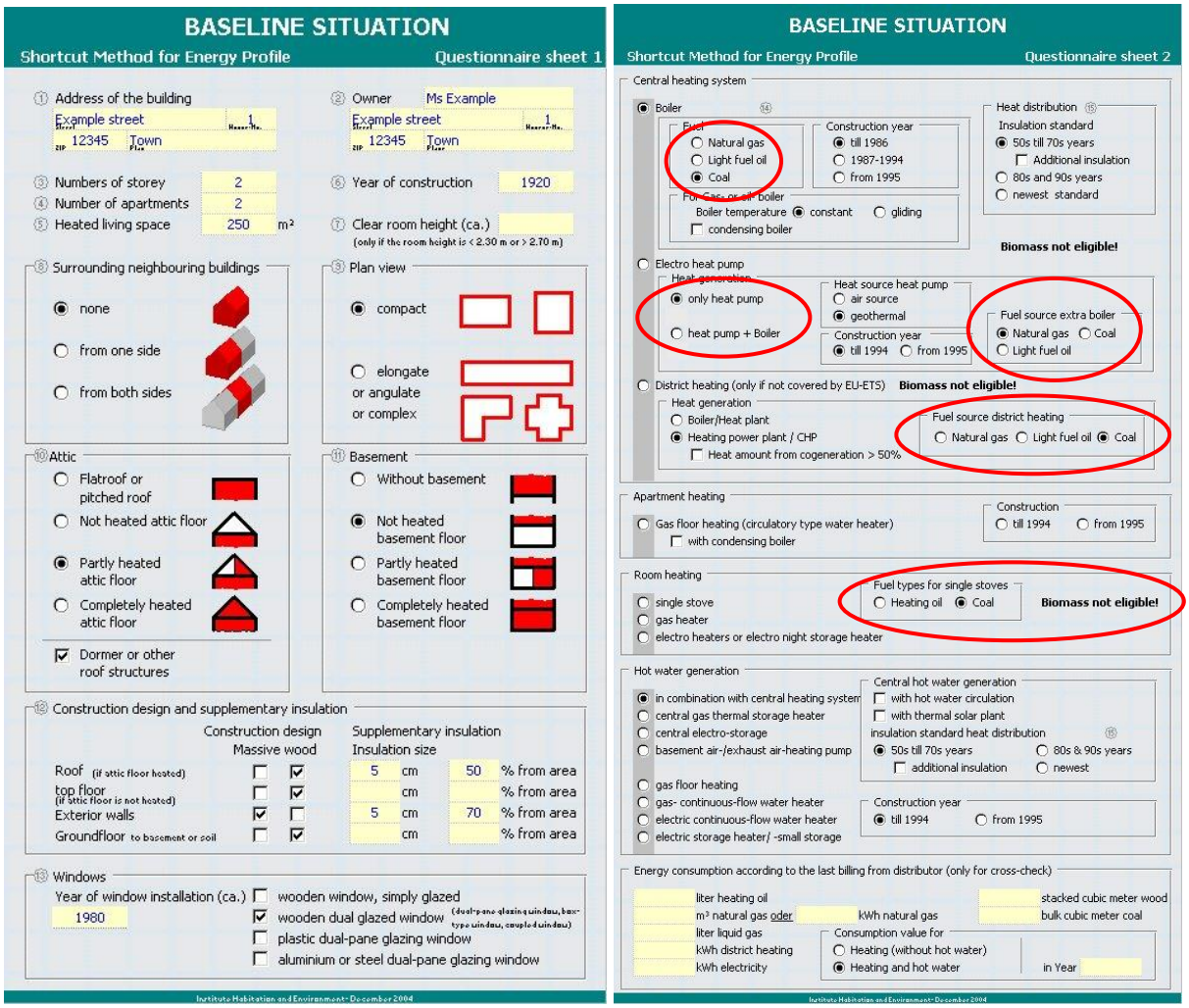


Figure 4: Questionnaire sheet 1 and 2 for the baseline situation with indication of adjustments

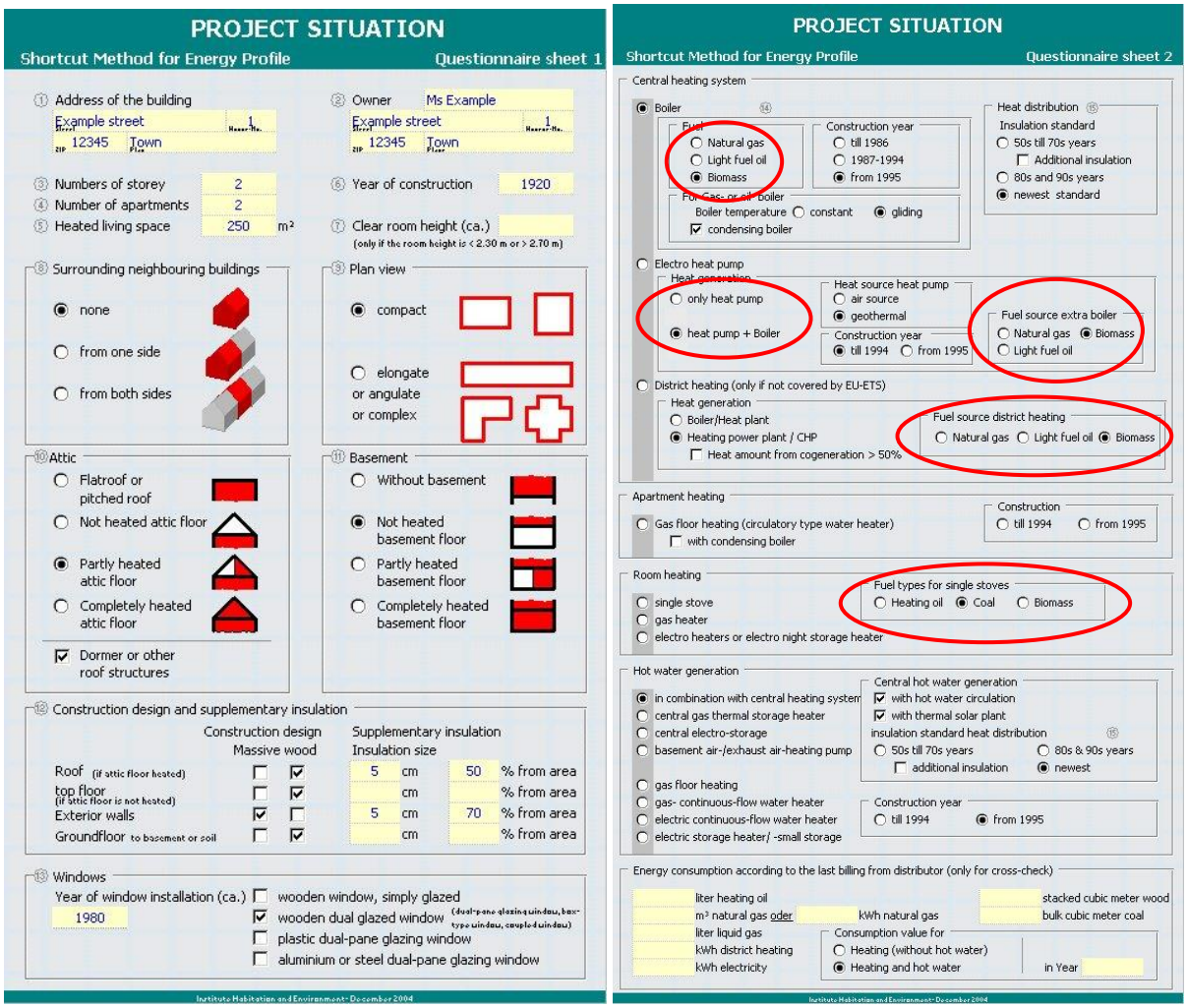


Figure 5: Questionnaire sheet 1 and 2 for the project situation with indication of adjustments

Annex 5

Part I: Additional information sheet for credit line

Information on the participant

Target group:

- ☐ Household/residential building
- ☐ Public building (e.g. schools, hospitals)
- ☐ Micro business (e.g. small, private hotels)
- ☐ Small and medium enterprise
- ☐ Large enterprises,
- ☐ Other (please specify)……

Name/Company/Facility/Institution:

_____

Street: _____

Postcode & Town: _____

Responsible Person:

First name, surname: _____

Position: _____

Fax: _____

Tel: _____

E-mail: _____

Information on the situation before implementation

Option A: for family houses:

1. For information on the building please see sheet 1 of calculation tool (Annex 4

2. For information on the heating system please see sheet 2 of calculation tool (Annex 4)

Option B: for other buildings:

3. Fuel source of old installation: _____

4. "building's energy audit sheet" submitted:

☐ No ☐ Yes

for all participants:

5. Further information on the heating system:

a. commissioning date of the boiler _____

b. Authorisation status: Installation under Regulation of the Council of Ministers of July 16, 2002 (OJ No 120, item 1269 with amds.):[65]

Does the installation have an operation permit from the UDT-Inspection Body regarding technical inspection?

☐ No ☐ Yes

Does the installation have to be replaced or modernised according to requirements, which result from this technical inspection?

☐ No ☐ Yes

c. District heating ☐ No (go to 6.) ☐ Yes (then continue)

Is the installation connected to a EU-ETS installation?

☐ No ☐ Yes

[65] In case of boiler replacement it will be checked that the installation has an operation permit available. In this case replacement of boilers is not legally required, and it is assumed that the expected lifetime of the boilers will be longer than the duration of the crediting period.

Fuel source of district heating system?

☐ Biomass ☐ Other, specify _____

Information on situation after implementation

Option A: for family houses:

6. For information on the building please see sheet 1 of calculation tool (Annex 4)

7. For information on the heating system please see sheet 2 of calculation tool (Annex 4)

Option B: for other buildings:

8. Fuel source of new installation: _____

9. "building's energy audit" submitted:

☐ No ☐ Yes

for all participants:

10. Further information on the heating system:

a. District heating ☐ No (go to agreement.) ☐ Yes (then continue)

Is the installation connected to a EU-ETS installation?

☐ No ☐ Yes

Fuel source of district heating system?

☐ Biomass ☐ Other, specify _____

b. Usage of any public subsidies?

☐ No ☐ Yes, please specify: _____

Part II: Supplementary Statement of End User to Credit Contract

As a participant in this programme, I agree

- to report the data of the building and heating system to BOŚ Bank at registration.
- to report the date of the implementation to BOŚ Bank.
-
- to make the generated emission reductions from the programme available to BOŚ Bank and not to take into account the generated emission reductions within other projects.
- not to use the replaced boiler in another activity and confirm that the replaced boiler is dismantled and if applicable, duly disposed [66]
-
- that an on-site visit and a proof of my data can take place by an independent entity during my participation in this programme.

Furthermore, I confirm that:

- I am neither registered as a JPoA participant nor included in another registered Joint Programme of Activities (programmatic JI-Project);
- Further operation of the existing installation/construction under legal and technical aspects is ensured (e.g. the installation is still in operation until the date of the replacement);
- I am not registered as a participant in a Joint Implementation Project;

[66] In case of on site visit from the auditor, a proof shall be available.

Basic Terms of the Agreement

Contracting Parties to End User Agreement	Carbon Organizer; and individual End User
Voluntary Participation	The End User shall confirm that it fully understands the nature and scope of the Programme and agrees that the Equipment be included as GHG Reduction activity under the Programme.
Obligations/Undertakings of End User	• The End User will at all times operate and maintain with due diligence and efficiency the Unit and the Equipment in compliance with applicable law, regulations and usual and prudent standards, including, without limitation, in conformity with appropriate health, building, safety and environmental practices and policies and other applicable or advisable requirements. • The End User will provide, as may be reasonably requested by the Carbon Organizer, access to the premises in which the Equipment is located for the purpose of periodic monitoring of maintenance of equipment, technical adjustements, and any other technical visit that may be required as a result of the nature of the Programme. • The End User will inform the Carbon Organizer promptly upon becoming aware, of any situation that may affect or have affected the regular operation of the Equipment.
Representations and Warranties of End User	• All consents, authorizations, registrations, filings, licences, permits (including Environmental Permit), approvals, authorities, processes and exemptions (including, without limitation, any building law and related to health and safety, Environmental Law and Poland JI Rules) from, by or with each Relevant Competent Authority required or advisable for (a) the execution and implementation of the End User Agreement and the performance of the End User's obligations under the End User Agreement, (b) the conduct of the End User's business and (c) the implementation, operation, monitoring and maintenance of the relevant JPA, Unit and Equipment have been obtained and is in full force and effect. • The End User has not sold any GHG Reductions generated to any third party other than the Carbon Organizer.
Title to Carbon Reductions	Any and all title, rights and claims in and to any GHG Reductions generated by the Programme, including its JPAs, arising from the Equipment and/or the use of the Equipment, will be fully and irrevocably transferred to the Carbon Organizer and be held by the Carbon Organizer at its full discretion and free of any rights of any kind whatsoever of the End User. The End User will irrevocably waive all rights in any and all GHG Reductions.
Cooperation between the End User and the Carbon Organizer	The End User and the Carbon Organizer will fully cooperate in order to obtain all approvals for the Programme, and with ANE or AIE, as the case may be, to ensure proper Verification of the GHG Reductions, and

	the Delivery of the ERUs.
Liability	The End User is liable to pay liquidated damages for any loss, fall-out or malfunctioning of the Equipment attributable to his fault or negligence. In addition, the End User is also liable to pay liquidated damages for any breach of any of the obligations set forth in the End User Agreement. It has to be clarified that the End User Agreement neither constitutes nor be deemed to constitute any right or claim of the End User towards the Carbon Acquirer. The Carbon Organizer is the sole contracting party under the End User Agreement. The End User does not acquire any rights or claims of any kind whatsoever against the Carbon Acquirer.

For the avoidance of doubt, the Carbon Organizer shall remain fully and primarily responsible for due performance of and compliance with any of its obligations in connection with the development, implementation, operation, monitoring and maintenance of the Programme as set forth in the Contract. The Carbon Acquirer does not assume any obligation whatsoever related thereto.

The duration of this contract starts with commissioning of my installation and ends by 31/12/2012 or in case of prolongation of credits generation period ends at the date of programme cessation defined in LoA but not longer that the whole crediting period. This supplementary agreement will expire automatically in case of cancellation of the contract with the BOŚ bank and therefore the claim for payment of the eco bonus for the rest of the original contract duration expires as well.

_____ _____

Signature of the JPoA participant Date

Annex 6

Emission Reduction Estimations

The estimated emission reductions are based on the assumptions made during development of the PIN that has been sent to the DFP for obtaining a LoE[67].

The number of new one family building for the crediting period is estimated to be 500 and for multi family building it would be 600.

The average emission reduction units per year and building have been estimated based on research on technology specific reduction potentials for one and multi family buildings[68].

Table 29: Emission reductions pro measure[69]

	One family	Multi family	Realization rate
ERU p.a/insulation	4.3	51.9	0.9
ERU p.a/boiler	7	85	0.9
ERU p.a./solar	0.8	0	0.1
ERU p.a./heat pump	12.2	148.3	0.1
ERU p.a./building type	11.47	138.04	

Number of one family building	500
Number of multi family buildings	600
ERU p.a./average building	80.51

In order to keep the emission reduction scenario as conservative as possible, the emission reductions for every following year are for only 6 months of the year.

Table 30: ERUs for the period 2010-2012

Year	New buildings	Buildings cum	ERUs
2010	200	200	8,051
2011	400	600	32,203
2012	500	1,100	68,432
Sum for the crediting period			**108,686**

[67] PIN "JIPoA_BOS_PIN_Buildings_2009-05-29"

[68] Annex II to PIN "AnnexII_PIN_Buildings_2009-05-29"

[69] Annex II to PIN "AnnexII_PIN_Buildings_2009-05-29"

2010-2012			

Table 31: ERUs for the period 2013-2020

Year	New buildings	Buildings cum	ERUs
2013	0	1,100	88,559
2014	0	1,100	88, 559
2015	0	1,100	88, 559
2016	0	1,100	88, 559
2017	0	1,100	88, 559
2018	0	1,100	88,559
2019	0	1,100	88, 559
2020	0	1,100	88, 599
Sum for the crediting period 2013-2020			**708,472**

Table 32: Overview of ERUs for the period 2010-2020

Year	New buildings	Buildings cum	ERUs
2010	200	200	8,051
2011	400	600	32,203
2012	500	1,100	68,432
Sum for the crediting period 2010-2012			**108,686**
2013	0	1,100	88,559
2014	0	1,100	88, 559
2015	0	1,100	88, 559
2016	0	1,100	88, 559
2017	0	1,100	88, 559
2018	0	1,100	88,559
2019	0	1,100	88, 559
2020	0	1,100	88, 599
Sum for the crediting period 2013-2020			**708,472**
Total sum 2010-2020			**817,158**

Annex 7

Energy audits – summary of the ordinance

The ordinance of the Minister of the Infrastructure of 17 march 2009 (OJ No 43, item 346) on the detailed scope and form of the energy audit and renovation audit, template of the audit cards and the formula of the thermo- modernization undertaking profitability assessment.

The main idea of the regulation is to assure:

- the correctness of energy audit performance and
- selection of the most optimal variations of the thermo-modernization undertaking

I Detailed scope of the energy audit that applies to the building:

This section of the audit consists of the following items:

1) Title page, where the general information on the: investor, the address of the building and information on auditor who performs the audit are included,
2) Energy audit card that contains: general information on the building, its energetic parameters, and listing of audit outcomes (before and after implementation of the investment),
3) List of documentation and core data used by the auditor when performing the audit as well as specification of investor's guidelines and comments that constitute improvements barrier including: the volume of investors funds assigned to cover the expenditures related to the investment and the volume of credit line available for the investor,
4) Technical and constructional stocktaking/inventory of the building including as follows:
    a) General technical data – description of the construction, technology and the system, essential indexes describing surface and cubature, average height of the storey, shape factor,
    b) At least simplified technical documentation including: horizontal projections of the building with dilatations and cardinal points marked,
    c) Technical description of essential elements of the building particularly: external walls, roof, ceilings, basement walls, windows and glass and transparent partitions, doors,
    d) Energy characteristic of the building including data on heat volume contracted, heat demand, heat use, the volume of tariffs and charges,
    e) Characteristic of heat unit/system including efficiency of the heating system (including efficiency of its components), unit description, its parameters, radiators, for building which underwent the modernization of heating system after year 1984 – description of the modernization.
    f) Characteristic of hot water installation including the type of the installation, metering and insulation of risers,
    g) Characteristic of boiler room or hot water terminal,
    h) Characteristic of ventilation system including its type,
    i) Characteristic of gas supply installation and discharge stacks when stacks may influence the improvement of thermo-modernization undertaking,
    j) Characteristic of electric installation it may influence the improvement of thermo-modernization undertaking,
5) Evaluation of technical condition of the building in the scope that is essential when indicating the appropriate improvements and thermo-modernization undertakings

6) Listing of indicated types of improvements and undertakings made accordingly with the profitability assessment algorithm.
7) Documentation of:
   - realization of the optimization peaces of the profitability assessment *algorithm*,
   - selection of the most optimal scenario of the thermo-modernization undertaking including cost calculation,
8) Technical description, essential outlines/plans, estimation of construction work within the undertaking,

Optimization paces of the abovementioned algorithm:

1) Pace 1 - Indication of the thermo-modernization improvements types aiming at decreasing of the heat demand used for:
- covering heat losses through walls and heating/warming up of the ventilation air,
- preparation of use hot water,
2) Pace 2
   - Selection of the optimal improvement and thermo-modernization scenario from the abovementioned options according to the methodology described **in Annex 1, section 3,points 1 & 2** of the ordinance,
   - Listing of selected improvements and thermo-modernization scenarios in increasing volume of SPBT order - according to the formula defined **in table 1, Section 2 , Annex 1** of the ordinance
3) Pace 3
   - Selection of the optimal thermo-modernization undertaking scenario that effects on improvement of the heating system according to the methodology described in **Annex 1, section 3, item 3** of the ordinance
   - Listing of the improvements scenarios according to the scheme described in **table 2 of Annex 1, section 2** of the ordinance**,**
4) Pace 4
   - Selection of the optimal thermo-modernization undertaking scenario that meets legal requirements defined in the act on supporting thermo-modernization and rehabilitation undertakings and investors financial capabilities

II Detailed scope of the energy audit that applies to the heating system

This section is divided into two subsections. One is dedicated to the local heating system placed outside the building or to the heating system supplying more than one building. Second subsection is dedicated to the local heat distribution system placed in the building.

Subsection 1 Audit dedicated to the local heating system placed outside the building or to the heating system supplying more than one building

This section of the audit consists of the following items:

1) Title page, where the general information on the: investor, address of the heating source its type and year of construction and auditor who performs the audit are included,

2) Energy audit card that contains: general constructional characteristics of the local heating system, its energetic parameters and listing of the audit outcomes (before and after implementation of the investment)
3) Listing of the documentation and core data used by the auditor when performing the audit as well as specification of investor's guidelines and comments that constitute improvements barrier including: the volume of investors funds assigned to cover the expenditures related to the investment and the volume of credit line available for the investor,
4) Technical and constructional stocktaking/inventory of the heating system including as follows:
   a) Technical characteristics consisting of – the type of the local heating system, number of heat generating or transforming units, their nominal parameters, type and parameters of fuel used, type and parameters of the heater (e.g. water), technical diagram along with specification of units, fittings(armature) and pipelines (before ,
   b) Technical characteristics of local heating source installation including: boilers, pipelines, pumps, monitoring and metering devices, setting/controlling devices, exhaust gas purifiers, flue, ash remover, fuel supplying device,
   c) Characteristics of the building where the local heating system is placed,
   d) Heat balance of the local heating system,
5) Evaluation of technical condition of the heating installation and the building in the scope that is essential when indicating the appropriate improvements and thermo-modernization undertakings.
6) Documentation of:
   - realization of the optimization peaces of the profitability assessment *algorithm*,
   - selection of the most optimal scenario of the thermo-modernization undertaking including cost calculation,
7) Technical description, essential outlines/plans, estimation of constructionwork within the undertaking

Optimization paces of the abovementioned algorithm

1) Pace I – Indication of the thermo-modernization improvements types,
2) Pace II – calculation of investment costs of improvements indicated under Pace I,
3) Pace III
   – calculation of heat balance concerning the indicated improvements accordingly to the methodology described in section 2, of Annex 2,
   – calculation of ecological effects i.e. decreasing of primary energy loses,
4) Pace IV
   – Calculation of heat generation costs,
   – Calculation of economic effects,
5) Pace V Selection of the optimal thermo-modernization that meets legal requirements defined in the act on supporting thermo-modernization and rehabilitation undertakings and investors financial capabilities

Subsection 2 dedicated to the heat distribution system placed in the building

This section of the audit consists of the following items:

1) Title page, where the general information on the: investor, address of the heating system its type and year of construction and auditor who performs the audit are included,

2) Energy audit card that contains: general constructional characteristics of the local heat distribution system, its energetic parameters and listing of the audit outcomes (before and after implementation of the investment)
3) Listing of the documentation and core data used by the auditor when performing the audit as well as specification of investor's guidelines and comments that constitute improvements barrier including: the volume of investors funds assigned to cover the expenditures related to the investment and the volume of credit line available for the investor,
4) Technical and constructional stocktaking/inventory of the heating system including as follows:

– detailed constructional characteristics of installation,
– type and parameters of the heater (steam, water)
– technological diagram of the heating installation including technical specification of units, fittings (armature) and pipelines,
– calculation of total heat losses in local heating system using metering devices or methodology described in **section 3 of Annex 3** of the ordinance

5) Evaluation of technical condition of the heating installation and the building in the scope that is essential when indicating the appropriate improvements and thermo-modernization undertakings.
6) Documentation of:
   - realization of the optimization peaces of the profitability assessment *algorithm*,
   - selection of the most optimal scenario of the thermo-modernization undertaking including cost calculation,
7) Technical description, essential outlines/plans, estimation of construction work within the undertaking

Optimization paces of the abovementioned algorithm

1) Pace I – Indication of the thermo-modernization improvements types concerning the heating intallation,
2) Pace II – calculation of investment costs of improvements indicated under Pace I,
3) Pace III
   – calculation of total heat losses from local heating system accordingly to the methodology described in **Table 1, section 2, of Annex 3** of the ordinance heat losses from and heating installation,
   – calculation of energetic effects of thermo-modernization undertaking accordingly to the methodology described in **section 3 of Annex3** of the ordinance,
4) Pace IV – calculation of economic effects i.e. total costs of heat distribution before improvements implementation – total costs of heat distribution after the investment,
5) Pace V – listing of thermo-modernization improvements in increasing SPBT order,
6) Pace VI – selection of the optimal thermo-modernization undertaking that meets legal requirements defined in the act on supporting thermo-modernization and rehabilitation undertakings and investors financial capabilities

We will require to use subsections 1 & 2 when performing energy audit for residential buildings with boiler-room.